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Preface

This report covers the activities of the Centre during 1998-99. This was a year of consolidation. Plans for office building and staff quarters were initiated and the Ninth Five Year Plan proposals were finalised. Major renovation of existing office building had to be undertaken. During the year proposals under NATP were also approved and initiated. The Centre has started playing a leading role in Council's initiative on research prioritisation.

As the Centre's research programmes proceed on course, participation of scientists in policy dialogues and professional bodies was further intensified. The Centre also initiated some projects in collaboration with national and international institutions. Human resource development programmes have also been planned and are being implemented. Substantive work has also been started with economists working in ICAR institutes and state agricultural universities.

Dr. P. Adhiguru has compiled this report with the help of Ms. Umeeta Ahuja. Mr. Anil Kumar has helped in preparation of Hindi computer-script. I am thankful to them and other colleagues who have all contributed to this effort.

March, 1999
New Delhi

Dayanatha Jha
Director

ANNUAL REPORT 1998-99

Executive Summary

The National Centre for Agricultural Economics and Policy Research (NCAP) was established by Indian Council of Agricultural Research (ICAR) in March 1991. The Centre is located at the campus of the Indian Agricultural Statistics Research Institute (IASRI), a sister institute of ICAR and is adjacent to the Indian Agricultural Research Institute (IARI), a premier research institute in the country. The Centre has at present twenty scientists, and sixteen other staff. It had a total budget of Rs. 119.75 lakhs for the year 1998-99.

The Centre is guided in its policies by a high-level Research Advisory Committee (RAC) comprising mostly of eminent professionals outside the system. Dr. S.S. Johl is the current Chairman. The Centre also has a Management Committee (MC). A number of internal committees, such as Staff Research Council, Budget and Policy Committee, Official Language Committee, Consultancy Processing Cell, Grievance Cell, Women Cell, Institute Joint Council etc. have been constituted for decentralised management.

Research programmes are underway in each major thrust area viz. technology policy; sustainability of agriculture; supply demand and markets; institutional change; and agricultural growth and adjustment. This section summarises the salient findings of completed studies.

A study was undertaken to estimate the contribution of technical change to the growth of livestock output in the country. Aggregate indices of livestock output and inputs were constructed. TFP growth was computed as the difference between output and input growth rates. The study revealed that the livestock sectoral output grew at 2.59 percent per annum over 1950-51 to 1995-96. The input index increased by 1.79 percent per annum and TFP grew at about 0.8 percent. There was no TFP growth in the first period (1950-51 to 1970-71) suggesting no technical change. The real upswing started in the eighties when sectoral output growth touched nearly 4 percent per annum and TFP growth jumped to nearly 1.8percent (Table 1), contributing about 45 percent to total output growth. Backed by an improved market and institutional environment, investments in livestock research have begun to pay off.

To identify what would drive the future growth in livestock production, another study was undertaken with Karnataka's livestock sector as a case. About two third of the growth in cattle milk production and half of the growth in buffalo milk production is accounted for by productivity and this contribution has been rising over time. Rapid shift in herd structure in favour of high milk yielding species and improved feed fodder supplies and animal health services would facilitate future growth. Meat production increased at an annual rate of more than 9 percent. However, growth in meat output of almost all the species is on account of increase in slaughter rates. Growth in egg production is also largely due to increase in population of layers. Future growth in egg production would come from a shift in layer population in favour of improved layer and intensive system of poultry production.

A study was undertaken to examine the level and pattern of energy use and its efficiency in soybean based cropping system of Madhya Pradesh using farm level data. Soybean and wheat are the two most important crops in the soybean belt. Wheat is the most energy intensive crop (13980 mega joules per ha). Chickpea, which competes with wheat, requires about half of the energy used in wheat cultivation. Commercial sources of energy account for more than 90 percent of the energy used in cultivation of these crops. Soybean, the Kharif season crop grown largely under rained conditions consumes 7142.5 mega joules per ha of which about 77 percent comes from commercial sources. Maize, sorghum and blackgram compete with soybean and require one-third of the energy used in soybean cultivation. These crops largely derive their energy requirements from non-commercial sources. The findings indicated that technologies such as integrated nutrient management, integrated pest management, etc. should be scaled up as to conserve commercial non-renewable energy whilst maintaining profitability of agriculture.

An inter-institutional collaborative research project on the economics of sorghum utilization in seven districts from the states of Maharashtra, Karnataka and Andhra Pradesh indicated that sorghum forms the main staple, constituting more, than half of the total cereal consumption in majority of sample districts. In rabi districts, sorghum consumption formed 55% of the total cereal consumption, followed by wheat (20%) and bajra (12%). In the kharif districts, consumption of sorghum formed 58% of total cereal consumption, followed by wheat (30%) and rice (11%). Sorghum is not the most important staple diet in Mahabubnagar. Here the consumption of rice accounts for half of the total cereal consumption thereby relegating sorghum to second position.

Rice-wheat based cropping system which covers about 10 million ha in the Indo-Gangetic plain of India is now showing multiple problems. To confirm these issues, a study was conducted to estimate the total factor productivity of rice-wheat based cropping systems, and examine the role of legumes in improving the sustainability of soil and water resources. The study used the secondary data from states, namely Bihar, Haryana, Punjab, Uttar Pradesh and West Bengal from 1976 to 1992. Results indicated that the annual growth in TFP which was about 3% during 1978-85period reduced to (-) 0.4% during 1985-92 period in the Indo-Gangetic plain of India. In the later period the growth rate in output was completely contributed by higher levels of inputs. Further, analyses indicated that the effect of legume area on TFP was positive and highly significant. The results clearly suggested that legumes are critical for the growth in productivity and for sustainability of the rice-wheat based cropping system.

Irrigation development in the past was not specifically targeted towards desired multiple impacts. Equity impacts of irrigation water distribution in India is empirically analysed at national level covering different decades. Results of this study showed that major source for reducing the inequality in the distribution - of irrigation facilities lies within the state level distribution of irrigation services across farm sizes rather than from balanced irrigation development across states. Increasing role of states in promoting the equity impacts of irrigation expansion across farm sizes is emphasised. Comprehensive modelling of irrigation systems is a pre-requisite to conduct ex-ante evaluation of policy intervention options for promoting equity in the sharing of irrigation benefits across farm sizes.

An empirical analysis for supply responsiveness in India's rainfed agriculture reveals that return from a crop relative to other crops plays significant role in affecting supply in the case of all the crops. Since, arithmetically, profitability depends as much on prices as on yield, the role of productivity in boosting output needs to be properly appreciated. In subsistence agriculture the impact of productivity improvement may be stronger than the prices because productivity change influences expectations in a more visible manner while price changes are only perceived vaguely. The results of the study show that relative crop returns are a strong motivation for the farmers in rainfed region to increase supply by increasing area or yield or both.

A study on review of trade policies shows clear positive impact on export of non-basmati rice, marine products and oilmeal. There were some relaxations like abolition of minimum export price, decanalisation, removal of bans and quotas for these commodities, particularly rice, which have contributed to the emergence of non-basmati rice as an important export item. Total agricultural exports were around $3000 million at the beginning of economic reforms period. In a short span of 3-4 years the export earnings became more-than double. This is a clear indication that the indirect effect of trade liberalisation, exchange rate adjustments and effects of relaxation in government controls and restrictions on agricultural exports is positive and significant. Among all agricultural commodities, oilseeds comprise the largest share in imports in most of the years during the last decade. This is happening despite a spurt in edible oilseed output in the recent years. Nearly half of the agricultural imports consist of fertilizer imports in most of the years. For the success of external liberalization, internal liberalization is said to be essential. External liberalization may not produce full impact if domestic reforms by way of removal of excessive and unnecessary government controls are not undertaken.

In another study, a comprehensive data series has been constructed for the country and states which include investments made in irrigation, rural roads, rural electrification, storage, marketing, agricultural research and education, . land development, cooperation, etc. This series will be useful for further research on growth and development of Indian agriculture. The data show a. consistent decline since mid seventies in all states. This does not auger welt for future growth and this study points to the need for a critical reappraisal of public expenditure and investments to address this distortion.

Two Policy Papers and two Policy Briefs, three workshop proceedings and three PME notes have been published during the year 1998-99. Centre staff have also been involved in a number of professional and policy-level interactions.

Other significant achievements during the year under report include finalisation and approval of Ninth Five Year proposals, approval and initiation of activities proposed under NATP, rigorous and intensive dialogue and training in research prioritisation and diagnostic surveys, planning for a network of agricultural economists, renovation of office building, and strengthening of LAN at the Centre.

I Introduction

The National Centre for Agricultural Economics and Policy Research (NCAP) was established by Indian Council of Agricultural Research (ICAR) in March 1991, to strengthen agricultural economics research in the national agricultural research system comprising ICAR, its affiliated institutions and state agricultural universities (SAUs). The mandate of the Centre includes:

- Policy oriented research on: (i) technology generation, diffusion and impact; (ii) sustainable agricultural production systems; (iii) interaction between technology and other policy instruments like incentives, investments, institutions, trade, etc; and (iv) agricultural growth and adjustments.
- Strengthen agricultural economics research and teaching capability in state agricultural universities and ICAR institutes.
- Enhance ICAR participation in agricultural policy decisions through policy-oriented research and professional interactions.

Location

The Centre is located at the campus of the Indian Agricultural Statistics Research Institute (IASRI), a sister institute of ICAR, and is adjacent to the Indian Agricultural Research Institute (IARI), a premier research institute in the country. This offers locational advantage to the Centre in terms of opportunities for inter-disciplinary interaction as well as access to library, computational and other infrastructural facilities available at these institutes.

Faculty

The Centre has at present twenty scientists. This includes the Director, one National Fellow, four Principal Scientists, four Senior Scientists and ten Scientists.

Management

A high-powered Research Advisory Committee (RAC) comprising mostly of eminent professionals outside the system guides the Centre in its policies.

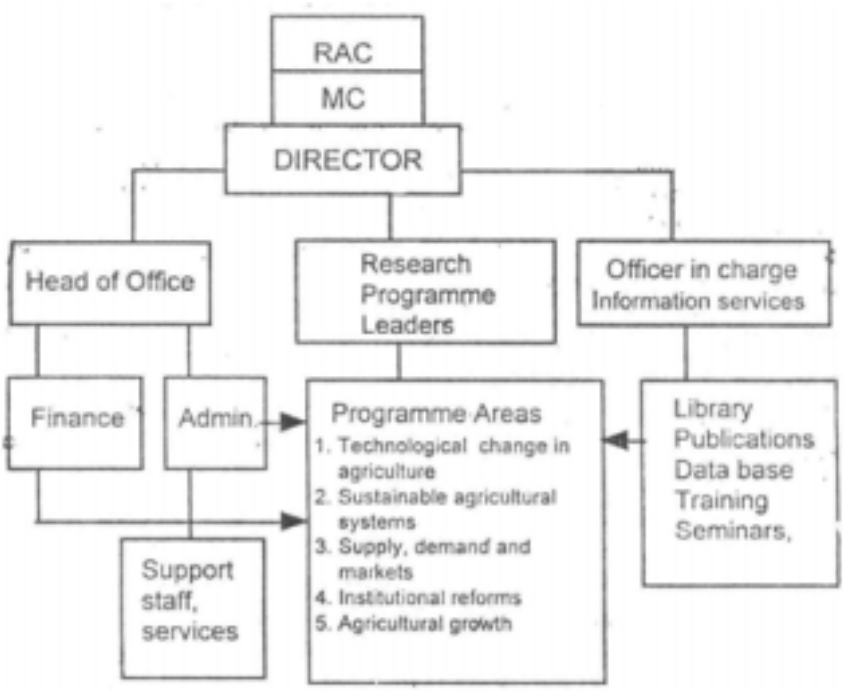
Prof. Y.K. Alagh, former Minister of State for Power and Science and Technology, Government of India and presently Member of Parliament (Rajya Sabha) was the first Chairman of RAC. Currently, the Chairmanship is held by Prof. S.S.Johl an eminent agricultural economist. Planning, research thrusts and strategies, initiatives in human resource development, approaches to improve policy dialogues and evaluation, are being guided by the RAC.

The Centre is supervised by the Management Committee (MC), as constituted and mandated by the Council. A number of internal committees, such as Staff Research Council, Budget and Policy Committee, Computers Committee, Official Language Committee, Library Committee, Publications Committee, Consultancy processing Cell, Grievance Cell and Women Cell have been constituted for decentralised management. The Institute Joint Council promotes healthy interaction and proper work environment.

Organogram

The organogram of the Centre is given in Fig. 1.

Fig. 1: Organogram of National Centre for Agricultural Economics and Policy Research (NCAP)



II Research Achievements

Research achievements during the year under the major programme areas of NCAP are given below.

TECHNOLOGICAL CHANGE

Total Factor Productivity in Livestock Sector
Anjani Kumar and U.K Pandey

The livestock sector has. recorded impressive gains in recent years. Its share in agricultural GDP has risen from about 17 percent in 1980-81 to 26 percent in 1996-97. It is important to know how this growth has come about. A study was undertaken to estimate the contribution of technical change to the growth of livestock output in the country. There is a long tradition of livestock research covering animal health, nutrition, breeding, and management. Aggregate indices of livestock output (milk and milk products, meat and meat products, eggs and poultry meat, hides and skin, wool and hair, draught power, dung) and inputs (numbers, feed, and labour) were constructed using secondary statistics from various sources and new estimates. TFP growth was computed as the difference between output and input growth rates.

The study revealed that the livestock sectoral output grew at 2.59 percent per annum over 1950-51 to 1995-96 (Fig. 2 and Table 1). The input index

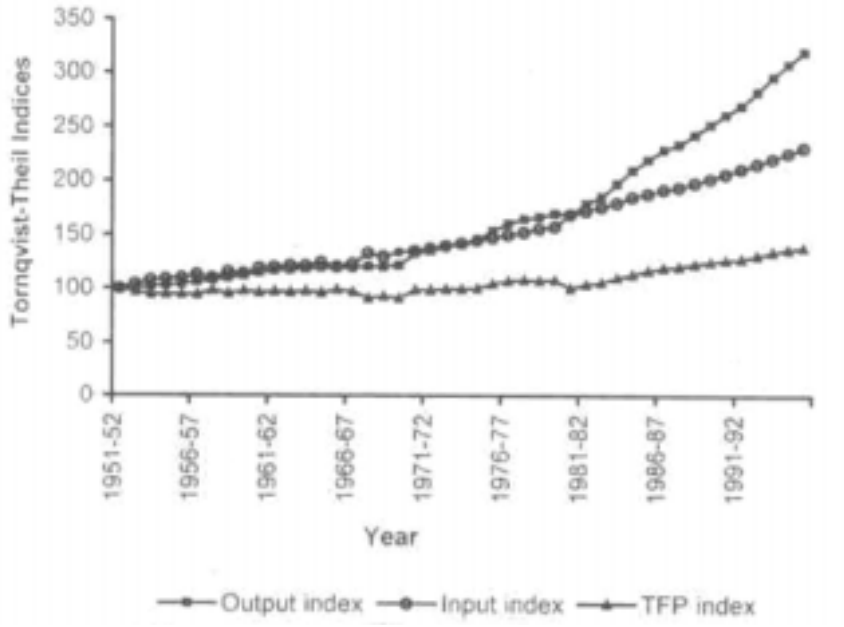
Table 1:
Total factor productivity changes in livestock sector in India

Item	Annual Growth rates (%)			
	1950/51 to 1995/96	1950/51 to 1970/71	1970/71 to 1980/81	1980/81 to 1995/96
Output	2.59	1.28	2.80	3.98
Inputs	1.79	1.32	1.87	2.19
TFP	0.81	-0.04	0.93	1.79

increased by 1.79 percent per annum and TFP grew at about 0.8 percent, implying that technical change contributed about 30 percent to overall output growth over the last 45 years. Period-wise results were more revealing.

There was no TFP growth in the first period (1950-51 to 1970-71) suggesting no technical change. Output growth proceeded along the traditional production function and was entirely driven by growth in measured inputs. Not surprisingly, the resulting growth in output was a modest 1.3 percent per annum. There was a sharp up-trend since then. Output as well as TFP growth picked up. The results show that the real upswing started in the eighties when sectoral output growth touched nearly 4 percent per annum and TFP growth jumped to nearly 1.8 percent (Table 1), contributing about 45 percent to total output growth. Backed by an improved market and institutional environment, investments in livestock research have begun to pay off.

Fig. 2: Trend in input, output and TFP indices in Indian livestock sector (1951-1995)



Sources of Growth in Livestock Production
Pratap S. Birthal and A. Ravishankar

The demand for livestock products is income elastic, and sustained rise in per capita income and changing lifestyles are driving rapid growth. On the supply side, different livestock outputs have been growing at annual rates of 4-7 percent. However, given the current production environment it is ambiguous whether these production trends would be sustained in the long run. To identify what would drive the future growth in livestock production, a study was undertaken with Karnataka's livestock sector as a case.

Milk production in the state has grown at a steady rate of about 5 percent per annum during the period 1975-96.The herd structure is gradually changing in favour of crossbred cattle and buffalo. About two-third of the growth in cattle milk production and half of the growth in buffalo milk production is accounted for by productivity (Table 2) and this contribution has been rising over time'. Livestock population would come under pressure due to feed fodder scarcity. The future growth would have to be productivity driven. Rapid shift in herd structure in favour of high milk yielding species and improved feed fodder supplies and animal health services would facilitate this.

Table 2:
Contribution of productivity to livestock output growth in Karnataka (%)

Output	1976-77 to 1986-87	1987-88 to 1995-96	1976-77 to 1995-96
Milk			
Cattle	57.3	80.8	65.3
Buffalo	36.3	68.6	50.0
Meat			
Cattle	-24.1	7.3	-9.5
Buffalo	-58.6	4.9	-6.7
Sheep	-1.9	-3.8	-2.3
Goat	8.9	8.1	8.7
Pig	26.8	1.5	11.5
Wool	88.1	12.6	65.4
Egg	21.6	10.2	19.4

Note: The data on meat production are for the period 1978-79 to 1995-96.

Meat production increased at an annual rate of more than 9 percent. Sheep and goats are the main suppliers of meat in the state. However, growth in meat output of almost all the species is on account of increase in slaughter rates Given the quantitative and qualitative deterioration in common property grazing lands in the state, which largely sustain the sheep and goat population, it is doubtful whether the number-driven growth in meat production would be sustained in the long run. In the short run, improved nutrition and health care might increase the meat production. To sustain the growth in the long run, small ruminant breeding policy has to be reconsidered. Further, slaughter rates of cattle and buffalo are low mainly due to socio-politico-religious factors. Slaughtering of cattle is banned and it is mainly the unproductive and infertile animals that find the way to slaughterhouses. In case of buffalo, male cattle are slaughtered at a very young age leading to a loss in potential meat production. Nevertheless there exists a potential for increasing the cattle and buffalo meat production for export. This demands policy intervention and public awareness.

Apart from meat production, sheep are raised for wool also. About two-third of the growth in wool production is due to improvements in wool productivity. However, the contribution of productivity to output growth has decelerated sharply. This is probably due to changes in priorities in sheep rearing in favour of meat. The future growth would largely be influenced by relative prices of wool and meat.

Growth in egg production is largely due to increase in population of layers. *Desi layers* dominate the flock and the share of improved poultry has been stagnating around 30 percent. Future growth in egg production would come from a shift in layer population in favour of improved layer and intensive system of poultry production.

Socio-economic Issues in Equine Husbandry
Pro top S. Birthal, S.N. Arya and Yash P. Sharma

Mules and donkeys are important draught animals. Their services are utilised in a variety of activities. These animals are maintained by poor rural households belonging to socially backward communities, mainly potters, who use these animals in their ancestral occupation of pottery. In order to understand the

role of mules and donkeys in livelihood support of poor, and their husbandry practices, a survey was undertaken in Haryana and Delhi.

Demand for draught services of mules and donkeys arise mainly from brick kilns where these are used to transport raw bricks from moulding sites to the kilns. Therefore, most of the equine owners migrate to brick kilns on contractual employment. The wages are institutionally fixed, but are rarely adhered to. Equines are engaged for about 20 standard days a month. The average earnings of a worker are about Rs. 100 per day, which is barely sufficient to support livelihood. In fact, these households pre-dominantly depend on equines for their livelihood support

Mule is preferred by most of the households because of its higher work efficiency. Accordingly, it gets preferential treatment in health care and feeding over donkeys. Donkeys are maintained both for work and breeding. Equine breeding and health services at the field level are rarely available at most of the veterinary centres mainly because these animals are not considered to be important by the concerned departments. Thus, from the research perspective, conservation of germplasm and systematic breeding of donkeys and mules should be accorded the top priority in equine husbandry.

Further the institutional support to equine husbandry is seriously lacking. An overwhelming majority of equine owners rarely avail any institutional credit facility for acquisition of animals or animal drawn equipment. This has resulted in increased dependence of equine owners on their employers for credit. Such arrangements generally result in unfavourable terms and conditions to equine owners. Another related institutional aspect is the animal insurance that merits consideration in view of the general poverty of equine owners. The species like mules and ponies are very costly. In case of death or theft, the owner is doomed to starve. These institutions can play important role in promotion of equine husbandry and welfare of those engaged in it.

Lack of local opportunities for employment of equine labour, decline in demand for traditional pottery, deterioration in common grazing lands, etc. are forcing many to give up equine husbandry. The demand for mules and donkeys is a function of expansion of construction sectors mainly brick kilns. Sustained economic growth is driving rapid growth in this sector. At present there are few alternatives to donkeys and mules in this enterprise.

Energy Demand for Crop Production in Rainfed Areas
Pro rap S. Birthal, L. M. Pandey and Suresh Pal

Issues concerning energy-agriculture-environment relationship are becoming more and more important with intensification of agriculture. The intensification-led growth demands more of *commercial non-renewable* energy in the form of fertilisers, diesel, pesticides and electricity. Compared to irrigated agriculture, rainfed agriculture uses less commercial non-renewable energy based inputs, however their use is likely to grow with the technological change in rainfed agriculture. This study examines the level and pattern of energy use and its efficiency in soybean based cropping system of Madhya Pradesh using farm level data.

Energy use is influenced by the cropping pattern and irrigation water availability. Soybean and wheat are the two most important crops in the soybean belt. Wheat is an irrigated crop and is the most energy intensive crop (13980 mega joules per ha). Chickpea, which competes with wheat, requires about half of the energy used in wheat cultivation. Commercial sources of energy account for more than 90 percent of the energy used in cultivation of these crops. Soybean, the *Kharif* season crop grown largely under rained conditions consumes 7142.5 mega joules per ha of which about 77 percent comes from commercial sources. Maize, sorghum and blackgram compete with soybean and require one-third of the energy used in soybean cultivation. These crops largely derive their energy requirements from non-commercial sources. Further, energy use efficiency is higher in coarse cereals and *Kharif* pulses, but these are grown on a limited scale because of their yield or price disadvantage or both, compared to the dominant crop.

Given the crop yield and its price, the form of energy to be used is determined by energy prices and policy environment. Higher use of commercial non-renewable energy in dominant crops is because it is cheaper than non-commercial renewable energy. Per mega joule cost of mechanical energy (tractors and threshers) is worked out to be Re. 0.44 as compared to Rs. 2.44 for human labour energy and Rs. 1.23

for animal labour energy. The cost of energy derived from chemical fertilisers is estimated to be Rs. 0.35 per mega joule, while the energy supplied by manures is costlier by Rs. 0.17. The unit cost of electric energy is Rs. 0.05. It may, however, be noted that some of the non-renewable energy inputs are highly subsidised. The own price elasticity of input energy (Table 3) used in

Table 3: Price elasticities of demand for enerqy

Energy inputs	Manure	Fertilisers	Human labour	Bullock labour	Machines
Manure	-1.227*	0.388*	0.348*	-0.066*	0.149
Fertilisers	0.349*	-1.383*	0.925*	0.311	-0.903*
Human labour	1.897*	0.559*	-0.603*	-0.692*	0.717*
Bullock labour	-0.397*	2.070*	-7.606*	-3.240	3.383
Machines	0.103	-0.694*	0.910*	0.390*	-5.803*

* Significant at 5 per cent

soybean cultivation suggests that the demand for non-renewable commercial sources would increase with commercialisation of agriculture. The estimates of cross-price elasticity however indicate that there is scope for substitution of non-renewable energy with renewable energy. This would require a favourable policy regime compatible with market forces. Further, technologies such as integrated nutrient management, integrated pest management, etc. should be scaled up as to conserve commercial non-renewable energy whilst maintaining profitability of agriculture.

The Role and Importance of Sorghum to the Livelihoods of the Poor: Implications for Improved Utilization - Findings from a Rural Quantitative and Qualitative Farm Survey
Ravishankar, A, B.Dayakar and Andy Hall

An inter-institutional collaborative research project on the economics of sorghum utilization involving ICRISAT, NRCS, NRI and NCAP was undertaken in seven districts from the states of Maharashtra, Karnataka and Andhra Pradesh. Results indicate that sorghum forms the main staple, constituting more than half of the total cereal consumption in majority of sample districts. In rabi districts, sorghum consumption formed 55% of the total cereal consumption, followed by wheat (20%) and bajra (12%). Wheat is the second most important cereal, which accounts for 23%, 21% and 17% in Pune, Solapur and Bijapur respectively (Table 4).

On an average, in the kharif districts, consumption of sorghum formed 58% of total cereal consumption, followed by wheat (30%) and rice (11%). Sorghum is not the most important staple diet in Mahabubnagar. Here the consumption of rice accounts for half of the total cereal consumption thereby relegating sorghum to second position.

Table 4: Profile of cereal consumption in selected districts

(Quintals/annum)

Cereal	Bijapur	Rabi Sorghum area			Kharif Sorghum area				Kh+Rb Sorghum area M.Nagar
		Pune	Solapur	Avg.	Nanded	Akola	Amravati	Avg	
Sorghum	1.63 (59.93)	1.01 (45.70)	1.24 (56.11)	1.34 (55.14)	1.91 (72.35)	1.28 (58.99)	0.98 (41.35)	1.39 (58.40)	0.85 (39.53)
Rice	0.34 (12.5)	0.22 (9.95)	0.11 (4.98)	0.24 (9.88)	0.33 (12.5)	0.19 (8.76)	0.23 (9.70)	0.25 (10.50)	1.08 (50.23)
Wheat	0.47 (17.28)	0.52 (23.53)	0.47 (21.27)	0.49 (20.16)	0.38 (14.39)	0.59 (27.19)	1.16 (48.95)	0.71 (29.83)	0.03 (1.40)
Ragi	0.00 (0.00)	0.01 (0.45)	0.04 (1.81)	0.02 (0.82)	0.00 (0.00)	neg. (0.13)	Neg. (0.07)	neg. (0.07)	0.02 (0.93)
Bajra	0.27 (9.93)	0.42 (19.00)	0.24 (10.86)	0.30 (12.35)	neg. (0.01)	neg. (0.11)	Neg. (0.02)	neg. (0.04)	0.01 (0.47)
Minor millets	neg. (0.13)	0.01 (0.45)	0.01 (0.45)	0.01 (0.41)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	neg. (0.01)
Total cereals	**2.72 (100.00)**	**2.21 (100.00)**	**2.21 (100.00)**	**2.43 (100.00)**	**2.64 (100.00)**	**2.17 (100.00)**	**2.37 (100.00)**	**2.38 (100.00)**	**2.15 (100.00)**

Note: Figures in parentheses indicate percentage to total

SUSTAINABLE AGRICULTURAL SYSTEMS

Growth Performance and Prospects of Rice-Wheat Production in the Indo Gangetic Region
Ramesh Chand and B C Roy

There is widespread deceleration in yield growth in agriculturally advanced state of Punjab (Table 5). Not only that, yield of rice has almost stagnated in the state. The slowdown in yield growth has also started in some districts in Haryana. In Uttar Pradesh, there is deceleration in growth rates of yield of wheat in almost all the districts but the growth rate remains positive and varies from low to moderate level. There is lot of variation in growth rates of rice yield. Some districts show high and some show moderate growth rates. In a few cases there is decline in yield. Rice yield in West Bengal is continuing to grow at a slow rate in most of the districts. After impressive growth rate during 1974-75 to 1983-84, wheat yield in West Bengal started moving on a declining trend in several districts. In Bihar, there are certain pockets, which show promising growth in rice yield whereas there are other pockets where yield is either stagnant or declining. For the state as a whole growth rates in yield of wheat and rice in the recent period look better compared to the past and these growth rates can be easily sustained by arresting and reversing declining trend prevalent in several districts in the state.

Table 5: State wise growth rate of yield of rice and wheat, 1988-89 to 1996-97

State	Rice	Wheat
Punjab	1.07	1.65
Haryana	0.28	1.90
Uttar Pradesh	1.44	2.53
Bihar	2.68	3.61
West Bengal	1.97	3.70
Total	**1.68**	**2.31**

In case the existing growth rates in rice and wheat yield do not increase, the food security of the country would be seriously jeopardised. The recent growth rates in yield of rice and wheat in the Indo Gangetic region, which is major foodgrain producing region of the country, have fallen below the growth rate in demand. In order to meet the future requirement for food grains in the country there is a need for renewed and vigorous drive to enhance yield of rice and wheat in Indo-Gangetic region as the scope for increase in output through area expansion is very limited. This would require different strategy for different sub-regions. Punjab and Haryana require some fresh technological breakthrough while in the other three states moderate to high growth rates can be attained for some more time by spread of already existing technology and improvement in supporting infrastructure.

Sustainability of Rice-Wheat Based Cropping Systems in India
Joshi, P.K and P. Kumar

Rice-wheat based cropping system which covers about 10 million ha in the Indo-Gangetic plain of India is now showing multiple problems. Among others, two major problems are related with (i) stagnating productivity despite higher input use, and (ii) deteriorating status of soil and water resources. To confirm these issues, a study was conducted to estimate the total factor productivity of rice-wheat based cropping systems, and examine the role of legumes in improving the sustainability of soil and water resources. The study used the secondary data from states, namely Bihar, Haryana, Punjab, Uttar Pradesh and West Bengal from 1976 to 1992. Total factor productivity (TFP) approach was used to assess the sustainability of nee-wheat based cropping system. A sustainable system should have a positive trend in TFP.

Table 6: Trends in indices of total factor productivity of rice-wheat based cropping system in the Indo-Gangetic plain of India

Item	Index (%) Base (1980-81)			Annual growth rate (%)		
	1976	1985	1992	1976-85	1985-92	1976-92
Input index	78	105	128	3.2	3.5	3.4
Output index	70	126	152	3.2	3.5	4.9
TFP	89	120	119	2.9	-0.4	1.5

It was noted that the annual growth in TFP which was about 3% during 1976-85 period reduced to (-) 0.4% during 1985-92 period in the Indo-Gangetic plain of India (Table 6). During 1976-85 period, growth in output was almost equally contributed by growth in use of input and TFP. In the later period (1985-92), the growth rate in output was completely contributed by higher levels of inputs.

Crop diversification through incorporation of legumes can play an important role in improving the sustainability of natural resources, and thereby enhancing the TFP of rice-wheat based cropping systems. In production process, legumes improve soil fertility status, require less water than cereals, and their rotation with cereals help control diseases and pests. To confirm the role of legumes in the sustainability of the rice-wheat based cropping system; legume area was included in the TFP decomposition model. The results revealed that the effect of legume area on TFP was positive and highly significant. The results clearly suggested that role of legumes is of crucial importance for the growth in productivity and for sustainability of the rice-wheat based cropping system. There is a need to develop location-specific technologies for legume production in the rice-wheat based cropping system.

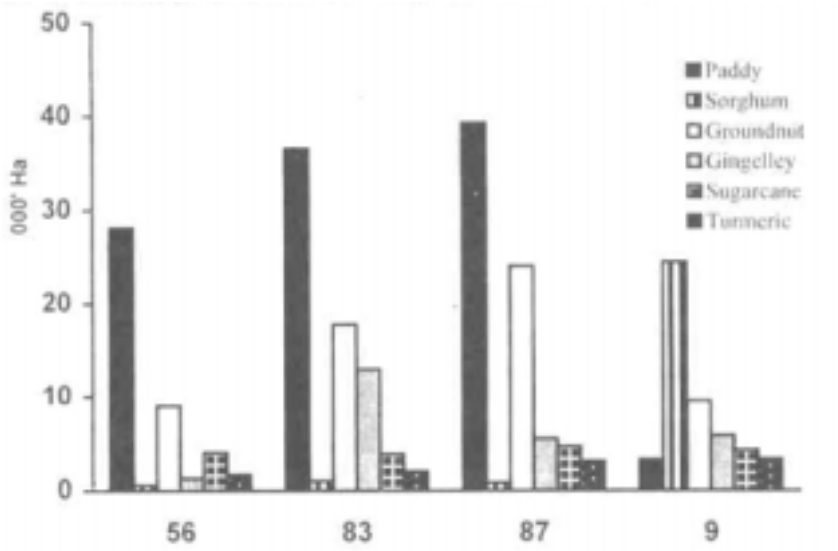
Water Resource Budgeting for Lower Bhavani Project
Sdvurajan, S. and Lafcsfimi Prascmna

The objective of this study is to develop and apply a systems approach for linking various components of the irrigation system to analyse alternate policy options for promoting equitable and sustainable production impacts in the Lower Bhavani Project (LBP) main canal command area of Tamil Nadu state.

The LBP main canal command area is about 83,770 hectares, constituting 83 per cent of the LBP command area. The irrigation distribution system consists of 3 major distributaries, 69 distributaries, 196 minor distributaries and 118 direct sluices. The project was initially conceived for irrigated dry crops like groundnut, cotton and millets with paddy area localised to only 4000 ha in the valleys. The current cropping pattern is given in Fig. 3. In case of three years wherein the actual inflow into LBP main canal varied from 56 to 87 per cent of the designed flow, the cropping pattern was dominated by paddy followed by groundnut. Only when the actual inflow is only 9 per cent of the designed flow, rainfed and irrigated dry crops like sorghum, groundnut and gingelly has dominated the cropping pattern with least area under paddy.

The year to year inflow fluctuations in the LBP irrigation system was analysed based on the annual budgeting of the water in the reservoir during the period 1955-92. The analysis revealed that the management of inter- year inflow fluctuations in the system ensured more stability in the water flow in old *ayacut* by absorbing most of the variations in LBP main canal. Such a policy, undoubtedly resulted in more variations in the LBP main canal water flow which is commanding 83 per cent of the LBP command area. The water management is further confounded by the fact that the existing cropping system is dominated by paddy which occupies more than 50 per cent of the command area as against the initially planned area of less than five percent of the command area.

Fig. 3: Cropping area in LBP main canal command



Variable inflow into LBP main canal as a per cent of designed inflow

The inter-relationship between average monthly rainfall and evaporation shows that rainfall exceeds pan evaporation only during four weeks corresponding to end September to end October. The water deficit period is dominating almost throughout the year extending to eleven months highlighting the importance of integrated resource management encompassing rainfall, surface water and ground water starting from catchments area and ending with farm area. The annual potential demand for water within the irrigation system is assessed as 75 TMC arising from irrigation, municipal and industrial sectors. The average annual inflow into the reservoir, net of evaporation losses, is 67.5 TMC with the inter year variability of 43 per cent.

The widening of demand-supply gap, annual variability in inflow and paddy dominated cropping pattern resulted in the experimentation of different water distribution policies. Initially, intermittent irrigation system was adopted (up to 1958), followed by zonal system of irrigation (up to 1969) and year to year rotation of irrigation (existing) in the LBP main canal command area. It is however essential to model the irrigation system in its totality so that past irrigation water distribution policies can be objectively assessed. Alternative policies for future management of the command area can be comprehensively evaluated before actually experimenting them. An irrigation system modelling formulated for this purpose is being validated for its application in this command area.

Equity Impacts of Irrigation Water Distribution in India
Selvamjan, S. and A.Ravishankar

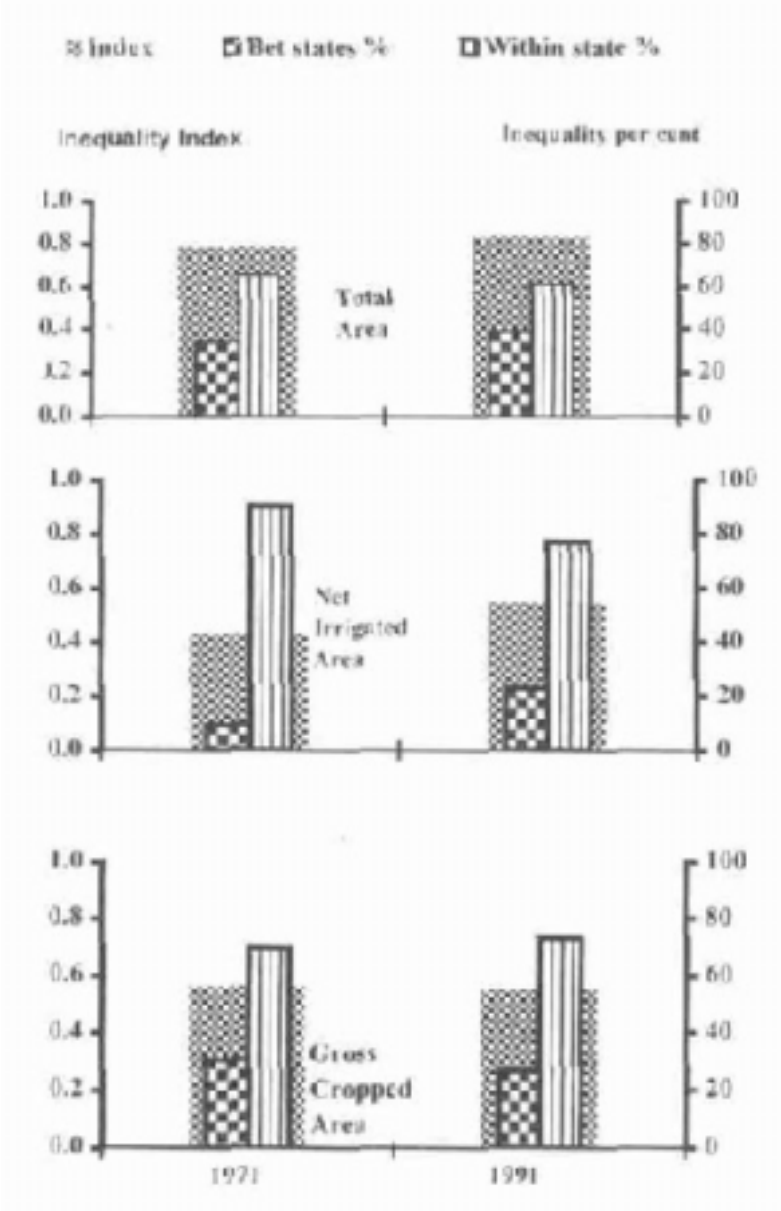
Irrigation retains its crucial role in productivity-led agricultural production growth, in alleviating poverty and in reducing inequality in income distribution in rural areas. Irrigation development in the past was not specifically targeted towards desired multiple impacts. Equity implications as influenced during the course of irrigation development initiatives therefore, assume significance while formulating future water resource developmental strategies. Equity impacts of irrigation water distribution in India is empirically analysed at

national level covering different decades. For the country as a whole, number of small and marginal farm households increased from 49.1 million in 1971 to 83.5 million in 1991 of which partially and wholly irrigated small and marginal farm households accounted for 41.2 and 46.8 per cent respectively. In terms of irrigated area, irrigated small and marginal farm households accounted for 23 per cent of the total household area of small and marginal farm households in 1971 which increased to 34.5 per cent in 1991.

Inter-farm inequality in irrigation distribution is measured by applying Theil's information theoretic measure based on five farm holding sizes namely; less than 1 ha; 1-2 ha; 2-4 ha; 4-10 ha and above 10 ha. Total area (TA), Net irrigated area (NIA) and Gross cropped area irrigated (GCAI) are the irrigation attributes considered for measuring Theil's inequality measure nationally as well as in terms of 'between states' and 'within state' sources.

The estimates of inequality arising from 'between state variations in irrigation development status' and 'within state variations existing across farm holding sizes' are highlighted in Fig 4.

Fig. 4: Inequality in irrigation distribution in India



Inequality in the distribution of total area among different irrigated farm holding sizes is not only considerable but has increased as well between 1971 and 1991. Irrigation distribution policy linked to the proportionate land area owned may therefore perpetuate the inequality further. Two-third of inequality in land area is due to within the state inequality in land distribution and remaining one-third of inequality in land area is due to between states inequality in terms of per household availability of across states. State wise average holding size has come down by 28 per cent during 1971-91 with marginal increase in inter-state variability by 5 per cent.

Inter-farm size inequality in irrigation distribution (NIA) is lower by 35 to 45 per cent during this period as compared to that of total area distribution. This implies that irrigation development in aggregate terms across sources has moderated the inequality in total area distribution. However, over decades, inequality in NIA has increased by 27 per cent during the period 1971-91. Even though inequality attributed to within state source has come down; it still accounts for three-fourth of total inequality in NIA distribution. Only one-fourth of the inter-farm inequality in NIA distribution across farm sizes is accounted by the between states variation in the development of irrigation facilities. The magnitude of inequality in gross cropped area irrigated has marginally come down but remained similar to that of NIA inequality, implying that cropping intensity in the irrigated area across farm size holdings has not altered the inequality in the distribution of irrigation facilities.

The inter-farm inequality analysis of irrigation distribution in India as contributed from within and across states revealed that major source for , reducing the inequality in the distribution of irrigation facilities lies within the state level distribution of irrigation services across farm sizes rather than from balanced irrigation development across states. Increasing role of states in promoting the equity impacts of irrigation expansion across farm sizes is emphasised. Comprehensive modelling of irrigation systems is a pre-requisite to conduct ex-ante evaluation of policy intervention options for promoting equity in the sharing of irrigation benefits across farm sizes.

SUPPLY, DEMAND AND MARKETS

Supply Responsiveness in India's Rainfed Agriculture

Rainesh Chand

Supply responsiveness in underdeveloped agriculture, as prevalent in India's rainfed region, depends upon several factors, which differ from zone to zone and crop to crop. Broadly, the factors affecting supply can be grouped in four categories viz. economic factors, infrastructure factors, technological factors and agroclimatic factors. All these factors interact in complex manner to shape response of supply.

An empirical analysis for supply responsiveness in India's rainfed agriculture reveals that return from a crop relative to other crops plays significant role in affecting supply in the case of all the crops. Therefore this set of results indicates that own price and prices of competing crops are an important instrument to boost supply (Table 7). Since, arithmetically, profitability depends as much on prices as on yield, the role of productivity in boosting

Table 7: Output supply elasticity of selected crops in rainfed zones with respect to important variables

Variables	Rice	Cotton	Kharif sorghum	Groundnut	Chickpea	Wheat	Rapeseed Mustard
Own price	0.2518	.0.2511	0.2553	0.8114	0.1542	0.8515	0.3103
Price of Competing crop	-0.0584	-0.0212	-0.2494	-0.4297	0.1959	-0.3787	-0.1702
Fertilizer Price	-0.1631	-0.4737	-0.1569	-0.6516	-0.1382	-0.0216	-0.7219
Relative	2.4553	5.1400	2.1707	3.8541	5.1275	1.3491	4.0982
productivity Irrigation	-0.0041	0.2249	0.2938	0.5395	0.4930	0.8993	0.5558
Zone	7	10	10	12	9	10	7

output needs to be properly appreciated. In subsistence agriculture the impact of productivity improvement may be stronger than the prices because productivity change is experienced or is observed by the farmers while price changes are only perceived in some cases inadequately or vaguely. The results of the study show that relative crop returns are a strong motivation for the farmers in rainfed region to increase supply by increasing area or yield or both.

Private Sector Seed System in Rajasthan
Suresh Pal

Although it is widely .agreed that the private sector should take major responsibility for input delivery, concerns are often expressed about the degree to which commercial firms address the needs of resource-poor farmers. A study collaboration with Overseas Department Institute (UK) in Rajasthan examined the performance of pearl millet seed market in a part of Rajasthan that is gradually increasing its utilisation of commercial inputs. About two-thirds of the farmers plant commercial pearl millet seed (public or private hybrids). They easily distinguish between hybrids and local varieties, but relatively few farmers are able to recognise the names or characteristics of the different commercial hybrids. Farmers are also confused about the names of public and private seed companies. When choosing which seed to purchase, farmers tend to rely on the advice of other farmers or merchants (Table 8). Information flow from farmers to seed companies and plant breeders is also deficient. Despite these problems, commercial seed market expansion has had a positive effect on farm productivity.

Table 8: Sources of information on hybrids

Source	All 1997 hybrids cultivated (%)
Other farmers	48
Shopkeeper	36
Extension worker	12
Other/ not known	4
Total	**100**

Effects of Trade Liberalisation on Indian Agriculture
Ramesh Chand

This study is being undertaken in two phases. The first phase has been completed which focussed on: (a) history of trade regime, (b) trade patterns and (c) trade regime towards 2000 or 2004.

The policy of trade liberalisation shows clear positive impact on export of non-basmati rice, marine products and oilmeal (Table 9). There were some relaxations like abolition of minimum export price, decanalisation, removal of bans and quotas for these commodities, particularly rice, which have contributed to the emergence of non-basmati rice as an important export item. Export of oilcake and oilmeals increased from $374 million in the beginning of liberalisation period to $982 million after 5 years. Similar is the story with marine export from $535 million in 1990-91 before liberalisation to $1122 million in 1996-97. Processed fruit products are also believed to have great potential for exports, and some incentives have been provided to fruit processing industry to encourage the exports. Total agricultural exports were around $3000 million at the beginning of economic reforms period. In a short span of 3-4 years the export earnings became more than double. This is a clear indication that the indirect effect of trade liberalisation, exchange rate adjustments and effects of relaxation in government controls and restrictions on agricultural exports is positive and significant.

Table 9: Value of export of major agricultural commodities from India, 19985/86to 1995/96

Commodities	1986/87	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Basmati rice	153	221	203	276	338	276	254	337
Non basmati rice	1	36	104	60	72	108	1111	550
Rice total	154	258	307	337	410	384	1366	887
Wheat	37	17	59	4	"9	13	102	197
Pulses	4	10	16	18	23	29	39	37
Sugar	1	12	50	118	54	19	118	238
Fresh vegetables	na	na	142	108	132	79	89	97
Fresh fruits	na	na	ng	ng	ng	60	69	70
Floriculture production	na	na	6	5	6	10	18	17
Groundnuts	na	na	3	3	54	32	69	88
Castor oil	4	34	57	41	92	141	222	176
Coffee	232	140	135	130	174	335	449	400
Tea	451	60	492	337	338	311	350	279
Spices	218	130	151	136	181	195	237	337
Tobacco	145	147	153	164	147	81	134	152
Cotton raw	160	472	124	63	208	45	61	453
Oil meals	149	339	374	534	741	573	702	982
Marine prod.	422	535	585	602	814	1126	1011	1122
Processed fruits and juices	na	na	36	41	50	54	61	63
Agricultural & allied products	2678	3521	3196	3028	4021	4226	6111	6759
All commodities	9743	18145	17867	18539	22241	26329	31795	33115

Source: 1. Economic Survey, Ministry of Finance, Government of India, various issues.
2. Monthly Statistics of Foreign Trade of India, Volume I: Exports and Re-Exports, Annual Number Ministry of Commerce, Various issues
Na - not available
Ng - negligible, less than 1 million $

Import of rice declined from $170 million in 1989-90 to nil in the last two years. However, India continued to be occasional importer of sizeable quantity of wheat following poor domestic harvest. Among all agricultural commodities, oilseeds comprise the largest share in imports in most of the years during the last decade. This is happening despite a spurt in edible oilseed output in the recent years. Nearly half of the agricultural imports consist of fertiliser imports in most of the years (Table 10).

Table 10: Value of import of major agricultural commodities to India, 1985/86 to 1995/96.

Unit: $ Million

Commodities	**1986/ 87**	**1990/ 91**	**1991/ 92**	**1992/ 93**	**1993/ 94**	**1994/ 95**	**1995/ 96**	**1996/ 97**
Rice	1	22	4	25	18	3	ng	ng
Wheat	34	12	ng	245	40	ng	3	114
Cereal preparations	68	101	66	63	35	26	21	22
Pulses	183	299	121	117	186	199	212	265
Sugar	172	5	ng	ng	ng	727	65	1
Fruits and nuts	na	na	41	65	69	100	99	129
Milk and cream	na	na	3	15	5	2	11	1
Cashew nuts	56	75	108	130	154	220	227	194
Cotton raw	21	32	ng	44	6	161	156	9
Vegetable oils	496	182	101	58	53	199	676	825
Sub total	1031	728	444	762	566	1637	1470	1560
agriculture Crude fertilizer	270	348	185	159	124	153	157	132
Manufactured fertilizer	451	636	645	699	633	767	1381	686
Fertiliser total	721	984	830	857	756	916	1538	816
Total agriculture	**1581**	**1681**	**1256**	**1618**	**1317**	**2544**	**3001**	**2303**
All commodities	15725	24076	19412	21883	23310	28653	36675	38559

Source 1.Economic Survey, Ministry of Finance, Government of India, various issues.
2. Monthly Statistics of Foreign Trade of India, Volume II: Imports, Annual Number Ministry of Commerce, Various issues.
Na - stands for not available
Ng - indicates less than 1 million $.

For the success of external liberalisation, internal liberalisation is said to be essential. External liberalisation may not produce full impact if domestic reforms by way of removal of excessive and unnecessary government controls, rationalisation of domestic policies on land lease, land markets, produce movement, private sector participation in agriculture etc. are not undertaken.

There is strong pressure on the country to liberalise agricultural imports. This would subject domestic producers to face competition from international agriculture, which enjoys access to cheap capital, sound infrastructure, and scale advantage. To face this situation there is need to increase productivity and efficiency.

INSTITUTIONAL CHANGE

Strengthening Research and Extension for Rainfed Farming
Farrington.J. Rasheed Sulaiman, V. and Suresh Pal

This study, undertaken in collaboration with Overseas Development Institute (ODI), proposes changes in four institutional factors to strengthen research and extension for rainfed farming. These are (i) inputs from a wider stakeholder constituency in research problem identification, monitoring and evaluation (ii) shift in balance between core and contract funding to make the system more client oriented (iii) higher operational support for research and extension and (iv) suitable changes in the incentive and reward system to reflect client orientation.

The study recommends updating of the following social science skills for scientists and extension agents: (i) needs assessment techniques, including the role of such techniques as Participatory Rural Appraisal, (ii) understanding of farmers' risk-averting practices and their implications for the design of research and extension and formulation of recommendations (iii) modes of working in multi-organization partnership with research and extension agencies within and outside the public sector (iv) management of the cycle of research projects, from preparation through implementation to review, including the conduct of participatory on-farm research and eliciting feedback from farmers (v) the preparation and management of research and service contracts with commercial organizations and NGOs.

As many of the technologies for rainfed agriculture are group-based and need community action, the following skills are going to be crucial for extension agents: (i) group formation (ii) development of leadership skills (iii) conflict resolution and negotiation between different interest groups (iv) management of common property resources (v) use of different types of media and (iv) communication, project preparation, data collection, analysis and documentation. These are not focussed upon in current extension programmes.

AGRICULTURAL GROWTH AND ADJUSTMENT

Analysis of Resource Endowment and Economic Management - A Case Study of North Eastern India
Barah B. C and A K Neog

The north-eastern region (NER) occupies 2.6 lakh sq km which is approximately eight per cent of the land area of the country inhabited by 3.73 per cent of country's population. The resource use pattern within the peculiar diverse socio-economic, political and cultural mix, has undergone dynamic changes. An understanding of the emerging pattern of natural resources would be useful for developing alternative policy for natural resource management, including the mega biodiversity of the region. In the absence of concerted efforts to manage the resources efficiently, and contrary to conserving the bio-diversity, the stock of the biological resources is depleting rapidly. The depletion of resources signifies that resources are not only over-exploited but also signals ecological imbalances. The impact of the imbalance, among other thing, is the frequent occurrence of natural calamities. In addition to inefficient management of natural resources, lack of technical change, also resulted to low level of productivity. The absence of technical innovation and inadequate infrastructure are major determinants of stagnation in agriculture. Lack of infrastructure is the Achilles Heels, which is responsible for the NER's economy as limping economy. The poor performance indicator of the existing infrastructural facilities clearly supports the backwardness thesis.

Table 11: Indicators of economic and social infrastructure development (A comparative illustration of the NER)

Name of The State	Index of Econ. & Social Infrastructure	Rank (All India=100)
North Eastern Region		
Arunachal Pradesh	48.94	25
Assam	81.94	15
Manipur	70.38	22
Meghalaya	73.75	19
Nagaland	70.92	20
Tripura	83.55	14
Sikkim	104.62	10
India	100.00	
Developed Region		
Punjab	219.19	1
Maharashtra	121.70	8
Tamil Nadu	149.86	5
Karnataka	101.20	11

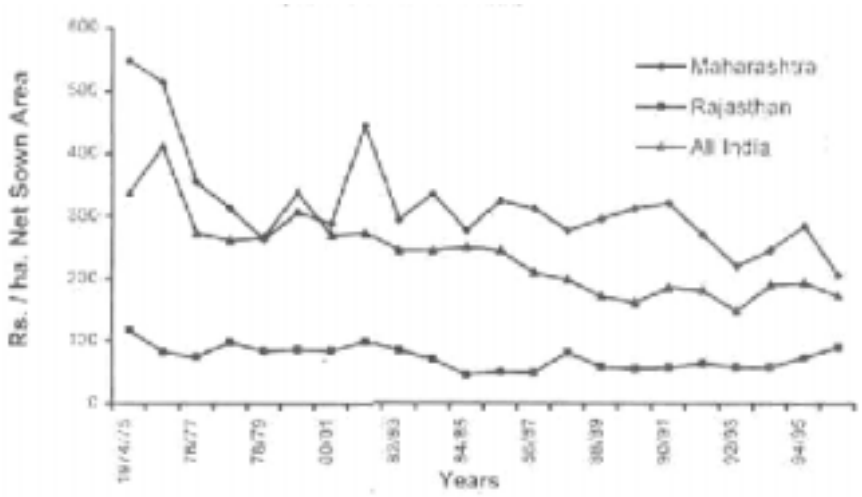
Source: Report of the Tenth Finance Commission, GOI 1994
Functional Relationship: PCI = (IDI)βe
Estimated function: InPCI = 1.75 + 1.04 InIDI $R^2 = 0.53$
(t value 4.13) (N,df) = (17,15)

The functional relationship shows the importance of infrastructure development (IDI) in increasing per capita income (PCI) of a region. The estimated model parameters clearly demonstrate that improved infrastructure could at least double the per capita income. Since the indicators of infrastructure development in the north eastern states are highly inadequate (Table 11), appropriate policy is needed to address this issue.

Emerging Trends and Regional Variations in Agricultural Investments
Ramesh Chand

The critical role of public investment as a determinant of agricultural performance is well appreciated. There has been a growing concern on the decline in such investments over the last decade. These inferences are drawn from estimates provided by the Central Statistical Organisation (CSO) which cover mainly irrigation investments.

Fig. 5: Capital outlay on agriculture: 1974/75 to1995/96
(at 1980-81 Prices)



In this study, a comprehensive data series has been constructed for the country and states which include investments made in irrigation, rural roads, rural electrification, storage, marketing, agricultural research and education, land development, cooperation, etc. This series will be useful for further research on growth and development of Indian agriculture. Fig. 5 presents the trend in public investment for the country and for selected states. The data show a consistent decline since mid seventies in all states. This does not auger well for future growth and this study points to the need for a critical reappraisal of public expenditure and investments to address this distortion.

Decomposition of Variability of Crop income
B C Barah

The variability of crops income has two major components viz, biological or yield component and market component, the third component being the interaction or residual. The pattern of these components vary across space as well as over time. The paper estimates these components based on the variance decomposition model. The analysis uses time series data and clusters the districts in eastern India into component-based homogenous regions. The homogeneous infrastructure facility and vulnerability to climatic variables form the basis of clustering of the region. The analysis shows that the major source of income variability in the backward region is yield rather than the market. On the contrary, the fluctuation of market condition significantly contributes to overall income variability in well-endowed regions. This implies that production stabilization policy is important for the backward region. It also indicates the significance of regional perspective in policy formulation.

The preliminary results of the decomposition analysis of a few selected districts demonstrate that the relative yield variability dominates the price variability in the less developed districts. The yield and price components are expressed as per cent of gross income variability and are given in the bracket in the same order for the individual district: Hazaribagh (42% 39%), Dhanbad (76,30), Darbhanga (22,12), Hamirpur (63,35), Etah (54,45) and Saharsa (25,14). The results confirm that yield variability is inversely related to infrastructure support On the contrary, the price variability is more as compared to yield variability in the well developed districts such as Sambalpur(19%,29%), Burdhwan (20,51), Jabalpur (58,65), Mandla (29,54), Seoni (37,50) and West Dinajpur (8,19). A striking feature is that more backward districts suffer from higher level of both price as well as yield variability. For example, Palamau in Bihar (55,159), Kalahandi (64,113), Ganjam in Orissa (65,109) are among the highly backward districts not only experience highly volatile market but also suffer from higher yield variability. The results have significant implication on various stabilisation policies in the agriculture sector.

Comparative Analysis of Development of Coastal and Adjoining Non-Coastal Districts - An Inventory

Dayanatha Jha, Sam Kumar and Amit Kar

There is a notion that coastal communities are economically poor with uncertain and fluctuating incomes compared to the hinterlands. In addition, coastal regions also encounter location specific problems like coastal storms, shoreline erosion and problem of tidal waves etc. A comparative analysis was carried out to examine agricultural development parameters between coastal and adjoining non-coastal regions of the country. Since database on coastal regions of the country is not available, therefore, comparisons reported here are based on the information for coastal and adjoining non-coastal districts. Statistical data used in this study pertain to developmental parameters for the quinquennial average of the years 1990-1994.

It was observed (Table 12) that demographic features, in general, are superior in coastal regions. However the population dependent on agriculture is higher in non-coastal regions and people engaged in services are more in coastal regions. The various parameters of infrastructural status i.e., (a) bank branches per lakh population (b) number of principal markets per district are higher in coastal regions, whereas, the road infrastructure is more congenial in non-coastal regions. All the agricultural developmental parameters under study are, in general, better in the coastal regions. The productivity of oilseed was significantly higher in coastal districts. However, with some exception, pulse productivity is higher in non-coastal district.

Finally the economic developmental parameters are also higher for the coastal region as compared to non-coastal region. This is mirroring from the Relative Development Index, which is quite high in coastal region compared to non-coastal region. Further, the prosperity of eastern coastal regions was found to be higher than western-coastal regions. From the analysis, it is clear that coastal regions seem to be better compared to adjoining non-coastal region, although most of these differences were found to be statistically non-significant. Hence it can be concluded that coastal and adjoining non-coastal regions are more or less similar in terms of developmental parameters. However, it is true that the fishermen community are poor compared to other farmers in the coastal regions. This is because the income of these communities largely depends upon the volume of catch, which is uncertain, and consequently fetches fluctuating prices. These communities are also more vulnerable to devastating natural calamities.

Table 12: Comparative profile of coastal and adjoining non-coastal districts

Particulars	Coastal	Non-coastal
Demographic features		
a) Population density	983.40	257.70
b) Urbanization %	27.80	21.80
c) Literacy %	56.40	51.00
d) Percent population dependence		
i) Agriculture	64.60	71.90
ii) Services	21.40	16.30
Infrastructural status		
a) Bank branch per lakh population	7.40	6.70
b) Number of principal market per district	10.30	8.80
c) Road length (per 100sq. Km)	74.00	88.30
Agricultural Development parameters		
a) NIA as % of NCA	39.69	25.98
b) Fertilizer used (Kg. Ha)	95.40	87.10
c) Productivity (tons/ha)		
i) Cereals	1.94	1.50
ii) Pulses	0.44	0.47
iii) Oilseeds	0.60	0.53
d) Cropping intensity	135.14	124.14

III Education and Training

Education

This Centre provided support to the Post-Graduate research guidance programme of Indian Agricultural Research Institute as follows.

Name of the Scientist	Courses offered	Students guided	Area of Research
S. Selvarajan	nil	Two (Ph.D) (continuing)	Irrigation investment planning, Sustainable watershed development
Suresh Pal	nil	Two (Ph.D.) (continuing)	Investment in Indian Agriculture, Sustainability of Rice-Wheat System

Special Lectures

Name	Title of the Lecture	Venue
Barah, B.C	Traditional method$ of water appropriation (12 Nov. 1998)	Lady Shriram College, Delhi University
	Sustainability and resource use (1 Jan. 1999)	Academic Staff College, Jawanarial Nehru University, New Delhi
Haque, T	Land reforms and agricultural growth in West Bengal, (3 April, 1998)	Centre for Rural Studies, University of Visva Bharati, Shantiniketan
	Agricultural growth and poverty alleviation in India (21 May, 1998)	University of Agricultural Sciences, Bangalore
Ramesh Chand	Methods for assessment of trade liberalization policies. In Training course on Advances in methodology for policy research in agricultural economics (16-29 Mav 1998)	Centre for Advanced Studies in Agricultural Economics, Division of Agricultural Economics, Indian Agricultural Research Institute, New Delhi
Selvarajan, S	Modelling for policy intervention analysis (17-1 9 Feb. 1998)	Policy for Food, Agriculture and Sustainable Development Workshop, Centre de Sciences Humaines (CSH), New Delhi
	Net working of social scientists (26-27 Aug. 1998)	Sensitisation workshop on Priority Setting, Monitoring and Evaluation in Agricultural Research, National Centre for Agricultural Economics and Policy Research, New Delhi
	Irrigation water, development and management in India: status, impacts and prospects (3 Oct. 1998)	National Centre for Agricultural Economics and Policy Research, New Delhi
	Mathematical programming and simulation for agricultural research priority setting (19-21 Nov. 1998)	National Academy for Agricultural Research Management, Hyderabad
	Agricultural research priority setting: Approach and application in production system prioritisation (22-23 Dec. 1998)	Scientific Advisory Panel meeting for Irrigated Agro Eco-System, Indian Agricultural Research Institute, New Delhi
Joshi, P.K	Economic surplus approach for research prioritization; Prioritization of production constraints in agriculture; Assessing costs and benefits for research prioritization; Prioritization of research programs of rainfed rice production system : a case study . In Training workshop on 'Research Prioritization of programs and production systems in different agro-ecoreg ions' (1-6 Feb. 1999)	National Centre for Agricultural Economics and Policy Research, New Delhi.
Ravishankar, A	Intellectual property rights in crop genetic resources: possible implications for.Indian agriculture (20 Aug. 1998)	Department of Economics, Central University of Hyderabad, Hyderabad.

Guest Lectures

Eminent scholars from India and abroad gave seminars on the following topics.

Name of the visitor	Title of the Lecture	Institution
Daniel Debey	Multi level analysis tool for agriculture modeling (20 Feb. 1998)	Centre de Cooperation International en Recherche agronomique Pour le development (GIRD), France
Bon Emmanuel	Status and management of CPRs in India (26 Feb. 1998)	Centre for Social Sciences and Humane, France and National Centre for Agricultural Economics and Policy Research, New Delhi
Reimund P. Roetter	Sys net project for eco-regional planning (30 Mar. 1998)	International Rice Research Institute, Philippines
Chu Thai Hoanh	Rice supply demand analysis (30 Mar. 1998)	International Rice Research Institute, Philippines
Bisaliah, S	Natural resource management under centre of excellence component of NATP (4 Aug. 1998)	University of Agricultural Sciences, Bangalore
Singh, R.D	Orientation seminar (29 Oct. 1998)	Illinois University, USA
Kotovosky, G	Current economic scenario in Russia (20 Nov. 1998)	Institute of Oriental Studies, Russia
Singh, A.K	Terminator technology and its implication in developing world (9 Dec. 1998)	Indian Agricultural Research Institute, New Delhi

Training

Scientific

Name of the official	Theme	Duration	Place of training
Adhiguru, P	Agricultural extension and training methodology	14.7.98 to 28.8.98	Ministry of Agriculture, Republic of Indonesia
Dastagiri.M.B	Foundation course for agricultural research service	5.1.98 to 5.5.98	National Academy of Agricultural Research Management, Hyderabad.
Harbir Singh	Introduction to statistical packages	27.4. 98 to 02.5.98	Indian Agricultural Statistics Research Institute, New Delhi
	Advances in methodologies for policy research in agricultural economics	16.5. 98 to 29.5.98	Centre for Advance Studies, Division of Agricultural Economics, Indian Agricultural Research Institute, New Delhi
	Foundation course for agricultural research service	21. 07.98 to 13.11.98	National Academy of Agricultural Research Management, Hyderabad
Rajni Jain	Introduction to internet	14.12. 98 to 19.12.98	Indian Agricultural Statistics Research Institute, New Delhi
Ravishankar, A	Foundation course for agricultural research service	5.1.98 to 5.4.98	National Academy of Agricultural Research Management, Hyderabad
Roy, B.C	CIS techniques for agro-ecosystem characterization	30.3.98 to 30.4.98	International Rice Research Institute Los Banos, Philippines
	Use of computers in agricultural research	16. 11. 98 to 28.11.98	Indian Agricultural Statistics Research Institute, New Delhi
Sant Kumar	Use of computers in agricultural research	13.3.98 to 25.3.98	Indian Agricultural Statistics Research Institute, New Delhi

Technical

Name of the official	Theme	Duration	Place of training
Chauhan, M.S	Introduction to Internet	14.12.98 to 19.12.98	Indian Agricultural Statistics Research Institute, New Delhi
Khyali Ram	MS DOS and MS Windows'95	15.5.98 to 23.5.98	Indian Agricultural Statistics Research Institute, New Delhi
Sonia Chauhan	Use of Computers in Agricultural Research	16.11.98 to 28.11.98	Indian Agricultural Statistics Research Institute, New Delhi

IV Awards and Recognitions

Dayanatha Jha was elected as a fellow of the National Academy of Agricultural Sciences. He was re-elected as President of the Indian Agricultural Economics Association, and member of the Research Committee of the Indian Society of Agricultural Economics.

Joshi, P.K served as Member, Editorial Board, Indian Journal of Agricultural Economics for the year 1998-99. He also served as Member, Editorial Board, Agricultural Economics Research Review for the year 1998-99. He has been nominated as Member, Publication Committee, International Conference on 'Management of Natural Resources in the 21st Century'.

Ramesh Chand was selected as rapporteur for the Annual Conference of Indian Society of Agricultural Economics, for the theme Agricultural Marketing in India, December 21-23, 1998, held at Mahatma Phule Krishi Vidyapeeth, Rahuri. He was also selected as Editor for the journal Agricultural Economic Research Review for the year 1998-99.

Selvarajan, S. led an Indian Council of Agricultural Research team of experts to Bhutan to advise on agricultural development (11 March to 4 April 1999).

V Linkages and Collaboration in India and Abroad including Externally Funded Projects

Visits Abroad

Name of the official	Purpose	Place	Duration	Outcome
Dayanatha Jha	Meeting for the Sustainable rainfed agricultural development project	International Food Policy Research Institute, Washington	27.2.98 03.4.98	Developed a synthesis paper
	Asia-Pacific symposium on Sustainable food production, income generation and consumer protection	ESCAP, United Nations Beijing	23.6.98 26.6.98	Presented a Country paperon India
Adhiguru, P	To participate in international training course on Agricultural extension system and training methodology	Agriculture inservice training centre, Ministry of Agriculture, Indonesia	14.7.98 to 28.8.98	It is useful for developing training capsules using androgogic principles
Haque, T	To participate in the Tokyo regional seminar on Land tenure and agricultural productivity	Asian Productivity Organisation, Tokyo	05.8.98 to 13.8.98	Presented a paper on Land tenure and agricultural productivity
Joshi, P.K.	To present a paper in an international symposium on Sustainability of agriculture in transition	Baltimore, USA	19.10.98 to 28.10.98	Paper Presentation
Selvarajan, S	To lead the mission on the subtropical area development programme	Bhutan	10.3.99 to 04.4.99	prepared the project proposal and submitted it to the Ministry of External Affairs, GDI

Ramesh Chand	To attend draft report meeting of the first term of the Trade liberalization project	CGPRT Centre Bogor, Indonesia	5.5.98 to 8.5.98	Presented the project work and findings of the draft report. Discussed the work for the second phase
	To participate in the workshop on Sustaining rice-wheat production system: socio-economic and policy issues organized by the Rice-Wheat Consortium	Kathmandu, Nepal	1.7.98 to 3.7.98	Presented paper on growth performance and prospects of rice-wheat production issues in the Indo-Gangetic consortium
Ramesh Chand	To participate in the workshop on Strategic research on gender issues in rice-based household economy organized by IRRI, Phillipines	Los Banos, Phillippines	24.8.98 to 28.8.98	Presented a paper on Changes in rice based issues in household economy and gender issues in India, and helped the organiser to prepare a research project on gender issues.
Roy, B.C	To participate in the training course on CIS techniques for agro-ecosystem	IRRI, Los Banos, Philippines	30.3.98 to 30.4.98	Participation in the said programme would enable this Centre to apply CIS in various research projects.
Suresh Pal	To participate in planning meeting of Competed agricultural technology funds project	ODI, London	29.3.98 to 02.4.98	Finalization of work

VI List of Publications

NCAP Publications

Policy paper

Policy paper 8: Improving the effectiveness of agricultural research and extension in India

Policy paper 9: Sources of growth in livestock sector

Policy brief

Policy brief 6: On the New Agricultural Policy

Policy brief 7: Livestock sector in India: agenda for the future

Workshop proceedings

Food, population and environment: strategies for sustainable Indian agriculture

New paradigms of agricultural research management (under NATP)

Land use planning in India

PME notes

PME notes 1: The new paradigm for agricultural research

PME notes 2: Prioritization in agricultural research

PME notes 3: Prioritization of production system research

Publications by Scientists

Research papers

Adhiguru, P, "A study on the use of extension methods for dissemination of agricultural engineering technology", Journal of Extension Education 6(2)1998.

Birthal, P.S, L.M. Pandey and Suresh Pal, "Energy demand for crop production in rainfed areas", Indian Journal of Agricultural Economics, 53 (3). 1998.

Dastagiri, M.B, "World food production research", Out Look on Agriculture, UK, 27(2) pp 77-80, 1998.

Farrington, J, Rasheed Sulaiman.V. and Suresh Pal: Improving the effectiveness of agricultural research and extension in India : An analysis of institutional and socio-economic issues in rainfed areas, Policy paper 8, NCAP, New Delhi.

Hansra, B.S and P.Adhiguru, "Agriculture transfer of technology approaches since Independence in India", Journal of Extension Education, 9(4), 1998.

Haque, T, "New strategies for mitigating rural poverty, in fifty years of rural development in India", National Institute of Rural Development, Hyderabad, 1998.

Haefue, T, "Regional trends, patterns and determinants of agricultural wages in India", Indian Journal of Labour Economics, 41(4), 1998.

Haque, T, S.R.Hashim and Shangan Fan, "Role of infrastructure in agricultural development", Asia-Pacific Journal of Rural Development, 1998.

Haque, T, "Land use planning in India", PROUT, 16-31 Oct 1998, New Delhi.

Krishnan, M. and P.S. Birthal, " Pricing fish: A study of the economic and behavioural factors", Indian Journal of Agricultural Marketing, 12(3), 1998.

Kumar, P., P.K.Joshi, Johansen, C., Asokan, M., "Sustainability of rice-wheat based cropping systems in India: socio-economic and policy issues", Economic and Political Weekly, 33(39): A152-158, 1998.

Morris, M.L, R.P. Singh and Suresh Pal, "India's maize seed industry in transition: changing roles for the public and private sectors", Food Policy, 23(1), 1998.

Rajni Jain and Alka Kalra, "Y2K: Impacts on Indian agriculture", Computer Society of India Communications, 1998

Ramesh Chand, "Agricultural marketing issues and challenges", Rapporteur's report, Indian Journal of Agricultural Economics, 53(3),1998.

Ramesh Chand, "Removal of import restrictions and India's agriculture: the challenge and strategy", Economic and Political Weekly, 33(15), 1998.

Selvarajan, S., "Efficient water management in wheat cultivation in Eastern Yamuna Canal Command", Indian Journal of Soil Conservation, 26(2), pp. 117-121,1998.

SidJiu, B.S., Rupela, O.P., Beri, V., and Joshi, P.K., "Sustainability implications of burning rice- and wheat-straw in Punjab", Economic and Political Weekly, 33(39): A163-168, 1998.

Singh, R., P.S. Birthal and B.S. Rathore, "Review of animal health services in India", Indian Journal of Animal Sciences, 68(5), 1998.

Suresh Pal and Alka Singh,"Strengthening the Indian agricultural research and extension systems: Funding and institutional imperatives', Indian Journal of Agricultural Economics, 53(3), 1998.

Tripp, Robert and Suresh Pal, "Information exchange in commercial seed markets in Rajasthan", AgREN Network paper 83, ODI, July 1998.

Popular articles/Leaflets

Farrington, J, Rasheed Sulaiman, V and Suresh Pal "Strengthening Research and Extension", Agriculture Today, 1(3):32-34,1998.

Rajni Jain and Alka Kalra, "Y2K may affect Indian Agriculture also", ICAR News, January-March 1998.

Ravishankar, A and N.P.Singh, "Sugar economy of Karnataka: A comparative analysis", Southern Economist, 39(2), 1998.

Ravishankar, A, "Noble for ethics", Southern Economist, 36(3), 1998.

Suresh Pal, "AgriculturaJ research pays high dividends", ICAR News, January-March 1998 (also reprinted in APAARI Newsletter 7(1), June 1998.

Books

Ramesh Chand and V.C. Mathur, (ed.) "Agriculture industry interface", Agricultural Economics Research Association (India), New Delhi, 1998.

Ramesh Chand, "Agricultural diversification in India : potentials and prospects in developed region", Mittal Publications, New Delhi, 1999.

Chapter in books/Reviews/Reports

Dayanatha Jha and P.Kumar "Rice production and impact of rice research in India" in P.L. Pingali and M. Hossain (ed.) Impact of Rice Research, International Rice Research Institute, The Philippines 1998.

Dixit, R.S, and Sant Kumar, "Contract and co-operative farming: problems and prospects", in K.T. Chandy and O.S. Tyagi.(ed.), Future of farming in India : Contract or Co-operative farming, Indian Social Institute, Lodhi Road, New Delhi, 1998.

Hague, T. and P.S. Birthal, "Prospects of contract farming in India", in K.T. Chandy and O.S. Tyagi (eds.) Future of Farming in India: Contract or Cooperative, Indian Social Science Institute, 1998.

Jiju P. Alex and Rasheed Sulaiman, V, "Participatory technology development - implications for research and extension", in V.K. Sasidhar, R.M Prasad, S.Madhu, N.Motilal (eds.) Proceedings of the National Seminar on- Participartory Technology Development, Kerala Horticulture Development Programme, 1998.

Joshi, P.K. " Performance of grain legumes in the Indo-Gangetic plain", pp 3-7, in J.V.D. Kumar Rao, C. Johansen and T.J. Rego (eds.), Residual effects of legumes in the rice and wheat cropping system of the Indo-Gangetic plain, Oxford & IBH Publication Co. Pvt. Ltd., New Delhi, 1998.

Lakshmi Prasanna, P.A and S. Selvarajan, "Sugar economy in India: achievements, growth prospects and policy imperatives", in Agriculture industry interface, Ramesh Chand and V.C. Mathur (Ed), Advance Publishing Concept, pp 239-254, New Delhi, 1998.

Mruthyunjaya, Dayanatha Jha and S. Selvarajan, "Water resources scenario: economists" Perception, in National Water Policy: Agricultural Scientists' Perceptions, N.S. Randhawa and P.B.S. Sharma (Ed), National Academy of Agricultural Sciences, New Delhi, pp 357-366, 1998.

Pawar, J.R. and B. C. Roy, "Rapporteurs' report- Technical Session I", in Ramesh Chand and V. C. Mathur (ed) Agriculture Industry Interface, Agricultural Economics Research Association (India), New Delhi.

Ramesh Chand and Mathur V.C., "Challenges in the field of agriculture and agro-industries", in Ramesh Chand and V.C. Mathur ed. Agriculture Industry Interface, Agricultural Economics Research Association (India), New Delhi.

Ramesh Chand, Effect of trade liberalization on agriculture in India: Institutionalization and structural aspects, Working paper 38, CGPRT Centre, Bogor, Indonesia 1998.

Roy, B C, "Demand, supply, marketing and trade', in Ramesh Chand, (compiled) Fifty Years of Agricultural Research in India, Indian Council of Agricultural Research, New Delhi.

Roy, B.C, "Rapporteurs' Report- land use rights and pattern in north-eastern and other tribal areas', in T. Haque (ed.) Planning Commission-National Centre for Agricultural Economics and Policy Research, National Workshop on Land use planning, New Delhi.

Sant Kumar and D.K.Mishra "Role of co-operative in rural development" in G.S.Kainth, (ed) India's Rural Co-operatives, Deep and Deep Publication, New Delhi, 1998.

Sant Kumar and R.S. Dixit "Long term credit requirements of rural India: role of PLDBs" in G.S.Kainth (ed) India's Rural co-operatives, Deep and Deep Publication, New Delhi, 1998.

Presentations in conferences and symposia

Amit Kar, Sant Kumar and B.C. Roy "Problems of marketing vegetables by small and marginal farmers" Paper presented in National seminar on Problems of small and marginal farmers in marketing of fruits and vegetables, organised by Farmers Education and Welfare Society, New Delhi, 20-21 Aug. 1998.

Barah, B.C and A K Neog, "Analysis of resource endowment and economic management: a case study of north eastern India, National seminar on Socio economic development in the north eastern India; looking ahead", New Delhi, 30 Jan. to 1 Feb. 1998.

Barah, B.C, Decomposition of variability of crop income; National seminar on Risk management in rainfed rice, NCAP/IRRI, New Delhi, 21-24 Sept. 1998

Chandrakanth, M.G, H.Ramachandra Reddy, A.LSiddaramahiah, B Padmodaya, S.Jahagirdar, N.Basavaradhya and A. Ravishankar, "Plant protection practices in India based on Virkshayurveda", Traditional Indian Plant Science, III Congress on Traditional Sciences and Technologies of India, Varanasi, 28 Oct. to 2 Nov 1998.

Dayanatha Jha and Rasheed Sulaiman V "Farmer-Research-Industry-Policy Interface and agricultural export, Paper presented at the Fourth Agricultural Science Congress, National Academy of Agricultural Sciences, Jaipur, 21-24 Feb. 1999.

Dayanatha Jha and Sant Kumar "Vartman parikshep mein Bhavi Krishi Neetiyan" National seminar on Bhartiya krishi ka bhavi awroop, ICAR and ISAS, New Delhi, 11-13 Aug. 1998.

Hague, T, and G. Singh, "Problems of small farms in the production and marketing in fruits and vegetables", in Proceedings of the National Seminar, Farmers Education and Welfare Society, New Delhi, 20 Aug. 1998.

Haque. T., "Land tenure system and agricultural productivity" in Proceedings of the Asian regional seminar on Land tenure system, Asian Productivity Organisation, Tokyo, 1998.

Dayanatha Jha and Ramesh Chand, "Emerging trends and sustainability concerns in Indian Agriculture" Paper presented at the Asia Pacific symposium on Sustainable food production, income generation and consumer protection, Beijing, China, 1998.

Dayanatha Jha, Sant Kumar, and Amit Kar "Agriculture in coastal ecosystem: an inventory" in National seminar on Frontiers of research and its application in coastal agriculture, ISCAR and GAU at GAD, Navsari, 16-20 23-26 Sept. 1998.

Joshi, P.K, R.P Singh, and S. Pande, "Legumes in rice-wheat based cropping system for sustaining agriculture in the Indo-Gangetic plain", International Workshop on "Sustainability in agricultural system in transition", organized by the International Agronomy Society and the World Bank, Baltimore, Maryland, USA, 18-22 Oct. 1998.

Joshi, P.K, Dayanatha Jha, and K.K. Datta, "Policy options for salinity management", National workshop on Management of saline and waterlogged soils, Central Soil Salinity Research, Karnal, 2-5 Dec. 1998.

Ramesh Chand and B.C. Roy, "Changes in rice based household economy and gender issues in India", Workshop on Strategic research on gender issues in rice based household economy, International Rice Research Institute, Los Banos, Philippines, 24-28 August 1998.

Ramesh Chand and B.C. Roy, "Growth performance and prospects of rice-wheat production in Indo-Gangetic region", Workshop on Sustaining rice-wheat production system: socio-economic and policy issues, Rice Wheat Consortium, Kathmandu, Nepal. 1-3 July 1998.

Ravishankar, A and Dayakar Rao, "Sorghum production and consumption in Karnataka: shifts, trends and policy issues", Special session on Karnataka economy, 81st Annual Conference of the Indian Economic Association, Bangalore, 26-28 Dec. 1998.

Ravishankar, A and N.P.Singh, "Sugar economy of Karnataka: a comparative analysis, 81st Annual Conference of the Indian Economic Association, Bangalore, 26-28 Dec. 1998.

Ravishankar, A, LG.Lakshminarayana and Dayakar Rao, "Promoting entrepreneurship through IPRs: an institutional approach", International conference on Promotion, policy and sustainability of micro, small and medium enterprises, NISIET and UNESCO, Hyderabad, 29-28 Aug. 1998.

Sant Kumar and R.K Pandey "Economic study of production, storage and marketing of potato" Presented at the VI Annual Conference of Agricultural Economics Research Association, Hissar, 21-22 Sept. 1998.

Shyamasunder M.S, M.G.Chandrakanth and A.Ravishankar, "Interplay of markets, externalities, institutions and equity in groundwater development-an econometric study in the hard rock areas of Karnataka", Ford-Foundation sponsored workshop on Equity issues in groundwater development, University of Agricultural Sciences Bangalore, 17 Apr. 1998.

Tyagi V.P, Sant Kumar and Amit Kar "Trends in progress of institutional lending to agriculture in India, Presented at 58th Annual Conference of Indian Society of Agricultural Economics, Rahuri, 21-23 Dec.1998.

VII List of Approved on-going Projects

Title of Project	Project Leader	Year of start	Likely year of termination
Socio-economic analysis of cropping system research	Barah, B.C	1997	1999
Economic potential of biological substitutes for agro-chemicals	Birthal, P.S	1997	1999
Development of small ruminant sector in India	Birthal, P.S	1997	1999
The demand and supply projections of livestock towards 2020 for India and their policy implications	Dastagiri, M.B	1999	2000
Interaction and impact of technology infrastructure and policy variables on agricultural development	Haque, T	1995	2000
Role of infrastructure in sustainable rainfed agriculture	Haque, T	1996	1998
Emerging trend and regional variations in public investments in agriculture	Ramesh Chand	1996	1998
Analysis of productivity changes and future sources of growth for sustainable rice-wheat production in indo-gangetic regions	Ramesh Chand	1997	2000
Scope for privatising farm extension in India	Rasheed Sulaiman, V	1996	1999
Agro-climatic regional resource management for sustainable agricultural development	Selvarajan.S	1996	1999
Economic analysis of irrigation water use planning under uncertainty : a multi stage optimisation modelling approach	Selvarajan.S	1996	1999
Agricultural research prioritization and resource allocation	Suresh Pal	1996	1999

VIII Consultancy, Patents and Commercialisation of Technology

The Centre's research programmes and outreach activities is expanding to meet the increasing demand for socioeconomic inputs for policy analysis. The Centre is evolving multiple mechanisms to exploit the existing complementary linkages among national and international research institutions for feeding social science inputs into agricultural technology management. Integrating the research focus on targeted areas with more breadth and depth of coverage is the goal, sought to be pursued, through such mechanisms that include consultancy and contract research activities. The consultancy and contract research activities have been broadly formalized as per the Council's guidelines and specifically designed to complement the ongoing and emerging research thrusts and supplement the budgetary resources of the Centre.

Following consultancy services and contract research in collaborative mode are provided by the Centre during this year.

Consultancy / Contract Research

Name	Institution to which consultancy/ contract research is provided	Area of consultancy/ contract research	
Dr. B. S. Birthar	ICRISAT/World Bank	Primary data on cost of cultivation: planning, generation and reporting	Completed
Dr. Ramesh Chand	CGPRT, ESCAP, U.N. Bogor, Indonesia	Effects of trade liberalisation on agriculture in selected Asian countries	Second phase in progress
	ICRISAT/World Bank	Supply responsiveness in India's rainfed agriculture	Completed
Dr. Rasheed Sulaiman V. Dr. Suresh Pal	Overseas Development Institute, London	Improving the effectiveness of research and extension systems: an analysis of institutional and socioeconomic	Completed
Dr. S. Selvarajan	ICRISAT/World Bank	Methodology for validating rainfed agriculture typology	Completed
Dr. Suresh Pal	Overseas Development Institute, London	Pearl millet seed practices in Rajasthan	Completed
	Overseas Development Institute, London	Competed funds for agricultural technology development	Second phase in progress

IX RAC, NIC and SRG Meetings

Research Advisory Committee (RAC)

The composition of Research Advisory Committee of the Centre w.e.f. 8 Feb. 1999 is as follows.

Dr. S.S. Johl
Chairman
21, Gurudev Nagar
Ludhiana
(Punjab)

Dr. P.K. Joshi
(Member Secretary)
Principal Scientist
National Centre for Agricultural
Economics and Policy Research
Library Avenue, New Delhi

Dr. G.S. Bhalla
Centre for Study in Regional Development
Jawaharlal Nehru University
New Delhi

Dr. S.S Acharya
Director
Institute of Development Studies
8-B, Jhalana Institutional Area
Jaipur, Rajasthan

Dr. Ashok Gulati
Institute of Economic Growth
Delhi University
Delhi

Dr. S.S. Bisaliah
Vice Chancellor
University of Agricultural Sciences, Hebbal
Bangalore

Dr. J.C. Kanwar
Rtd. Jt. Addl. Registrar
Cooperative Societies
Department of Cooperation
Govt. of Punjab
Chandigarh

Dr. Mruthyunjaya,
ADG(ESM), ICAR
Krishi Bhawan,
New Delhi

Dr. Bhogendra Jha
Ex-Member of Parliament
Madhubani, Bihar

Dr Dayanatha Jha
Director
National Centre for Agricultural
Economics and Policy Research,
Library Avenue, New Delhi

Dr. P.V. Subba Rao
1-2-597/14, Lower Tank Bund Road,
Hyderabad

Research Advisory Committee meeting (29 June 1998)

The major observations of the RAC meeting are as follows :

National Centre for Agricultural Economics and Policy Research (NCAP) should act as a "think tank" for the agricultural policy makers and to meet this need, the Centre should identify some critical areas of research, for immediate attention.

The Centre should play an important role in the implementation of NATP project. Research prioritisation in agriculture needs to be studied. The committee emphasised the need for establishing good networking among scientists within ICAR-SAU system, and also with other social scientists outside the NARS. The Centre should constitute a small group with the help of one or two outside experts to review the research fundings and research priorities of the Centre. The Centre should initiate debates and dialogues on important policy issues and should prepare brief review paper on important themes.

Management Committee (MC)

The composition of the Management Committee of the Centre is given below.

Dr. Dayanatha Jha
(Chairman)
Director
National Centre for Agricultural
Economics and Policy Research
Library Avenue, New Delhi

Mr. Narander Kumar
(Member Secretary)
Assistant Administrative Officer
National Centre for Agricultural
Economics and Policy Research,
Library Avenue, New Delhi

Dr. Paramatma Singh
Professor
Division of Agricultural Economics,
Indian Agricultural Research Institute,
New Delhi

Dr. Bhogendra Jha
Ex-Member of Parliament
Madhubani,
Bihar

Dr. Mruthyunjaya
Assistant Director-General
(Economics, Statistics and Marketing),
ICAR Krishi Bhawan,
New Delhi

Dr. Karam Singh
Professor
Department of Economics and Sociology
Punjab Agricultural University,
Ludhiana

Dr. Katar Singh
Director
Institute of Rural Management
Anand, Gujarat

Dr. B.C. Barah
Principal Scientist
National Centre for Agricultural
Economics and Policy Research
New Delhi

Chief Finance & Accounts officer
Indian Agricultural Research Institute,
New Delhi

Dr. S. Selvarajan
Principal Scientist
National Centre for Agricultural
Economics and Policy Research
New Delhi

Dr. P.V. Subba Rao
1-2-597/14
Lower Tank Bund Road
Hyderabad

Dr. Rajvir Singh
Principal Scientist and Head
Dairy Economics and Management Division
National Dairy Research Institute
Karnal-132001

Sh R Narayan
Director
Directorate of Agricultural
Marketing, 20, Old Secretrariat,
Delhi-110054

Two meetings of the Management committee were held during the year. The major observations of the Committee are indicated below.

Ninth Management committee meeting (5 May, 1998}

The committee opined that NCAP should come up with its review of Indian Agriculture every year on reforms in different sections of agricultural economy. Project investigators are requested to provide more specific details on the progress of the projects. The committee-emphasised importance of project based budgeting. It approved the various committees functioning at the Centre and suggested for constitution of a Director's advisory committee. The IX plan proposal was approved.

Tenth Management committee meeting (28 Dec. 1998)

The committee expressed the need for bringing out regular publications covering an annual review of agriculture with comments on the major policy decisions in this year affecting agriculture. The committee emphasised the need to look for project funded by semi-government and private agencies. It suggested to present the budget in project based budgeting format. High resource allocation for HRD/training was stressed.

Staff Research Council (SRC) Meetings

Twelve meetings of the SRC were held during the period. Progress of the on-going research programs was reviewed in these monthly meetings. A new research proposal was reviewed and approved for commencement Some major decisions were taken. The SRC was made the final authority to approve research projects. Informal voluntary research teams were formed around each of the research area. Respective program leaders made detailed presentations of the dimensions and perspectives of their research areas. An incentive fund for the administrative, technical and supporting staff was operationalized. An objective and just system for measuring the productivity and performance of scientists is in the process of being evolved. Seminars on visits by scientists to institutions and conferences abroad were arranged. Proposals for seminars and workshops were discussed

Other Committees

The following committees have been constituted for decentralized management.

Budget and Policy Committee

- Dr. Ramesh Chand (Chairman)
- Dr. S. Selvarajan
- Dr. G. Singh
- Ms Lakshmi Prasanna
- Mr. Narender Kumar
- Mr. Naresh Arora

Terms of Reference

- To plan, review and monitor expenditure and income including those for sponsored projects
- To ensure compliance of proper procedures
- To constitute proper purchase committees as and when needed » To approve and recommend all expenditure

Publications Committee

- Dr. Selvarajan (Chairman)
- Dr. Ramesh Chand
- Dr. Suresh Pal
- Dr. Rasheed Sulaiman V. (Secretary)

Terms of Reference

- To plan all Centre publications
- To get all research-related publications reviewed
- To decide on printing, pricing and other issues

Computers and Accessories Committee

- Dr. B.C. Barah (Chairman)
- Dr. S. Selvarajan
- Dr D.K. Agrawal (IASRI)
- Ms. Rajni Jain (Secretary)

Terms of Reference

- To plan and monitor computers/ accessories acquisition for the Centre
- To initiate and supervise LAN and E-mail and computer facilities at the Centre

Official Language Committee

- Dr. G.Singh (Chairman)
- Dr. Sant Kumar
- Mr. S Yadav
- Mr. M.S. Vashisht (Secretary)

Terms of Reference

- To monitor the progress of work done in official language from time to time
- To organize Raj Bhasha weeks/days as intimated by the Council from time to time.

Consultancy Processing Cell

- Dr. S Selvarajan (Chairman)
- Dr.Suresh Pal
- Dr.Rasheed Sulaiman V. (Secretary)

Terms of Reference

- To examine the proposal related to consultancy with reference to guidelines of the Council issued from time to time.

Grievance Cell

- Dr. B.C.Barah (Chairman)
- Dr. P.S.Birthal
- Mr Satinder Kataria
- Ms Umeeta Ahuja (Secretary)

Terms of reference

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

Women Cell

- Ms. Laksmi Prasanna (Chairman)
- Ms. Seema Khattar
- Dr. Harbir Singh
- Ms. Sonia Chauhan (Secretary)

Terms of reference

- Should basically function for the welfare of the women employee and should cater to the issues grievances pertaining to the women employees.
- To make recommendations on issues concerning women staff for expeditious relief and redressal.

X Participation in Conferences, Meetings, Seminars and Workshops

Name	Theme and Duration	Place
Dayanatha Jha	Workshop on Sustainable rainfed agriculture research and development project (20-21 April 1998)	Central Research Institute for Dryland Agriculture, Hyderabad
	National workshop on Watershed approach for managing degraded lands in India challenges for the 21s' century (27-29 April 1998)	Ministry of Rural Areas and Employment, Department of Wastelands Development, Vigyan Bhawan, New Delhi
	International workshop on WTO agreement on agriculture jointly with the Action Aid India and the Institute for Agriculture and Trade Policy, USA (2 May 1998)	India Habitat Centre, New Delhi
	Asia pacific symposium on Sustainable food production, income generation and consumer protection (23-26 June 1998)	ESCAP, United Nations, Beijing
Dayanatha Jha	Roundtable on National agriculture policy and its operationalisation (10 July 1998)	Federation of Indian Chambers of Commerce and Industry. New Delhi
	Sensitization workshop on Socio-economic research under NATP (11-12 August 1998)	National Centre for Agricultural Economics and Policy Research, New Delhi
	Meeting of the Sectional committees on social sciences (11 August 1998)	National Academy of Agricultural Sciences
	National seminar on Problems of small and marginal farmers in marketing of fruits and vegetable (20 August 1998)	Farmers' Education and Welfare Society, New Delhi
	National conference on Salinity management in agriculture (2-5 Dec, 1998)	Central Soil Salinity Research Institute, Karnal
Dayanatha Jha	Session meeting of the Consultative committee of the Ministry of Agriculture on Minimum support price policy for agricultural commodities with special reference to Commission for Agricultural Costs and Prices (21 Dec. 1998)	Department of Agricultural Research, Ministry of Agriculture, New Delhi

Ramesh Chand	Workshop on sustaining rice-wheat production system : socio-economic and policy issues (1-3 July 1998)	Kathmandu, Nepal
	Workshop on strategic research on gender issues in rice based household economy (24-28 Aug. 1998)	International Rice Research Institute, Los Banos, Philippines
Rajni Jain	Workshop of ARIS Incharges to discuss the problems of ARIS acquired hardware and software at National level with, respective vendors and experts from the concerned/areas(17-18 Aug. 1998)	National Bureau of Plant Genetic Resources, New Delhi
Rasheed, S.V Selvarajan.S	Global Symposium on Connecting Strategic Intent in Project Management (14-16 Dec. 1998)	Centre for Excellence in Project Management, New Delhi
Rasheed, S.V	National workshop on Monitoring and Evaluation of Innovations in Technology Dissemination Component of NATP(12-13, Nov, 1998)	National Institute of Agricultural Extension Management (MANAGE) Hyderabad
Joshi, P.K Selvarajan, S	6th Annual conference of Agricultural Economics Research Association (21-22 Sept. 1998)	Chaudhary Charan Singh Haryana Agricultural University, Hissar
Joshi, P.K	International workshop on Sustainability of agricultural systems in transition, organized by the International Agronomy Society and the World Bank (18-22 Oct. 1998)	Baltimore, Maryland, USA
	National seminar on Managing saline and waterlogged soils (5 Dec. 1998)	Central Soil Salinity Research Institute, Karnal.
Joshi, P.K Suresh Pal	Workshop on Prioritization research programs in rainfed rice production system (14 Dec. 1998)	National Centre for Agricultural Economics and Policy Research, New Delhi
Joshi, P.K Ramesh Chand Roy, B.C, Suresh Pal	58th Annual conference of Indian Society of Agricultural Economics (21-23 Dec. 1998) 31	Mahatma Phule Krishi Vidyapeeth, Rahauri

Ravishankar, A	International conference on Conservation and sustainable use of medicinal plants, FRLHT and JNCAS-IISC (23-26, Jan. 1998)	Jawaharlal Nehru Centre for Advanced Studies, Indian Institute of Science, Bangalore
	Ford-Foundation sponsored workshop on Equity Issues in Groundwater Development (17 Mar. 1998)	University of Agricultural Sciences Bangalore
	Interaction meeting on AICAR-ICAR project on Agricutural Marketing and Trade Policies (4-6 Jan. 1999)	National Centre for Agricultural Economics and Policy Research, New Delhi
Selvarajan, S	NATP mission mode project meeting on Data base digitalisation (24-25 Sep. 1998)	National Bureau for Soil Survey and Land Use Planning, Nagpur
	NATP Hill and mountain agro eco-system project proposal review meeting (15-17 Oct. 1998)	Central Soil and Water Conservation Research and Training Institute, Dehradun
Selvarajan, S	National workshop on dynamic crop simulation modeling for agro-met advisory service (4-6 Jan. 1999)	National Centre for Medium Range Weather Forecasting, Indian Meteorological Department, Delhi
Roy.B.C	Methodology Workshop of the NATP project analysis of productivity changes and future sources of growth for Sustainable rice-wheat cropping system (16-17 Jan. 1998)	National Centre for Agricultural Economics and Policy Research, New Delhi
	Review and planning workshop for IRRI project farmers participatory rice breeding in eastern India (23-24 Mar. 1998)	India International Centre, New Delhi
Roy, B.C Dayanatha Jha Suresh Pal	Sensitization workshop on Priority-setting, monitoring and evaluation in agricultural research (26-27 Aug. 1998)	National Centre for Agricultural Economics and Policy Research, New Delhi
Roy, B.C	IRRI-NCAP Workshop on Risk and uncertainty in rice production in Eastern India (21-23 Sept. 1998)	National Centre for Agricultural Economics and Policy Research, New Delhi

Policy Interaction

The Centre and its staff have been involved in a number of activities including informal discussions with academicians and policy makers and analysts.

Dr. T. Haque served as a member of the High Powered Committee to monitor the impact of WTO on Punjab Agriculture, Government of Punjab. He served as member of the Research Advisory Committee, Ministry of Rural Areas and Employment, Govt. of India and Lal Bahaur Shastri National Academy of Administration, Mussorie. He also assisted the Planning Commission in preparing the section on Agriculture and Rural Development of the Draft Ninth Five Year Plan. He

also served as a member of the expert group on Syllabus revision for Indira Gandhi Open University; Member, National Committee on Agriculture; Member, Research Review Committee Indian council of Social Science Research; Member, Core group of Indian Rural Development report NIRD, Hyderabad; Member, Academic Council Haryana Institute of Rural Development

Dr. Ramesh Chand was a special invitee to the meetings of the Committee on "All aspects related to the state of farmers in the country" constituted in the Ministry of Agriculture. He had contributed to the discussion on Foodgrain production and requirement held under the Chairmanship of Agricultural Commissioner, Ministry of Agriculture. Member of the Standing Group to review and analyse the emerging trends in world agriculture, Ministry of Agriculture. Member of the 'Group for Monitoring the Preparation for Mid-term Review of WTO on Agreement on Agriculture' set up by the Ministry of Agriculture.

Dr. Rasheed Sulaiman V, served as a member of the sub-group, monitoring and evaluation of extension component of NATP, Ministry of Agriculture, Government of India; member of the ICAR Subject Matter Committee for restructuring P.G. Curricula in Social Sciences.

Dr. S. Selvarajan, served as a member of the World Bank mid-term review mission on Tamil Nadu water resources consolidation projects of Tamil Nadu and Orissa; Leader of the Indian mission for assessing the sub-tropical area development programme in Bhutan set up by the Ministry of Agriculture and Co-operation, Government of India; Member of the ICAR Subject Matter Committee for restructuring P.G. Curricula in Social Sciences.

XI Workshops/Seminars

Workshops /Seminars /Brain storming sessions were organised periodically on current issues in agricultural development. These were organised either individually or in collaboration with national and international institutions. Such events are given below.

- One-day Workshop was organised under NATP on 'Research Prioritisation of Programs in Rainfed Rice Production System' on 14 Dec. 1998. The workshop was organised in collaboration with the Central Research Institute on Dryland Agriculture, Hyderabad.
- The Inception meeting of the ICAR - ACIAR (Australian Centre for International Agricultural Research), collaborative project on "Equity Driven Trade and Marketing Policy Strategy in Indian Agriculture" was organised on 4-6 Jan. 1999.
- Training workshop from 1-6 Feb. 1999 was organised on 'Research Prioritisation of Programs and Production Systems in Different Agro-Eco-regions' under NATP for agricultural economists and other scientists who represented different agro-eco-regions delineated by the NATP.

ICAR-Private Sector Interface in Agricultural Research

The National Agricultural Research System (NARS) in India is currently responding to the process of reforms in agricultural, economic and scientific environments. Innovative institutional arrangements for identifying and exploiting the complementary linkages between public and private sector institutions are the need of the hour. A brainstorming workshop on ICAR-Private sector *interface* organised by our Centre on 2 April 1998 and deliberated on the issues relating to the exploitation of complementary linkages between public sector, scientists, research managers and planners attended the meeting, from the public and private sector R&D. Organisation and representatives of NGOs, co-operatives, trade and export organisations.

The deliberations covered the following issues: Identifying a complementary role for the private sector, building an environment of trust between the two sectors, developing an agreement on sharing basic information and materials (germplasm), IPR and PVP related matters, use of public institutions for R and D by private sector, provision of contract research, and institutionalisation of private-public sector interface.

Action Plan

- The Policy Advisory Committee on genetic resources to be made broad based to include other stakeholders.
- ICAR to constitute functional groups with major stakeholder representatives for effective interface between NARS and private sector.
- ICAR to strengthen the Legal and Policy Cell during the IX Plan.
- National Bureau of Plant Genetic Resources to organize brainstorming session on NARS-Private sector interface exclusively for germplasm and seed related issues.
- National Research Centre on Plant Bio-technology to organize a meeting with public and private sectors to document the existing capacity for biotechnology research in the country
- Indian Agricultural Statistics Research Institute to bring out a bulletin on "ICAR Services to Industry" and to develop a data base covering private sector role in agriculture.
- Policy Cell of the Council to develop guidelines for accreditation of private sector based R&D institutions to enable their participation in competitive research grants.
- Policy Cell and NCAP to develop MOU and other procedures for interfacing functional relationships and sharing of information and materials between ICAR and Private sector.

Food, Population and Environment

- The brainstorming seminar was organised by the National Centre for Agricultural Economics and Policy Research on 1 Aug. 1998. A number of Economists Policy makers, Biological Scientists, NGO representatives, Research administrators from different parts of India participated. The major recommendations of the seminar are as follows:

Recommendations

- Meeting the food needs of the growing population implies producing more than 6 million tons of additional food production on sustainable basis every year. More effective and efficient agricultural technology management is crucial to achieve this.
- Although food security is the primary objective, the new National Agriculture Policy (NAP) must also consider the objectives of improving quality of population (population as productive resource) and environmental sustainability, which must go together in planning for food security.
- The future technology and policy interventions, besides targeting increased agricultural productivity and sustainable income stream to the poor, must emphasise the issues of right to entitlement, gender equality, and employment opportunities for the rural population.
- All productivity enhancing research must integrate efficient management of natural resources to achieve sustainable improvement in the performance of production system within the eco-system. Efficient land use planning must receive greater attention.
- People's participatory approach and the value of traditional knowledge are recognised as important elements of agricultural development and hence there is need to promote involvement of the stakeholders in developing research agenda to include elements of indigenous knowledge.
- Reorientation of extension, research and development in partnership mode with the stakeholders (e.g. SAUs, farmers, NGOs and other private sectors) are necessary to include strategies for diversification of agriculture, conservation of biodiversity and capacity building to make Indian agriculture more efficient. Such new initiatives based on eco-regional technological planning for backward areas are recommended for promoting social equity and ecological security.
- Innovative institutional arrangements to correct the existing lacunae in management and use of natural resources need to be stressed. Ongoing reforms and trade liberalisation underline the role of institutional change and the need for analysing the likely impacts on agricultural productivity and environment.
- Declining and/or stagnating total factor productivity in agriculture calls for stepping up both public and private investment in agricultural research, social and economic infrastructure development. An inter-ministerial perspective is absolutely essential for realising the goals of rural development.
- Precise projections on demand and supply of food are urgently required for future agricultural planning. Therefore, it is recommended to constitute a task force of experts to examine the current projections and suggest mechanism to update it periodically.

Priority Setting, Monitoring and Evaluation in Agricultural Research

In order to accelerate organisation and management reforms under National Agricultural Technology Project, NCAP has been given co-ordinating responsibility of research Priority setting, Monitoring and Evaluation (PME) activities. Under this activity, NCAP organised a two-day sensitisation workshop on PME on 26-27 Aug. 1998. Senior research managers, Agro-ecosystem Directors, chairpersons of scientific advisory panels, principal investigators and experts, attended this workshop. Basic objective of this workshop was to sensitise the participants and key stakeholders about importance of PME and proposed plan to institutionalise PME.

Recommendations

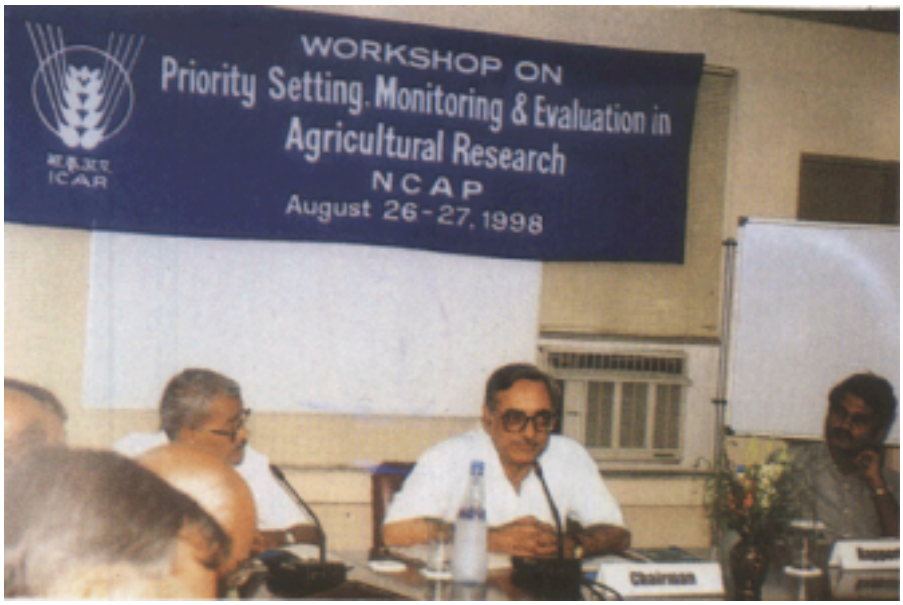
- There is a need for more sensitisation workshops at agro-ecosystem level with the help of case studies
- Institutionalisation of PME is a strategy to improve research efficiency. It is a driving force both within and beyond NATP. It. must be forthwith implemented, and institutions must earmark resources for this purpose.
- NATP programme must be integrated with on-going research programmes at various institutions/ This is necessary for holistic prioritisation approach.
- There should be an explicit mechanism for inter-institutional collaboration and developing a culture of sharing information (including methodologies), software, resources, etc. through networking. This is necessary to avoid duplication as well as to provide complementarity.
- Research programme development, monitoring and evaluation must be fully integrated with funding, personnel evaluation and reward system to ensure that the procedure is effectively implemented. This has not been the case in past.
- Agricultural economists should be provided on a permanent or temporary basis through redeployment in the PME cell at all levels. Research monitoring process should integrate monitoring tools, research resources and institutional aspects. It should also place equal emphasis on both quantitative and qualitative dimensions of research.
- ARIS should also provide value-added data on agriculture.

Action Plan

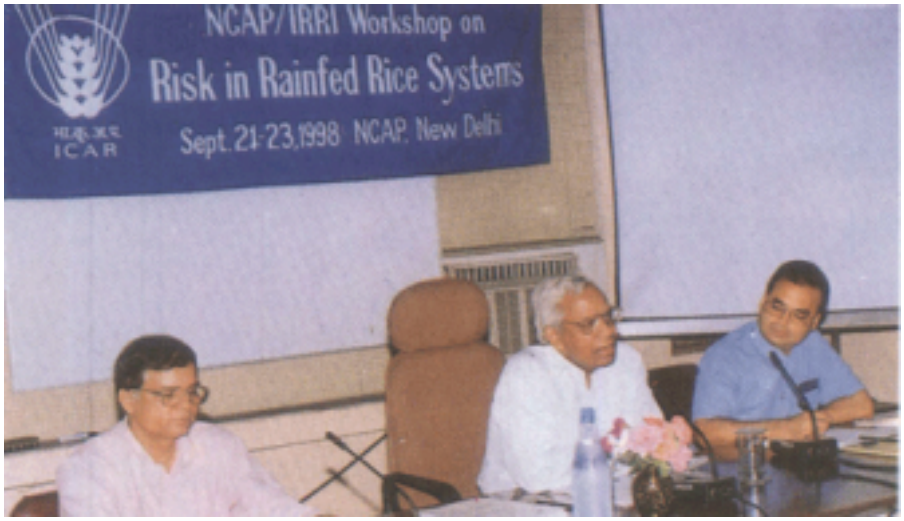
- Creation of PME cells at the national, ecosystem and institute/SAU levels in the research system.
- Organise training programmes on priority-setting, monitoring and impact assessment methodology.

ICAR-Private Sector Interface in Agriculture Reserch

Food, Population and Environment



Priority Setting, Monitoring and Evalution in Agricultural Reserch



Risk Analysis of Rainfed Rice System

Risk Analysis of Rainfed Rice System

The workshop was jointly organised by the International Rice Research Institute and the National Centre for Agricultural Economics and Policy Research on 21-23 Sept. 1998. The seminar focussed on the following themes viz.

- Micro-level case studies on risk characterisation and coping mechanisms
- Stability analysis at the district and state levels
- Review of conceptual and methodological aspects for risk analysis
- Price, policy responses and institutions
- Rice technology and risk

Major issues identified

- Anthropogenic sources of risk due to deforestation and other causes.
- The role of collective institutions in managing risks.
- Macro-economic forces impact on risk in agriculture.
- Risk and commercialisation of agricultural systems.
- Quantifying the impacts of unpredictable shocks at different geographic scales.
- Risk coping mechanisms and the extent of commercialisation.
- The data needs for risk analysis at different geographic scales.
- Crop insurance - its viability for rainfed rice.
- Role of price support schemes in the context of rainfed rice.

Action Plan

- Risk characterisation using secondary data, crop modelling and GIS.
- Development of a computerised district-level data base on cropping pattern and other economic information for Eastern India.
- Micro-economic analysis of risk-coping mechanisms from different representative sites.
- Development of a farm-household model that captures the effect of risk and risk aversion to evaluate the likely effect of new rice technology and policy changes on rice production and farm income.
- Analysis of the role of community-based institutions in risk-management.

XII Distinguished Visitors

India

Dr. R. S. Paroda, Director General, ICAR and Secretary, DARE, New Delhi

Dr. Abhijit Sen, Chairman, Commission on Agricultural Costs and Prices, New Delhi

Dr. Paul Perrault, Research Fellow, ISNAR, The Hague

Dr. M. V. Rao, Former Vice-Chancellor, APAU, Hyderabad

Dr. K.V. Raman, Former member ASRB, New Delhi

Dr. M. L. Madan, Deputy Director General, ICAR, New Delhi

Dr G.L. Kaul, OSD (NATP)JCAR, New Delhi

Dr. Prem Vashist, Agro-Economic Research Centre, Delhi

Dr Bruno Dorin.CSH, New Delhi

Abroad

Dr. Ruth Alsop, Research Fellow, International Food Policy Research Institute, Washington

Dr Akira Fueki, Hiroshima Prefectural University,Japan

Dr. Kazuo Masai, Journalist, Japan

Dr. Michio Kanai.ESCP-CGPRT Centre, Indonesia

Dr Boorijit Tiapiwatanakun, Kasetsart University, Thailand

Dr. K.Bgunjal, FAO, Rome

Dr. Fiona Marshall, Centre for Environmental Technology, U.K

Dr John Stonehouse, Imperil College of Science, Technology, Medicine, UK

Dr. Z.Y.Zhou, University of Sidney, Australia

Dr. D.P. Chaudhri, University of Wollongong, Australia

Dr C.Lewcock, NRI, UK

Dr. P.T. perrault, ISNAR, The Netherlands

Dr. Padma Lal, ACIAR, Australia

Dr. John Farrington, ODI. UK

Dr. Robert Tripp, ODI. UK

Dr Cynthia Bantilan, ICRISAT, Hyderabad

Dr Suresh Babu, IFPRI, Washington

Dr Sushil Pandey, IRRI, The Philippines

Dr Reimund P. Roether, IRRI, The Philippines

Dr Chu Thai Hoanh, IRRI, Philippines

XIII Personnel

Posts

The details of the positions sanctioned, filled and remaining vacant at NCAP are given in Table 13.

Table 13: Positions sanctioned, filled and vacant

S No	Post (Category wise)	Positions sanctioned	Positions filled	Positions vacant
1.	Director	1	1	-
2.	Principal Scientist	4	4	
3.	Senior Scientist	6	4	2
4.	Scientist	10	10	-
5.	Assistant Administrative Officer	1	1	-
6.	Assistant Finance and Account Officer	1	1	-
7.	Assistant	1	1	-
8.	Senior Clerk	1	1	-
9.	Stenographer	1	-	
10.	Junior Stenographer	1	2*	-
11.	Junior Clerk	2	2	-
12.	Technical Assistant	4	4	-
13.	Driver	1	1	-
14.	S.S. Grade	2	2	-
	Total	**36**	**34**	**2**

Adjusted against the position of Stenographer

List of Staff Members

Scientific

Dayanatha Jha	Director
B.C.Barah	Principal Scientist
P.K.Joshi	Principal Scientist
Ramesh Chand	Principal Scientist
S.Selvarajan	Principal Scientist
T.Haque	National Fellow
Amit Kar	Senior Scientist (since May 1998)
G.Singh	Senior Scientist
P.S.Birthal	Senior Scientist
Suresh Pal	Senior Scientist
A.Ravishankar	Scientist
Anjani Kumar	Scientist
B.C.Roy	Scientist
Harbir Singh	Scientist
M.B.Dastagiri	Scientist
P.A.Lakshmi Prasanna	Scientist
P.Adhiguru	Scientist
Rajni Jain	Scientist
Sant Kumar	Scientist
V.Rasheed Sulaiman	Scientist

Administrative

Narender Kumar	Assistant Administrative Officer
Naresh Arora	Asst. Finance & Accounts Officer
M.S. Vasisht	Assistant
Umeeta Ahuja	Junior Steno
Anju	Junior Steno (since Sept. 1998)
Seema Parmar	Junior Steno (till April. 1998)
S.K. Yadav	Senior Clerk
Ravindra Kumar	Junior Clerk
Inderjeet Sachdeva	Junior Clerk

Technical

Khyali Ram Chaudhary	T-II-3
Mangal Singh Chauhan	T-II-3
Sonia Chauhan	T-II-3
Arun Kumar	T-II-3
Satinder Singh Kataria	T-1

Supporting

Mahesh Kumar	S.S. Gr. I
Sanjay Kumar	S.S. Gr. I

XIV Budget

Expenditure pattern during the year 1998-99 is shown in Table 14 below:

Table 14: Expenditure during 1998-99 (in lakh Rs.)

Head of Account	Plan	Non-Plan	Total
Pay and Allowances	13.69	57.0	70.69
OTA		0.15	0.15
Travelling Expenses	2.00	0.5	2.50
Works	6.00	-	6.00
Other Charges	36.00	5.0	41.00
Total	**57.69**	**62.65**	**120.34**

XV Special Infrastructure Development

Scientific strength has expanded during the year. Additional working space was provided for office staff through renovation and expansion within the limited space available for the Centre. Lecture room was renovated with system, good light and sound effects. For effective communication, efficient administration and quick co-ordination, LAN connectivity is provided by linking with Indian Agricultural Statistics Research Institute, to all the scientists of the Centre. LAN nodes are strengthened with more speed and storage to improve the access to the LAN. Scientists are provided with their personal E-mail accounts at desktop. Independent desktop computing facilities is provided in a phased manner depending upon the requirements and available budgetary support through in-house and external sources. The Centre is moving towards a modest level. Land for independent office space and staff quarters have been provided, and architectural plans are under preparation. Additional transport and national networking facilities is going to be provided in the Ninth Plan and the National Agricultural Technology Project.

Salient Features of Ninth Five Year Plan

Programmes for IX Five Year Plan are designed to strengthen and intensify technology, growth, sustainability, institutional and trade-related policy research covering crops, livestock, fisheries and agro-forestry and related mandates. It also ensures that required infrastructural base be provided for the Centre. The Centre will maintain its small size in terms of scientific staff. No additional scientific positions are proposed. The proposal is based on absolute minimum.

New initiatives on social science networking, visiting scientists/policy research and social science information depository programmes are proposed to fulfil the Centre's HRD mandate of strengthening social science linkages and capacity enhancement within the National Agricultural System.

Innovative and need based human resource development programmes for scientists, technical and administrative staff alongwith information support systems are envisaged in IX Plan proposal. This is considered essential in view of the non-traditional environment confronting the system.

Creation of modest physical and a modest addition to support staff infrastructure is needed on priority to provide suitable habitat and visibility to this new Centre which is on the threshold of evolving into an important policy research institution during IX Plan period. Existing facilities are out of date and inadequate. More than 82 per cent of the plan resources are earmarked for this critical need.

वार्षिक प्रतिवेदन
1998-99

सारांश

राष्ट्रीय कृषि आर्थिकी एवम् नीति अनुसंधान केन्द्र की स्थापना भारतीय कृषि अनुसंधान परिषद् द्वारा 1991 में की गई। यह केन्द्र भारतीय कृषि सांख्यिकी अनुसंधान संस्थान के परिसर में स्थित है। परिषद् के अन्य संस्थानों का सामिप्य इस केन्द्र को कई मूलभूत सुविधाएँ उपलब्ध कराता है। वर्ष 1998-99 में केन्द्र में 20 वैज्ञानिक तथा 16 अन्य कर्मचारी कार्यरत थे। इस वर्ष का कुल बजट रु. 119.75 लाख था।

केन्द्र की नीतियों का निर्धारण एक उच्च-स्तरीय अनुसंधान सलाहकार समिति करती है तथा साधारण कार्यकलापों का निरीक्षण प्रबन्ध समिति द्वारा होता है। इसके अतिरिक्त कई आन्तरिक समितियाँ केन्द्र के दैनिक कार्यों का संचालन करती हैं। अनुसंधान के क्षेत्र में इस वर्ष की विशिष्ट उपलब्धियों का संक्षिप्त विवरण नीचे दिया गया है –

पशुधन विकास सम्बन्धित शोध प्रदर्शित करते है कि पिछले 25 वर्षों में दुग्ध उत्पादन में उन्नत तकनीकियों का सहयोग क्रमशः बढ़ता रहा है। भेंस उत्पादन का विश्लेषण कर्नाटक प्रदेश के संदर्भ में यह दर्शाता है कि इस क्षेत्र में उन्नत तकनीकियों का प्रयोग परिलक्षित नहीं होता। संकर नस्लों के सीमित विस्तार के संदर्भ में इन शोधों ने ध्यान आकर्षित किया है।

गंगा के सिंचित मैदानों में धान-गेहूँ फसल चक्र की उत्पादकता में ह्रास चिन्ताजनक है। इस विषय में शोध यह इंगित करते है कि इस फसल चक्र में दलहनों के समावेश से इस ह्रास की गति को रोका जा सकता है। यह कृषि वैज्ञानिकों के लिए एक चुनौती है।

असिंचित क्षेत्रों का एक शोध दिखाता है कि प्रमुख उत्पादन क्षेत्रों (जिलों) में अभी भी ज्वार एक मुख्य खाद्यान्न है और 50 प्रतिशत खाद्यान्नों की खपत ज्वार द्वारा होती है। एक अन्य शोध विश्लेषण से यह प्रकट होता है कि असिंचित फसलों का उत्पादन भी कीमतों तथा उत्पाद दरों पर निर्भर करता है। इससे यह बात स्पष्ट होती है कि भारतीय कृषि विकास में मूल्य नीति तथा प्रौद्योगिकी अति आवश्यक साधन हैं।

अन्तर्राष्ट्रीय व्यापार में भारतीय कृषि उत्पादों के योगदान पर की गई एक समीक्षा यह स्पष्ट करती है कि इस दशक में आर्थिक उदारीकरण की नीतियों ने कृषि निर्यातों को निश्चित रूप से प्रोत्साहित किया है। परंपरागत उत्पादों के अतिरिक्त, साधारण चावल, खनिज एवम् अन्य विलहन उत्पाद, समुद्री मत्स्य इत्यादि पिछले वर्षों में महत्वपूर्ण रहे हैं। कृषि संबंधी आयातों में खाद्य तेल एवं तर्वरकों का स्थान प्रमुख रहा है। इस शोध का एक महत्वपूर्ण निष्कर्ष यह है कि आयात-निर्यात सम्बन्धी नीतियों में सुधार तभी कारगर सिद्ध होंगे जबकि आन्तरिक व्यापार प्रणाली में उदारीकरण लागू किया जाएगा और अनावश्यक सरकारी हस्तक्षेपों से कृषि विपणन को पूर्ण रूप से मुक्त रखा जायेगा।

अन्तर्राष्ट्रीय संस्थाओं के सहयोग से किया गया एक अन्य शोध यह निष्कर्ष देता है कि कृषि विस्तार में मूलभूत परिवर्तन आवश्यक है। प्रसार की नई प्रणाली सामूहिक सहयोग पर आधारित होनी चाहिए तथा इसमें विभिन्न संस्थाओं की भागीदारी आवश्यक है।

उत्तर-पूर्वी क्षेत्र के आर्थिक विकास से सम्बन्धित एक शोध में इस क्षेत्र के विकास एवम् संसाधनों का सर्वेक्षण किया गया। प्राकृतिक संसाधनों का अनुपयुक्त शोषण तथा मूलभूत आर्थिक सुविधाओं का अभाव इस क्षेत्र की प्रगति में बाधक रहे हैं।

इस वर्ष केन्द्र द्वारा वर्षों पंचवर्षीय योजना को अन्तिम रूप दे दिया गया तथा इसकी स्वीकृति भी गई। साथ ही राष्ट्रीय कृषि प्रौद्योगिकी परियोजना (एन.ए.टी.पी.) के अन्तर्गत केन्द्र के कार्यक्रमों का प्रारूप बनाया गया। इसके अन्तर्गत कृषि अनुसंधान में प्राथमिकता प्रणाली की स्थापना, तथा राष्ट्रीय स्तर पर परिषद् के संस्थानों तथा कृषि विश्वविद्यालयों में अर्थशास्त्रियों के शोधों में तालमेल के कार्यक्रम बनाए जाएंगे।

पिछले वर्ष की भाँति इस वर्ष भी मानव संसाधन प्रशिक्षण पर विशेष ध्यान दिया गया तथा कई प्रशिक्षण कार्यक्रमों में केन्द्र के वैज्ञानिकों तथा तकनीकी सहयोगियों ने भाग लिया। केन्द्र की ओर से भी कुल प्रशिक्षण कार्यक्रम आयोजित किये गए। इसके अतिरिक्त केन्द्र में मूलभूत सुविधाओं में वृद्धि की गई, यथा कार्यालय परिसर का पुनरीकरण, लैन (LAN) सुविधाओं का विस्तार, तथा आवश्यक उपकरणों की आपूर्ति।

इन सब के साथ-साथ, केन्द्र के वैज्ञानिकों ने सक्रिय रूप से कृषि नीति संबंधी विचार-गोष्ठियों और संगोष्ठियों में भाग लिया। केन्द्र द्वारा 2 नीति प्रपत्र (Policy Paper), 2 नीति-सार (Policy Brief), 2 गोष्ठी प्रारूप (Seminar Proceedings) तथा अन्य शोध आलेख प्रकाशित हुए। इन प्रकाशनों तथा वैज्ञानिकों द्वारा अन्य पत्रिकाओं में प्रकाशित प्रपत्र केन्द्र की प्रतिष्ठा बढ़ाने में सहयोगी सिद्ध हुए।