

## Preface

This report covers the activities of the Centre during 1997. This was a year of consolidation. Recruitment proceeded as planned and infrastructural support was strengthened. Ninth Five Year Plan proposals, consistent with the directions of the Perspective Plan, were finalised. Initiatives were also taken to develop programmes under the National Agricultural Technology Project proposed for World Bank funding.

Apart from intensification of on-going research and outreach activities, the Centre also competed for and obtained approval for several research projects from ICAR and other agencies. Human resource development programmes have also been planned and initiated. Substantive dialogue has also been started with economists working in ICAR institutes and state agricultural universities.

Dr. P. Adhiguru has compiled this report with help from Drs. S. Selvarajan, Ramesh Chand, Rasheed Sulaiman V. and Ms. Umeeta Ahuja. Mr. Ravindra Kumar has helped in preparation of Hindi computerscript. I am thankful to them and other colleagues who have all contributed to this effort.

**February,  
1998New Delhi**

**Dayanatha Jha  
Director**

## 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 fifteen scientists, and fifteen supporting staff. It had a total budget of Rs. 55.49 lakhs for the year 1997-98.

The Centre is guided in its policies by a high-level Research Advisory Committee (RAC) comprising mostly of eminent professionals outside the system and is supervised by the Management Committee (MC). A number of internal committees, such as Staff Research Council, Budget Review Committee, Library Committee and Publications Committee have been constituted for decentralized management.

Policy research conducted during the year covered current and emerging areas of concern which include agricultural research and extension investment, evaluation and analysis, pesticide use in agriculture, sustainability of crops and cropping systems, agricultural typology for planning, diversification prospects towards high value crops, processing of fruits and vegetables, informal rural credit systems, trends and regional variations in public investment in agriculture.

Agricultural research and extension investment analysis revealed that India is currently spending 0.42 per cent and 0.20 per cent of AgGDP on research (excluding education) and extension, respectively. The share of private investment is only 15 per cent in research and 8 per cent in extension. Increased resource allocation for agricultural research and extension to states like Bihar, Uttar Pradesh, Madhya Pradesh, Assam and Orissa is emphasised.

Ex-ante analysis of research on rice-wheat system for incremental investment to be made under the National Agricultural Technology Project in Indo-Gangetic plains justified increase in research investment. There is not much difference between the rates of return on crop improvement research and crop and resource management research, except water management research where projected research cost is very high and expected adoption rate is comparatively low.

A study on research and extension for future rainfed farming identified specific institutional factors like wider stakeholder involvement, appropriate mix in core and contract funding for client oriented system and matching changes in the incentive and reward system. The study also identified specific skill development needs for researchers and extension agents in the area of participatory techniques, group actions, project cycle management and conflict resolutions for efficient designing and delivery of appropriate rainfed farming technologies.

Analysis of pesticide use in Indian agriculture showed that growth in pesticide use outweighed the growth in food production upto the first decade of green revolution. Thereafter, pesticide use registered lower growth than the growth in food production. Development of pest resistant crop cultivars and integrated pest management technologies helped in moderating intensive use of pesticides in food crops. Intensification and diversification of eco-friendly strategies is emphasised for targeting sustainable growth in future agricultural production.

Growth rate analysis of rice-wheat system revealed that wheat yield growth fluctuated in West Bengal and accelerated in Bihar. Growth rates witnessed decline in the recent quinquennium for other states. Lowest growth rates are observed in Punjab which also continued to face deceleration in growth in rice after late 1970's and in wheat after early 1980s.

Bio-economic simulation of wheat production strategies in northern parts of India highlighted that delayed planting of wheat in about half of the existing area requires additionally 1.6 lakh tonne of fertiliser-N, 7.2 lakh ha m of irrigation water and energy for maintaining productivity at 4 tonnes per ha. Decelerating

growth rates in yield, falling ground water table and imbalance in soil nutrient status is the emerging evidence challenging the future pathway for development.

Rainfed agricultural typology study revealed that for constructing relatively more homogeneous typologies with similar response expectation to external policy stimuli, the typology classification approach should encompass not only agro-ecological variables like normal rainfall, soil type and length of growing period but also underlying poverty, output market, population pressure, infrastructure, input market and demography related socio-economic structural variables. Proposed agricultural activity based classification of 201 rainfed districts from 13 states into 15 rainfed agricultural typologies effectively integrated these agro-ecological and socio-economic variables.

Analysis of diversification potentials towards high value crops in Karnataka highlighted the profitability of cultivating cereals either with flowers or with vegetables and sericulture or with fruits and vegetables. Specific preferences of the farmers for flowers, vegetables and fruits were identified alongwith the relaxable market and infrastructure related constraints for enhancing the profitability and employment potentials of high value crop based diversification in Karnataka's agriculture.

A study of fruits and vegetable processing industry revealed considerable inter-state variation in terms of distribution of processing units and levels of infrastructural development which is again not matching with the production of fruits and vegetables and availability of other raw materials. Bihar, which contributes 13 per cent of total production accounts for only 1.3 per cent of processing units. Modernising and spatially extending the processing units with matching basic infrastructure is emphasised particularly in eastern and north-eastern India.

In terms of future plans, following major research themes for NCAP are identified in the Perspective Plan for the Centre.

- Evaluation of prospective technologies
- Constraints to technology transfer
- Agricultural research policy
- Impact assessment
- Efficiency in inputs use
- Impact of natural resource degradation
- Evaluation of sustainable agricultural systems
- Supply, demand and markets
- Group action studies
- Institutional constraints
- Investments in agriculture
- Growth analysis and modelling

As visualized in the medium-term plan, by the end of the Ninth Plan, ICAR will have an in-house unit capable of effective interface with policy making. It will have the capacity to analyse and interpret policy implications of its technology generation activities. An institutional base will be created for prioritisation of research as dictated by national concerns. The Centre will establish its credibility as a policy research group and will provide an effective mechanism for policy dialogue between ICAR and policy making bodies. It will develop strong linkages with SAUs, other ICAR institutes, centres of research, and international agricultural research centres. The human resource development programme will contribute to significant improvement in the quality and relevance of agricultural economics research in the ICAR-SAUs system.

Two Policy Papers and one Policy Brief have been published during the year 1997-98. Centre staff have also been involved in a number of professional and policy-level interactions.

# 1 Introduction

The National Centre for Agricultural Economics and Policy Research (NCAP) was established by Indian Council of Agricultural Research (ICAR) in March 1991, as a part of its resolve 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 access to library, computational and other infrastructural facilities available at these institutes.

## Faculty

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

## Management

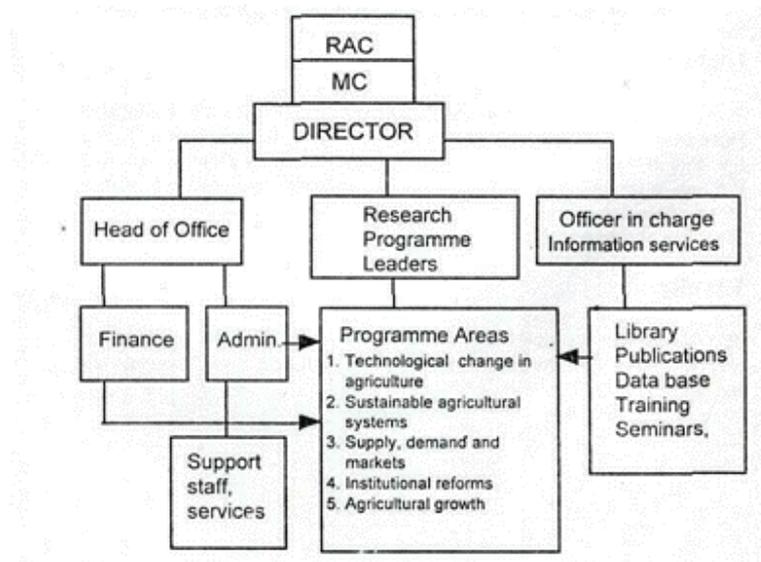
The Centre is guided in its policies by a high-powered Research Advisory Committee (RAC) comprising mostly of eminent professionals outside the system. Prof. Y. K. Alagh, former Vice-Chancellor, Jawaharlal Nehru University, New Delhi, and presently Minister of State for Power and Science and Technology, Government of India, is the Chairman of RAC. 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 Review Committee, Library Committee and Publications Committee have been constituted for decentralized management.

## Organogram

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

**Fig. 1 Organogram of NCAP**



## II Research Achievements

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

### TECHNOLOGICAL CHANCE

#### **Agricultural Research and Extension Investments**

*Suresh Pal and Alka Singh*

A database on agricultural research, extension and education investments, containing state-wise data since 1960/61, has been developed and analysed. Presently, India is spending 0.42 per cent and 0.20 per cent of AgGDP on research (excluding education) and extension, respectively. These intensities are very low in comparison to those in developed nations. Most of the investments are made by governments; the share of private investment is only 15 per cent in research and 8 per cent in extension. State-wise data indicate wide variations in research and extension intensities (Table 1).

Table 1 also shows the need for increased allocation to states like Bihar, Uttar Pradesh, Madhya Pradesh, Assam and Orissa. Further analysis on changes in factor shares has shown that there is sharp decline in the share of non-salary expenditure, impairing the efficiency of research and extension systems. Determinants of research and extension investments were examined using a political-economy model. The results indicate positive association between research and extension investments. Research investment is positively related with the demand for agricultural commodities, while extension investment showed economies of scale. Alternate sources of growth have negatively affected extension investment, whereas there were efforts to develop research system irrespective of changes in alternate sources of growth. Research investment increased with the increase in the share of agriculture expenditure in the total government expenditure. But extension expenditure increased when there was an increase in investible government resources, indicating that extension was accorded low investment priority. Rural literacy has significant positive effect on research and extension investments.

**Table 1 : Actual and normative allocation of national research investment by states**

State	Intensity* of state investment	Intensity* of State & ICAR investment	Per cent share in total investment	
			Actual	Normative
Andhra Pradesh	0.26	0.46	8.7	9.8
Assam	0.41	0.46	2.7	3.6
Bihar	0.16	0.22	3.8	7.1
Gujarat	0.38	0.46	5.3	4.8
Haryana	0.31	0.65	6.6	2.8
Himachal Pradesh	1.23	1.94	2.4	0.5
Jammu & Kashmir	**	**	1.1	0.7
Karnataka	0.29	0.42	5.8	6.8
Kerala	0.49	0.36	6.9	3.9
Madhya Pradesh	0.14	0.27	4.6	8.8
Maharashtra	0.46	0.61	13.7	7.6
Orissa	0.21	0.49	3.1	4.7
Punjab	0.30	0.34	5.2	4.4
Rajasthan	0.21	0.43	5.6	5.8
Tamil Nadu	0.42	0.53	6.5	6.5
Uttar Pradesh	0.16	0.32	11.3	12.8
West Bengal	**	**	4.2	7.3
All India	0.27	0.49	100.0	100.0

\* Intensity is defined as research and education expenditure as per cent of AgGDP

\*\* AgGDP data were not available.

Several measures relating to investment levels, institutional structure, resource allocation, management process, etc. are suggested to improve the efficiency of research and extension system in the country. The important suggestions are:

- Increase research and extension intensity
- Rationalise resource allocation across states and commodities
- Increase the share of non-salary expenditure to 40 per cent
- Diversify institutional structure by encouraging private sector (profit and non-profit organisations) participation in research and extension
- Develop agricultural research and extension information system
- Institutionalise improved priority setting, monitoring and evaluation process to develop decision support system
- Strengthen social science research
- Adopt flexible extension approach
- Link performance evaluation with incentive structure

### **Ex-ante Agricultural Research Evaluation**

*Suresh Pal, Selvarajan, S. and Ramesh Chand*

Economic justification is becoming an essential pre-requisite for enhancing investment in agricultural research. The investments made in the past have generated impressive rates of returns which are much higher than those in other investment options like irrigation and watershed development. If the expected rates of return from further investment in research are also high, there is a case for increasing the investment. Furthermore, increased investment should be allocated according to the expected research benefits. With this view, *ex-ante* analysis of research on rice-wheat system was undertaken. The results given in Table 2 show that the expected rates of return are very attractive, justifying increase in research investment.

**Table 2 : Expected rates of return to research on rice-wheat system**

Project	Internal rate of return (%)	
	High productivity region	Low productivity region
Development of rice variety	109	85
Development of wheat variety	65	70
Tillage and residue management	79	*
Water management	48	45
Nutrient management	68	56
Weed control	74	62

\* Tillage and residue management is not a research priority for the low productivity region.

These rates of return are computed for incremental investment to be made under the National Agricultural Technology Project. It is assessed that the incremental benefits would occur through shortening of R&D lag by one year and increasing probability of research success by 10 per cent. The rates of return are computed for low and high productivity regions separately. High productivity region covers Punjab, Haryana and Western Uttar Pradesh, whereas low productivity region covers Eastern Uttar Pradesh, Bihar and West Bengal.

Interestingly, the rates of return are not much lower for the low productivity region because of larger adoption domains available for new technologies. Also, there is not much difference between the rates of return on crop improvement research and crop and resource management research except water management research where projected research cost is very high and expected adoption rate is

comparatively low. Nevertheless, these rates of returns are high, justifying further increase in research investment.

### **Strengthening Research and Extension for Rainfed Farming: Role of Social Science and Institutional Factors**

*John Farrington, Rasheed Sulaiman V, and Suresh Pal*

Research and extension efforts in generation and transfer of appropriate technologies for rainfed farming need to be constantly improved because it is from these areas that further increase in production have to come to meet the growing demands of the population. Several reports have highlighted poor performance of research and extension systems in meeting the technological demands of rainfed areas. This study, undertaken in collaboration with Overseas Development Institute (ODI), London, proposes changes in four institutional factors. 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 more strongly.

Apart from an increase in the number of social science positions in the NARS, 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-organisation 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 organisations and NGOs.

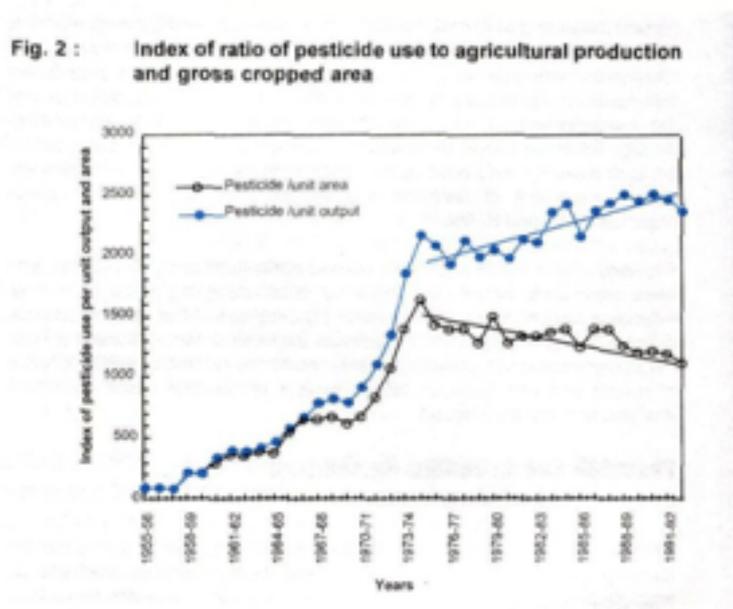
As many of the technologies for rainfed agriculture are group-based and need community action, the following skills are going to be crucial for extension agents: (i) group formation (ii) development of leadership skills (iii) conflict resolution and negotiation between different interest groups (iv) management of common property resources (v) use of different types of media and (iv) communication, project preparation, data collection, analysis and documentation.

### **Pesticide Use in Indian Agriculture**

*Ramesh Chand and BIRTHAL, P.S*

Pesticide use in Indian agriculture has been growing rapidly during the last four decades. Though pesticides have contributed substantially to agricultural growth and food security, there is growing concern about their adverse impacts on ecology and human health. The growth in pesticide use outweighed the, growth in crop output upto the first decade of green revolution, and thereafter, it registered lower growth than the agricultural production, partly because of development of pest resistant crop cultivars and emphasis on adoption of integrated pest management technologies (Fig 2). In India, per hectare pesticide use is about 400 grams, which is far less compared to many developed and developing countries. Cotton accounts for about half of the total pesticide use in agriculture in India while its share in gross cropped area is less than 5 per cent. The share of wheat and rice, the main green revolution crops, in total pesticide use is lower than their share in gross cropped area. Thus, green revolution technology *per se* could not be blamed for excessive and indiscriminate use of pesticides. In the absence of suitable alternative eco-friendly pest control technologies, diversification in favour of crops like cotton, vegetables and fruits is likely to result in increased use of pesticides.

**Fig. 2 : Index of ratio of pesticide use to agricultural production and gross cropped area**



However, keeping in view the increasing public awareness of ill effects of pesticides, promotion and popularisation of Integrated Pest Management practices and greater emphasis on development of pest resistant cultivars are needed to curtail pesticide use.

## **SUSTAINABLE AGRICULTURAL SYSTEMS**

### **Sustainability, Policy and Technology Interactions in Wheat in Northern India** *Selvarajan. S*

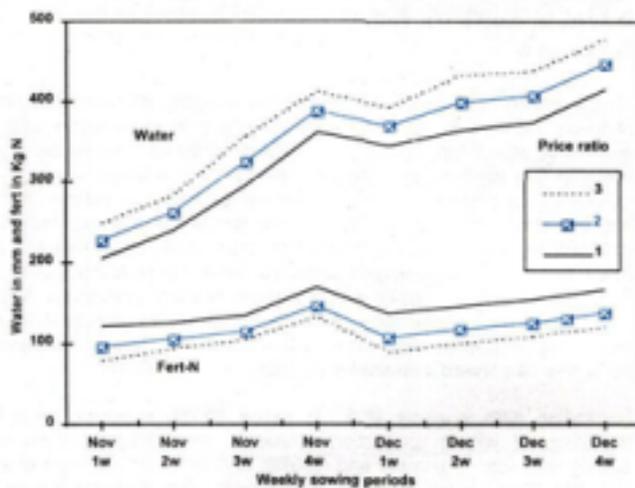
Favourable technology-policy interactions enlarged the decision domain of wheat farmers in northern India. Changes in input levels and mix constituted one of the management strategy adopted by wheat farmers to minimize the productivity variations arising from delayed sowing which quickened the pace of expansion in wheat production in parts of Punjab, Haryana and Uttar Pradesh. Spatially and temporally differing magnitudes of levels and trends in area, production, productivity, input use and input mix in wheat underline the continuous adjustment in production strategies by the farmers in response to external stimuli introduced through technology-policy interactions. However, the tendency to substitute more inputs like irrigation water and fertilizer for overcoming management variations has raised Sustainability concerns in this region.

Expansion path analysis (Fig. 3) based on bio-economic simulation modelling of wheat production strategies revealed that: (i) extending sowing time upto November end resulted in nearly 125 mm more of water use and 30 kg more of N for maintaining productivity at 4 tons per hectare; (ii) with the adoption of early maturing cultivars in December, increasing requirements of water and N use could be effectively moderated upto first two weeks but beyond that, the input use exhibited increasing trend. Water use increased by 77 mm and N use by 25 kg per hectare when the sowing time of early maturing cultivars was extended upto last week of December; and (iii) upscaling of bio-economic simulation results for the region showed that delayed planting of wheat in about half of the existing area requires additional 1.64 lakh tonnes of fertiliser-N, 7.2 lakh ha m of irrigation water and energy for maintaining productivity at 4 tons per ha in this region. The figure also shows that while price adjustments alter the levels of these inputs, the above trends remain the same.

Thus, substitution of inputs like water and fertilizer-N for overcoming management variations in wheat helps in moderating resultant productivity fluctuations. Growth rate analysis based on moving eight year periods revealed that area and yield growth rates for this region during 1970's through 1980's peaked at

over 4 per cent. Recent trends in growth rates for these states, expressed as per cent of peak growth rates, are 21, 66 and 44 for area, yield and production respectively. Scope for further area expansion is limited. Yield growth rates have decelerated but are still maintained at the two-third level of the peak rates. Currently, application of inputs is often more than the recommended level in several parts of this region. Decelerating growth rates, falling ground water table and imbalance in soil nutrient status are the emerging evidences. Such a pathway for development, driven by current technology-policy interactions, cannot be sustained into future.

**Fig. 3 : Simulated expansion path for attaining 4 tonnes/ha wheat yield under different planting dates and input price ratios**



### Sustainability of Rice Wheat Cropping System in Indo Gangetic Region

*Ramesh Chand and Hague, T*

It is often said that yields of rice and wheat in the Indo-Gangetic plains region have either reached a plateau or are declining. The factual position in this regard can be ascertained from information given in Table 3.

Growth rates in wheat yield have been erratic in West Bengal while Bihar witnessed acceleration in annual growth rate from 2.12 between first and second half of 1980's to 3.58 per cent in early 1990's over late 1980's. In almost all other cases the growth rates witnessed decline in the recent quinquennium. Leaving aside the growth rate in wheat in West Bengal and rice in Bihar, lowest growth rates are experienced in Punjab which also continued to face deceleration in growth in rice after late 1970's and in wheat after early 1980s.

**Table 3 : State wise growth rates in yield of wheat and rice between successive quinquennium during 1970-71 to 1994-95.**

*Per cent/annum*

Period	Bihar	West Bengal	U.P.	Haryana	Punjab	India
<b>Wheat</b>						
1971/75 and 1976/80	-0.96	-1.26	3.50	3.02	2.27	2.40
1976/80 and 1981/85	2.87	2.10	4.79	3.02	3.10	3.98
1981/85 and 1986/90	2.12	-1.96	2.81	4.44	2.93	3.14
1986/90 and 1991/95	3.58	1.40	2.50	3.26	2.31	2.93
<b>Rice</b>						
1971/75 and 1976/80	0.50	1.31	2.76	6.73	6.10	1.76
1976/80 and 1981/85	0.23	0.69	4.92	1.59	1.82	2.27
1981/85 and 1986/90	4.16	5.55	5.65	0.15	1.28	3.25
1986/90 and 1991/95	-0.02	3.19	3.45	1.66	1.00	2.64

The yield growth rates show that, except few cases, there is neither stagnation nor plateauing of yield curves but there is deceleration in growth of yield of these two crops in some states.

#### **Agricultural Typology for Policy Analysis**

*Selvarajan ,S and Lakshmi Prasanna. P.A*

The existing status of zonification in India for planning agricultural strategies has been limited to biophysical characterization. Soil characteristics, climate, rainfall and water availability were the principal characteristics used for such classifications primarily for assessing the land use potentials, targeting agricultural research infrastructure development, focusing on agricultural research and adoption domains, identifying suitable cropping patterns and formulating regionally differentiated development strategies. Ideally, both biophysical and socio-economic variability need to be considered while characterising the agricultural typologies for evaluating various production and resource use options under alternative development pathways. Such typologies are expected to be more homogeneous in terms of responding to policy interventions for promoting sustainable development.

#### **Validation for rainfed agricultural typology**

Discriminant analytical model was used to validate the methodology for generating rainfed agricultural typologies that can integrate key agro-ecological and socio-economic factors.

The socio-economic variables set considered for this analysis included triennium averages (1991-93) of variables related to poverty, output market, population pressure, infrastructure, input market and demography. The agro-ecological variable set included normal rainfall, soil type and length of growing period. Several iterations were carried out to determine the final set of predictor and grouping variable sets for the validation exercise. The final grouping variable set included 16 agro-ecological zones (AEZs) and 15 rainfed agricultural typologies (value of production based cropping zones- CZs) considered independently for evaluating and testing the classification of 201 rainfed districts from 13 states. The effectiveness of rainfed agricultural typology classification was tested by using alternative discriminant modelling techniques.

The results of rainfed agricultural typology validation exercise are given in Table 4.

**Table 4 : Evaluation of alternatively based rainfed agricultural typologies**

Predictor variable set	Grouping variable (per cent)	
	AEZ	CZS
<b>Agro-ecological variables</b>		
Length of growing period	28	19
Normal rainfall	38	24
Length of growing period and normal rainfall	43	36
<b>Socio-economic variables</b>		
Socio-economic variable set (excluding credit variable)	51	74
Socio-economic variable set	59	82
<b>Agro-ecological and socio-economic variables</b>		
Length of growing period and socio-economic variable set	62	87
Length of growing period, normal RF and socio-economic variable set	66	91

The agro-ecological variables individually and in combination are able to classify 28 to 43 per cent of the districts correctly with AEZ as the grouping variable and 19 to 36 per cent of the districts correctly with CZS as the grouping variable.

Agricultural activity based (value of production based) rainfed agricultural typology construction is able to effectively integrate both the agro-ecological and socio-economic variables considered in this analysis. The discriminating power varied from 87 to 91 per cent which indicates that nearly 175 to 182 districts, classified based on the discriminate modelling approach, are matching with the agricultural activity based rainfed agricultural typology classification.

For testing the effectiveness of the classification of rainfed districts, the discriminant model was run repeatedly by randomly selecting half of the rainfed districts for every run. The discriminant function, generated by the model, was used to classify the remaining districts and the simulated classification rate was compared. The CZS approach moved in a band of 75 to 90 per cent as compared to a band of 62 to 66 per cent observed in case of AEZ approach.

The discriminant analytical model was also run by successively increasing the number of randomly selected districts. The discriminating power of agro-ecological and socio-economic variables in distinguishing agricultural activity based typology formation has progressively increased from a minimum level of 75 per cent to a maximum of around 91 per cent when all the rainfed districts are used in the stability analysis. The mean value was estimated at around 83 per cent. Similar approach in case of agro-ecologically based zoning resulted in a mean correct classification rate of around 60 per cent.

The validation exercise revealed that for constructing relatively more homogeneous rainfed agricultural typologies with similar response expectation to external policy stimuli, the typology classification approach should encompass not only agro-ecological variables but also underlying socio-economic structural variables which are effectively reflected in the proposed agricultural activity based classification of rainfed districts.

## SUPPLY, DEMAND and MARKETS

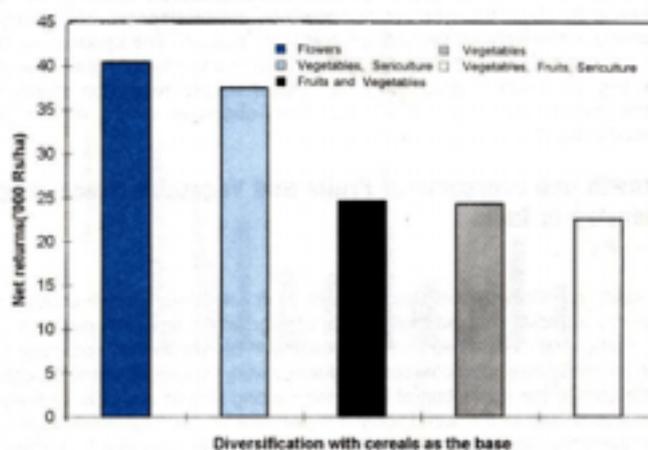
### Potential of Diversification Towards High Value Crops in Karnataka

*Singh, G and Haque, T*

Horticulture sector contributes about 40 per cent of the total agricultural GDP in Karnataka state. The state also contributes about 64 per cent of total raw silk production in the country. A study was taken up to analyse the extent of diversification and economics of growing high value crops in Karnataka.

The net returns under different diversification scenarios presented in Fig. 4 clearly revealed that cereals grown with flowers yielded highest net returns which worked out to Rs. 40463/ha. This was followed by cereals with vegetables and sericulture (Rs. 37505/ha), cereals with fruits and vegetables (Rs. 24583/ha), cereals with vegetables (Rs. 24315/ha) and cereals with vegetables, fruits and sericulture (Rs. 22498/ha).

**Fig. 4 : Net returns realised in different scenarios of diversification (in Rs.)**



The crop preference of farmers under different diversification scenarios indicated that among flowers, they preferred aster over chrysanthemum followed by rose. Among fruits, mango was preferred over grapes. Potato had highest preference among vegetables followed by cabbage, beans and tomato. The scope for diversification with cereals as the base was thus observed to be vast both in terms of income derived and labour employed.

The constraints in both production and marketing of flowers, fruits, vegetables and sericulture were analysed. The major constraints in production are high cost of production, non-availability of credit and scarcity of skilled labour. Non-availability of disease free layings is a serious constraint in sericulture. The major marketing constraints are lack of organised market, high commission charges at the market, price fluctuations, and absence of proper transport and cold storage facilities. The major government support needed for diversification with high value crops is for the establishment of organised markets/special commodity markets exclusively for vegetables, fruits and flowers. The establishment of cold chain facilities for storage, processing, transportation, grading and packing, provision of adequate credit, power supply, regulation of wage rates and timely supply of inputs were observed to be the other requirements.

### Growth and Prospects of Fruits and Vegetable Processing Industry in India

*Roy, B.C*

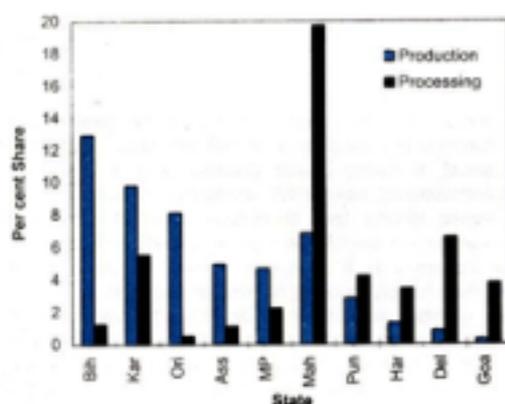
A study on "Growth and Prospects of Fruit and Vegetable Processing Industry in India" showed that in spite of significant growth in production of fruits and vegetables, the proportion of production processed commercially has not increased commensurately. In recent years, though India earned the distinction of being the second largest producer of fruits and vegetables in the world, only 1.8 per cent of the total production is commercially processed. It is far below the level compared to many developed and

developing countries such as Malaysia (83 per cent), Philippines (78 per cent), Brazil (70 per cent) and USA (65 per cent).

However, every year 25-30 per cent of the total produce goes waste due to inadequate post-harvest technology, poor infrastructure, as well as absence of linkages between processing industry and the growers.

The study also revealed considerable inter-state variation in terms of distribution of processing units and levels of infrastructural development. It was found that processing units are mainly concentrated in the states with better infrastructural facilities rather than the availability of raw materials. Bihar, which contributes 12.97 per cent of total production accounts for only 1.28 per cent of processing units. The same pattern is observed for Orissa, Madhya Pradesh, Karnataka and north-eastern states. On the other hand, Maharashtra, Rajasthan, Punjab, Haryana, Tamilnadu, Himachal Pradesh, Uttar Pradesh, Goa, Delhi and Chandigarh have a lower share in production in comparison to their share in total processing units in the country (Fig. 5 )

**Fig. 5 : Share in production and processing of fruits and vegetables by states.**



The study calls for the need to modernise the existing processing units and developing basic infrastructure particularly in eastern and northeastern India which hitherto received little attention. There is .also a need to encourage contract farming in order to overcome the problem of quality raw material supply faced by the industry. Finally, policy makers should provide appropriate incentives to the cooperative and corporate sectors and assure a policy environment conducive to the establishment of fruit and vegetable processing units in potentially productive areas.

## **INSTITUTIONAL CHANGE**

### **Diversification of Agricultural Research and Extension System**

*Suresh Pal and Alka Singh*

Recent changes in agricultural, economic and scientific environment call for acceleration of agricultural research and extension services through diversified institutional arrangements. Developments in institutional economics suggests that private (for profit and non-profit) sector can directly fund and/or provide research and extension services which are of toll or private goods in nature. Basic and strategic research, which is a public good, can continue to be in the public domain. Enforcement of appropriate incentive and regulatory policies is necessary to attract private investment in research and extension directly and to ensure competition and quality of services. The experience of the new policy for seed development has been very encouraging in this regard. Besides, supportive regulatory policies, strong linkages with public research programmes are necessary for the growth of private investment.

## **Informal Rural Credit System in India**

*Birthal, P. Sand Haque, T*

Dualism has been an important characteristic of India's rural credit system. However, over the last few decades the informal sector has shrunk considerably in size mainly due to growth in formal sector and technological change in agriculture. With these considerations in mind, in recent years it has been suggested that priority sector lending to agriculture should be phased out to make formal sector more resilient. In this process of policy change, however, it is important to take into consideration the regional variation in performance of agricultural growth and socio-economic characteristics. Evidences indicate that informal sector largely caters to the consumption credit needs of poor households and is likely to remain an important component of rural credit system because of its operational flexibility and information advantage over formal sector. Though the demand for consumption credit is inelastic and interest rate is higher on informal sector lendings, technology-led growth of agriculture helps drive down the interest rate on informal lendings by way of inducing competition among lenders.

## **AGRICULTURAL GROWTH AND ADJUSTMENT**

### **Emerging Trend and Regional Variations in Public Investment in Agriculture: A State-wise Analysis**

*Ramesh Chand*

The study has compiled a data series on capital outlay on agriculture and allied heads for each state of the country for the past two decades. This information is not so far available at the state level. Secondly, the series at the country level presents a broad picture of public investments in agriculture which is an improvement over the series published by Central Statistical Organisation as that includes mainly the investments in irrigation. The new series would be useful to researchers in making inter state comparison of capital outlay and in analysing its relationship with agricultural growth beside being useful in-making investment allocation to various states.

### III Education and Training

#### Education

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

Name of the Scientist	Courses offered	Students guided	Area of Research
Dr. Selvarajan, S	Research Methodology (till April, 1997)	Two (Ph. D) (Continuing)	Irrigation investment planning
			Sustainable watershed development planning
Dr. Suresh Pal		Two (Ph. D) (Continuing)	Investment and productivity in Indian agriculture
			Sustainable Rice-wheat System in Eastern India

#### Special Lectures

Name	Title of the Lecture	Venue
Dr. Birthal, P. S	Land tenure policies and changing agrarian structure in India (11-25 Feb. 1997)	Centre for Advanced Studies in Agricultural Economics, Division of Agricultural Economics, Indian Agricultural Research Institute, New Delhi
	Questionnaire design and interview techniques (21-25 June 1997)	Project Directorate on Cropping Systems Research, Modipuram
Dr. Haque. T	Agri-business in India (5 Nov. 1997)	Haryana Institute of Rural Development, Nilokheri, Haryana
Dr. Ramesh Chand	Quantitative restriction on agricultural imports and WTO(26 Nov. 197)	Indian Institute of Foreign Trade, New Delhi
Mr. Ravishankar, A	Systems analysis: concept, characteristics and criticisms (2 Jan. 1997)	Department of Agricultural Economics, University of Agricultural Sciences, Bangalore
	Intellectual property rights in Indian agriculture: role and relevance (12 Nov. 1997)	Department of Agricultural Economics, University of Agricultural Sciences, Bangalore

Name	Title of the Lecture	Venue
Mr Roy, B C	Assessment of socio-economic impacts of Agro-meteorological advisory services (8 Oct 1997)	National Centre for Medium Range Weather Forecasting, New Delhi
Dr Selvarajan. S	Policy intervention analysis in irrigation command area (16 Jan 1997)	Water Technology Centre, Indian Agricultural Research Institute, New Delhi
	Sustainable soil and water resources management ( 17 Feb 1997)	Centre for Advanced studies in Agricultural Economics, Indian Agricultural Research Institute, New Delhi
	Economic aspects of water management in irrigation project (22 Feb 1997)	Water and Land Management Institute, Okhla, Uttar Pradesh
	Economic dimensions of conjunctive water use planning in command areas (28 Feb 1997)	Indian Institute of Public Administration, New Delhi
	Irrigation system modelling for policy intervention analysis (5 June 1997)	Agricultural Research Station, Tamil Nadu Agricultural University, Bhavanisagar, Tamil Nadu

### Guest Lectures

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

Name of the visitor	Title of the Lecture	Venue
Dr Shangan Fan	Investment priorities of Indian agriculture (4 Feb 1997)	International Food policy Research Institute, Washington, D C
Prof Carl E Pray	Determinants of Agricultural Research Investment A Provincial Level Analysis for China and India (16Oct 1997)	Rutgers University, USA
Dr Hirashima, S	The East Asian miracle (12 March 1997)	Faculty of International Studies, Meiji Gakuin University, Yokohama, Japan
Prof Kotvosky, G. G.	Changing Political Economy of Russia (8 Dec 1997)	Institute of Oriental Studies, Moscow
Prof Thakur, D S	Economics of hill agriculture and hill economy (14 Jan 1997)	Himachal Pradesh Krishi Viswa Vidyalaya, Palampur

## Training

### Scientific

Name of the official	Theme	Duration	Place of training
Dr. Adhiguru, P Ms. Lakshmi Prasanna, P. A	Use of computers in agricultural research	13.10.97 to 25.10.97	Indian Agricultural Statistics Research Institute, New Delhi
Dr. Anjani Kumar	Foundation course for agricultural research service	4.3.97 to 1.7.97	National Academy of Agricultural Research Management, Hyderabad
Ms. Rajni Jain	Computer application in network management and informatics	26.5.97 to 14.6.97	Indian Agricultural Statistics Research Institute, New Delhi
Mr. Roy, B.C	Foundation course for agricultural research service	7.1.97 to 5.5.97	National Academy of Agricultural Research Management, Hyderabad
Dr. Sant Kumar	Foundation course for agricultural research service	3.10.97 to 30.1.98	National Academy of Agricultural Research Management, Hyderabad

### Administrative

Name of the official	Theme	Duration	Place of training
Mr. Inderjeet Sachdeva Ms. Umeeta Ahuja	Computer training on MS office	22.9.97 to 25.9.97	Indian Agricultural Statistics Research Institute, New Delhi
Mr. Ravindra Kumar Ms. Sonia Chauhan	Computer training for ARIS cell personnel	31.7.97 to 8.8.97	Indian Agricultural Statistics Research Institute, New Delhi
Mr. Vashist, M.S	Rajbhasha karyavyan mein nirikrhan vyavastha	10.12.97 to 12.12.97	National Academy of Agricultural Research Management, Hyderabad

## IV Awards and Recognitions

Dr. Dayanatha Jha was elected as a Fellow of the National Academy of Agricultural Sciences. He was re-elected as President of the Agricultural Economics Research Association. He served as a member of the research advisory committees of the Institute of Economic Growth, Delhi; Agro-economic Research Centre, University of Delhi; Indian Society of Agricultural Economics; Management Committee of National Academy of Agricultural Research Management, Hyderabad; UNDP Review Team for hybrid rice research.

Dr. Haque, T served as member of Research Advisory Committee Department of Rural Development, Govt of India; member, Academic Council, Haryana Institute of Rural Development, Nilokheri; member, Advisory Board, Political Economy Journal of India.

Dr. Ramesh Chand, was selected as Editor, Agricultural Economics Research Review, for the year 1997-98. Nominated as country expert by the ICAR to undertake study on, Impact of Trade Liberalisation on Agriculture in Selected Asian Countries, sponsored by CGPRT Centre, ESCAP, Bogor, Indonesia.

Dr. Birthal, P. S. was awarded Young Scientist Award by the Indian Council of Agricultural Research for the research proposal, Economic Potential of Biological Substitutes for Agro-chemicals. He has been elected as the Vice President of Agricultural Economics Research Association (India).



**Dr. Birthal, P.S. receiving the ICAR Young Scientist Award from Hon'ble Minister for Agriculture, Shri. Chaturanan Mishra**

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

### Visits Abroad

Name of the official	Purpose	Place	Duration	Outcome
Dr. Barah, B.C	To participate in the 13th conference of the International Association of Agricultural Economists	Sacramento, California, USA	10.8.97 to 16.8.97	Organised an International Symposium on global trends in food taste, preference and changing composition of food basket Also prepared proceedings and synthesis paper
Dr. Dayanatha Jha	To attend ESCAP-CGPRT regional workshop meeting on Market prospects for upland crops in Asia	CGPRT Centre Bogor, Indonesia	25.2.97 to 28.2.97	The report was finalised. Future research agenda suggested
Dr. Haque, T	To work with IFPRI scientists on Sustainable rainfed agriculture development project	IFPRI, Washington	6.8.97 to 4.9.97	The project work was reviewed
Dr. Ramesh Chand	To attend the planning meeting of the country experts to discuss project on Impact of trade liberalisation on agriculture in selected Asian countries	CGPRT Centre Bogor, Indonesia	16.6.97 to 17.6.97	Research proposal finalised
	To discuss and finalise objectives and methodology of the project on Impact of trade liberalisation on agriculture in selected Asian countries with special focus on CGPRT crops.	CGPRT Centre Bogor, Indonesia	27.8.97 to 28.8.97	Research project awarded to the ICAR-NCAP
Dr. Rasheed Sulaiman, V	To complete the report of the NCAP-ODI study on Improving the effectiveness of research and extension systems: an analysis of institutional and socio-economic issues	ODI, London	31.8.97 to 20.9.97	Completed the NCAP-ODI report
Dr. Selvarajan, S	To participate in Sysnet workshop on programming models	IRRI, Los Banos Philippines	23.9.97 to 3.10.97	Methodology refinement of ongoing project

## VI List of Publications

### NCAP Publications

#### Policy paper

Policy paper 6 : Import Liberalisation and Indian Agriculture : The Challenge and Strategy

Policy paper 7 : Agricultural Research and Extension in India: Institutional Structure and Investments

#### Policy briefs

Policy brief 5: Strengthening Research and Extension for Rainfed Farming: Role of Social Science and Institutional Factors

### Publications by Scientists

#### Research papers

Amerendar Reddy, A and A. Ravishankar, "Intersectoral labour migration: emerging perspectives and issues", *Kurukshetra*, Vol 45(13), 1997,

Barah B.C. and A K Neog, "Prospects of agricultural development in flood-prone eco-system", *Review of Agricultural Economics Research*, Vol 10 (1), 1997

Barah B.C., "Traditional water harvesting systems; A historical perspective and present status", *Indian Journal of Hill Farming*; Vol 8(2) 1997.

Birthal, P. S., "Occupational diversity and income distribution: some implications for rural development", *Journal of Rural Development*, Vol. 16(3), 1997.

Birthal, P.S. and T. Haque, "Behaviour of informal rural credit markets in India", *Political Economy Journal of India*, Vol. 6(1-2), 1997.

Dastagiri, M.B., Kantaraju. M.L. and Nadagouda V.B., "G-7 Countries natural resources utilization in the global scenario : policies and prospects", *Indian Journal of Economics*, Issue no. 309, 1997.

Dastagiri, M.B., Kantharaju., Kantaraju M.L. and Nadagouda V.B., "Indian Economic Position in the global scenario", *Indian Journal of Economics*, 1997.

Farrington, J, V. Rasheed Sulaiman and Suresh Pal "Strengthening Research and Extension for rainfed farming: Role of Social Science and Institutional Factors", *NCAP-ODI Policy Brief 5*, NCAP, New Delhi.

Haque, T., "Agrarian reforms and food security for the rural poor", *Journal of rural reconstruction*, Afro-Asian rural reconstruction organisation, Vol.30(2), 1997.

Ramesh Chand, "Import liberalisation and Indian agriculture: the challenge and strategy", *Policy Paper 6*, National Centre for Agril. Economics and Policy Research, New Delhi, Nov. 1997.

Ramesh Chand and P. S. Birthal, "Pesticide use in Indian agriculture in relation to growth in area and production and technological change", *Indian Journal of Agricultural Economics*, Vol. 52(3), 1997.

Ramesh Chand and T. Haque "Sustainability of rice-wheat crop system in Indo-gangetic region", *Economic and Political Weekly*, Vol.221,(13) 1997.

Roy, B.C, "Growth and prospects of fruits and vegetables processing industry in India", the *Bihar Journal of Agricultural Marketing*, Vol.5(3), 1997.

Sant Kumar, R.S. Dixit and S. Chandrsa Sen "Vegetables production in India-needs for a total system approach", *Indian Journal of Agricultural Economics*, Vol.52(3), 1997.

Selvarajan, S., P.K. Aggarwal, S. Pandey, F.P. Lansigan and S.K. Bandyopadhyay, "Systems approach for analysing tradeoff between income, risk and water use in rice-wheat production in northern India", *Field Crops Research*, 51(1-2), 1997.

Singh, R. P Suresh Pal and M. L. Morris, "Strengthening research-industry-farmers interface:The case of maize seed industry", *Agricultural Economics Research Review*, vol. 10 (2) 194-204, 1997.

Suresh Pal, and Alka Singh, "Agricultural research and extension in India: institutional structure and investments", *NCAP Policy Paper 7*, Dec. 1997.

### **Popular articles/Leaflets**

Chengappa P G and A.Ravishankar, "Five decades of agricultural marketing: retrospect and prospect", *Kurukshetra*, Vol.45(11):80-83,1997.

Ravishankar, A and P.G.Chengappa, "Union budget and agriculture: A marginal thrust" *Kurukshetra*, Vol.45 (8):23-26, 1997

Ravishankar, A, "Agriculture and IPRs policy options *The Economic Times* 8 Aug. 1997

Ravishankar A "Futures can wait" *The Economic Times*, 9 Sept. 1997.

### **Books**

Ramesh Chand, "Agricultural diversification and development of mountain regions" M.D Publications, New Delhi, 1997.

### **Chapter in books/Reviews**

Barah, B.C., "Andhra Pradesh: Throttled tanks", in Anil Agarwal and Sunita Narain,(ed.), *Dying wisdom* Centre for science and environment, New Delhi 1997

Hansra, B.S and P Adhiguru, "Staff development in agricultural sciences" in S Panda, (ed.), *Staff development in higher and distance education*, Aravali Books International, New Delhi, 1997

Ramesh Chand, "Basics of marginal analysis" in John M Kerr et. al, (ed.), *Natural Resource Economics - Theory and Applications in India*, Oxford and IBM Delhi, 1997

Ravishankar, A and M.V.Srinivasa Gowda, "Infrastructure development: A crisis of commitment", In M.V.Srinivasa Gowda and Susheela Subrahmanya, (eds.) *Infrastructure development for economic growth*, Deep and Deep Publications, Delhi, 1997.

## **Presentations in conferences and symposia**

Adhiguru, P and B.S. Hansra, "Networking agricultural systems for effective linkage", Proceedings of the International symposium on globalising Indian agriculture: policies and strategies for twenty first century, Tamil Nadu Veterinary and Animal Sciences University, Chennai, 27-28 Dec. 1997.

Anjani Kumar, "Pashudhan vikas ke lie chare ki mang aur apurti", National Seminar in Hindi, Pashudhan vikas awam chara anusandhan, IGFRI, Jhansi, 22-23 Dec. 1997.

Barah, B.C. and A.K.Neog, "An analysis of resource endowment and economic management; (A study of the North Eastern India)", Seminar on Socio-economic development in the North Eastern India : Looking ahead, Constitution Club, New Delhi, 31 Jan. 1997.

Birthal, P.S. and Dayanatha Jha, "Socio-economic impact analysis of integrated pest management programmes", National symposium on Integrated Pest Management in India- constraints and opportunities, National Centre for Integrated Pest management, New Delhi, 23-24 Oct. 1997.

Haque, T., "Strategies for alleviation of rural poverty in India", in proceedings of the National seminar on Fifty years of rural Development, NIRD, 3-4 Nov. 1997

Haque T. "Land use in India", Planning Commission-NCAP workshop on land use planning, NCAP, New Delhi, 28-29 Nov. 1997.

Ramesh Chand, "Diversification through high value crops in western Himalyan region: evidence from Himachal Pradesh", Proceedings of Annual conference of Indian Society of Agricultural Economics, Kerala Agricultural University, Thrissur, Kerala, 2-4 Jan. 1997.

Roy, B.C. "Growth and Prospects of fruit and vegetable processing industry in India", Vth annual conference of the Agricultural Economics Research Association (India), National Centre for Agricultural Economics and Policy Research, New Delhi, 16-17 Sept. 1997.

Suresh Pal and Dayanatha Jha, "Institutionalising agricultural research priority setting, monitoring and evaluation in the Indian NARS", base paper for the ICAR-World Bank workshop on Institutionalising priority setting, monitoring and evaluation in the Indian NARS, NCAP/IARI, New Delhi, 21-23 July 1997.

## 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	Dr. Barah, B.C	1997	1998
Economic potential of biological substitutes for agro-chemicals	Dr. Birthal, P.S	1997	1999
Development of small ruminant sector in India	Dr. Birthal, P.S	1997	1999
Interaction and impact of technology infrastructure and policy variables on agricultural development	Dr. Haque, T	1995	2000
Role of infrastructure in sustainable rainfed agriculture	Dr. Haque, T	1996	1998
Emerging trend and regional variations in public investments in agriculture	Dr. Ramesh Chand	1996	1998
Analysis of productivity changes and future sources of growth for sustainable rice-wheat production in indo-gangetic regions	Dr. Ramesh Chand	1997	2000
Scope for privatising farm extension in India	Dr Rasheed Sulaiman, V	1996	1998
Agro-climatic regional resource management for sustainable agricultural development	Dr Selvarajan. S	1996	1999
Economic analysis of irrigation water use planning under uncertainty a multi stage optimisation modelling approach	Dr Selvarajan. S	1996	1999
Agricultural research prioritization and resource allocation	Dr Suresh Pal	1996	1999

## VIII Consultancy, Patents and Commercialization of Technology

NCAP is expanding and fast approaching the sanctioned scientific strength of twenty scientists in different categories. The research programmes and outreach activities are expanding in view of the increasing demand for socio-economic inputs for policy analysis. The Centre is evolving multiple mechanisms to exploit the existing complementary linkages among national and international agricultural 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 which include consultancy and contract research activities initiated during this year. The consultancy and contract research activities have been broadly formalised 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 individual consultancy services and contract research in collaborative mode are provided by the Centre during this year.

**Table : 5 Consultancy/Contract Research**

<b>Name</b>	<b>Institution to which consultancy/ contract research is provided</b>	<b>Area of consultancy/ contract research</b>
Dr. Birthal, B.S	ICRISAT, Hyderabad	Primary data on cost of cultivation: planning, generation and reporting
Dr. Ramesh Chand	CGPRT Centre, Bogor, Indonesia	Trade liberalisation and India's agricultural sector
	ICRISAT, Hyderabad	Supply response of rainfed crops
Dr. Rasheed Sulaiman	ODI, London	Improving the effectiveness of research and extension systems: an analysis of institutional and socio-economic issues
Dr. Selvarajan.S	ICRISAT, Hyderabad	Methodology for validating rainfed typology
Dr. Suresh Pal	ODI, London	Improving the effectiveness of research and extension systems: an analysis of institutional and socio-economic issues
	ODI, London	Pearl millet seed practices in Rajasthan
	ICAR/UNDP	Ex-ante economic evaluation of hybrid rice in India

## IX RAG, MC and SRC Meetings Research Advisory Committee (RAC)

The composition of Research Advisory committee of the Centre is as follows.

Dr. Y. K. Alagh (Chairman)  
Minister of State for Power and  
Science & Technology  
Govt. of India  
New Delhi

Dr. V. S. Vyas  
Ex-Director Institute of Development  
Studies  
Jaipur

Dr. S. S. Acharya  
Director Institute of Development Studies  
Jaipur

Prof. Anil K. Gupta  
Centre for Management in Agriculture  
Indian Institute of Management  
Vastrapur  
Ahmedabad  
Gujarat

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

Dr. K. K. S. Chauhan  
164, Pocket 'B'  
Sheik1.- Sarai,  
Phase-1  
New Delhi

Dr. S. N. Mishra  
Former Director  
Institute of Economic Growth  
Delhi

Dr. G. S. Ram  
Economic and Statistical Advisor  
Directorate of Economics and Statistics,  
Krishi Bhawan New Delhi

Dr. S. S. Johl  
(Former Chairman, Commission on Agricultural Costs and  
Prices)  
C-21, Gurdev Nagar  
Ludhiana

Dr. Dayanatha Jha  
Director  
NCAP  
New Delhi

Dr. T. Haque  
(Member Secretary)  
National Fellow  
NCAP  
New Delhi

A meeting of the RAC was held on 3 April, 1997 (rescheduled from 1st March 1997). The major observations of the RAC meeting are as follows.

NCAP should undertake research for identifying few critical policy constraints and should have full autonomy in expressing its views. In addition to its own research, NCAP should also initiate measures for strengthening the socio-economic component in ICAR-SAU system. Several marketing and pricing issues in the regional context covering ICAR institutes and state agricultural universities need to be studied and NCAP should involve SAUs and ICAR research institutes to accomplish this task. In addition to medium term projects, NCAP should also prepare a medium term plan for research and developing policy dialogues. Development of a strong data base and generation of resources through consultancy and research collaboration with private sector need emphasis.

NCAP should have a strong data base on availability of various quality products which have export potentials. Further, strong linkages are to be developed with industry and business houses. Research projects for a few critical policy concerns like self sufficiency in foodgrain production should be taken up.

Emphasis should be laid on generating resources through consultancy and research collaboration with private sector. Reviewing education and training programme of ICAR-SAU system for future guidance has to be given due attention.

### **Management Committee (MC)**

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

Dr. Dayanatha Jha  
(Chairman) Director  
NCAP  
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  
NCAP,  
New Delhi

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

Dr. S. Selvarajan  
Principal Scientist  
NCAP,  
New Delhi

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

Mr. Narander Kumar  
(Member Secretary)  
Assistant Administrative Officer  
NCAP,  
New Delhi

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

### **Seventh Management committee meeting (January 29, 1997)**

The Committee opined that NCAP should organise a workshop on public and private agricultural research and a training programme on international trade. The Committee emphasised the need for monitoring research fund utilisation every quarter. The Committee approved the revised estimates 1996-97 and budget estimates 1997-98 and expenditure upto December 1996. The proposal to celebrate Founders Day on 1 March every year was also approved by the Committee.

### **Eighth Management committee meeting (July 28, 1997)**

The Committee observed that NCAP should ensure 20 per cent of its time allocation for contributing to policy interfacing activities. Participation by every scientist was underlined. Organising national level seminars and brain storming sessions on current and emerging key issues is recommended. The strategy

initially is to bring available expertise both within and outside NARS, together on specific themes and evolve future strategies on policy issues. Organising a "pre-budget overview of Indian economy with special reference to Agriculture" by NCAP on a regular basis was emphasised. The committee approved the Revised Estimate 1997-98 & Budget Estimate 1998-99 proposed by the Centre. Chairman emphasised that the provision for Human Resource Development for scientists, technical & administrative Staff should be indicated as a separate line item while preparing the budget. Revenue, receipts of the Centre should also be indicated as a line item in future.

### **Staff Research Council (SRC) Meetings**

Eleven meetings of the SRC were held during the period. Progress of nine on-going research programmes were reviewed in these monthly meetings. In addition, two new research proposals and proposals for seminars/workshops were also discussed. Seminars on visits by scientists to institutions abroad were also arranged in these meetings.

Programme leaders for the four priority areas of NCAP as enunciated in perspective plan have been identified as under:

Technological change	Dr. Dayanatha Jha
	Dr. Suresh Pal
Sustainable agricultural systems	Dr. B. C Barah
Supply, demand and markets	Dr. Ramesh Chand
Agricultural growth and adjustment	Dr. T. Haque

## X Participation in Conferences, Meetings, Seminars and Workshops

Name	Theme and Duration	Place
Dr. Adhiguru, P	International symposium on Globalising Indian agriculture : policies and strategies for twenty first century. International extension forum and Tamil Nadu Veterinary and Animal Sciences University (27-28 Dec. 1997)	Tamil Nadu Veterinary and Animal Sciences University, Chennai
Dr. Anjani Kumar	National seminar on Pashudhan vikas ewam chara anusandhan (22-23 Dec. 1997)	Indian Grass and Fodder Research, Institute, Jhansi
Dr. Dayanatha Jha	Market prospect of upland crops in Asia (25-28 Feb. 1997)	CGPRT Centre, Bogor, Indonesia
	International wheat congress (12-13 Aug. 1997)	Directorate of Wheat Research Karnal
	NIRD: foundation day seminar: 50 years of Development in India. (3-4 Nov. 1997)	National Institute of Rural Development, Hyderabad

Name	Theme and Duration	Place
Dr. Dayanatha Jha	FAO-IFFCO international seminar on IPNS for sustainable development. (25-27 Nov. 1997)	Vigyan Bhawan, New Delhi
Dr. Haque, T	National workshop on Land reforms: agenda. for the Ninth Plan, LBS National Academy of Administration, Mussorie. (7-8 Jan. 1997)	National Institute of Rural Development, Hyderabad
	International seminar on Industrial relations and labour productivity, (20-23 Feb. 1997)	Indian Labour Organisation, New Delhi
	International workshop on Multi-media and poverty alleviation in South Asia, SAPNA (29 Sept.-1 Oct. 1997)	Badkhal, Haryana
	National seminar on Fifty years of rural development (3-4 Nov. 1997)	National Institute of Rural Development, Hyderabad
	National seminar on Subsidies and development (16-17 Nov. 1997)	Jawaharlal Nehru University, New Delhi

Name	Theme and Duration	Place
Dr. Haque, T	National seminar on Informal sector, emerging perspectives in development(22-24, Dec. 1997)	Institute of Applied Manpower Research New Delhi
Mr. Ravishankar. A	Workshop for paper-writers in agricultural economics (25-27 Aug. 1997)	Indian Society of Agricultural Economics Acharya N.G. Ranga Agricultural University, Hyderabad
Mr. Roy, B.C	NATP workshop on Sustainability of Rice-Wheat based cropping system (18-21 June 1997)	Punjab Agricultural University, Ludhiana
Dr. Selvarajan, S	Working meeting to finalise methodology for rainfed typology (3 March 1997)	ICRISAT, Hyderabad
	In- country working seminar on Integrated data base management for research and planning (3-7 Nov. 1997)	Indian Agricultural Statistics Research Institute, New Delhi
Dr. Anjani Kumar Dr. Roy ,B.C	NATP workshop on Irrigated agro-ecosystem (14-15 Dec. 1997)	Directorate of Maize Research, Indian Agricultural Research Institute, New Delhi

Name	Theme and Duration	Place
Dr. Anjani Kumar Dr. Birthal, P.S Dr. Dayanatha Jha Dr. Ramesh Chand Dr. Roy, B.C Dr. Suresh Pal	Annual conference of Indian Society of Agricultural Economics (29-31 Dec. 1997)	G.B. Pant University of Agriculture and Technology, Pantnagar, U.P
Dr. Barah, B.C Dr. Haque, T Dr. Ramesh Chand	Seminar on Economic aspects of changes in rice production systems in eastern India, organised by International Rice Research Institute, Philippines (2-4 April 1997)	National Centre for Agricultural Economics and Policy Research, New Delhi
Dr. Birthal, P.S Dr. Dayanatha Jha	National symposium on integrated pest management in India-constraints and opportunities (23-24 Oct. 1997)	National centre for Integrated Pest Management, New Delhi
Dr. Dayanatha Jha Dr. Ramesh Chand	56th annual conference of Indian Society of Agricultural Economics (2-4 Jan. 1997)	Kerala Agricultural University, Thrissur, Kerala

Name	Theme and Duration	Place
Dr. Haque, T Dr. Ramesh Chand	Seminar on Economic aspects of changes in rice production systems in eastern India, International Rice Research Institute, Philippines (2-4 April 1997)	National Centre for Agricultural Economics and Policy Research, New Delhi
	National seminar on Subsidies and investments in Indian Agriculture, Rajiv Gandhi Institute of contemporary studies (17 April 1997)	Rajiv Gandhi Foundation, New Delhi
Dr. Selvarajan, S Dr. Suresh Pal	ICAR-World Bank workshop on Institutionalising priority setting, monitoring and evaluation in the Indian NARS, (21-23 July 1997)	Indian Agricultural Research Institute, 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. A series of group discussions, brainstorming sessions were organized on important topics involving peers and policy makers. These covered areas like research policy, economic liberalization, trade , land use planning, etc.

Dr. Dayanatha Jha, served as a member of the ICAR sub-group on socio-economics, informatics and policy issues, constituted under the working group on Agricultural research and education for Ninth five year plan; ICAR Steering committee for NATP formulation; and Expert Committee on Remedying regional imbalance in agricultural progress set up by the Ministry of Agriculture and Co-operation, Government of India and ICAR task force on priority setting, monitoring and evaluation.

Dr. Haque, T served as a member of the standing committee to monitor the impact of WTO on agriculture, Govt. of Punjab; member, national committee on agriculture, Confederation of Indian industries; Policy advisory group, Land reforms division, Lal Bhadur Shastri National Academy of Administration, Mussorie; Planning commission's sub-group on land use and land management; Indian Council of Social Science Research Review Committee.

Dr. Ramesh Chand, served as a member of the standing group to review and analyse the emerging trends in world agriculture, constituted by the Ministry of Agriculture and Co-operation, Government of India.

Dr. Rasheed Sulaiman V, served as a member of the sub-group, monitoring and evaluation of extension component of NATP, Ministry of Agriculture and Co-operation, Government of India.

Dr. Selvarajan.S, served as a member of the ICAR sub-group on socio-economics, informatics and policy issues, constituted under the working group on Agricultural research and education for Ninth five year plan;

## **XI Workshops/Seminars**

Workshops /Seminars /Brain storming sessions were organized 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.

- As part of the Founders day celebration, a brainstorming session on "Economic liberalisation and Indian agriculture", was organised at NCAP on 1 March 1997. Several officials of the Ministry of Agriculture and economists from different institutions in and around Delhi attended this discussion.
- Seminar on Economic Aspects of Changes in Rice Production Systems in Eastern India, was jointly organised by the Centre and International Rice Research Institute, Philippines on 2-4 April 1997.
- Brainstorming Session on "Indian Agriculture and New Economic Policy", was held on 3 Nov. 1997
- In addition to seminars, the Centre hosted several important policy level discussions of ICAR, such as meetings on " Agenda for socio-economic research in rice-wheat system" and steering committee meetings of "Sustainable rainfed agriculture" project.

The recommendations of the some of the seminars are presented below.

### **Institutionalising Priority Setting, Monitoring and Evaluation in the Indian NARS**

This ICAR-World Bank workshop was held on 21-23 July, 1997. National Centre for Agricultural Economics and Policy Research and Indian Agricultural Research Institute jointly organised the Workshop. The specific points which emerged during the discussion are given below.

## Recommendations

### **Priority Setting Methods**

- Basic approach should combine participatory methods involving beneficiaries including farmers organisations, and scoring/check list methods at project level.
- Should pilot benefit-cost analysis at selected applied research institutes.
- Finalize and supply guidelines on research priority setting methods at institute and project levels.
- Develop network of practitioners in PME. Monitoring and Evaluation
- Revise RPF for testing and computerization, and provide guidelines on integration into performance evaluation, ex *ante* evaluation and research funding decisions.
- Develop simple MIS with key variables and indicators to be implemented for funded projects based on improved RPFs.

### **Institutionalization**

- Policy advisory group should meet regularly and be proactive
- Need simultaneous reforms in administrative procedures including financing system (project based funding) and personnel performance evaluation.
- Need for multidisciplinary PME unit (preferably headed by economist) at the ICAR, SAU and Institute level.
- Representation of stakeholder in technical divisions and outside bodies as appropriate.
- Manualization of guidelines for PME as part of project cycle (project formulation, screening, monitoring evaluation and impact analysis (ex-post) etc).
- Pilot implementation of improved PME at 5-10 programmes (institutes/SAUs) of diverse structures/mandates that are closely involved in NATP by integrating Subject Matter Divisions of the Council.
- Needs baseline information and performance indicators and to be evaluated after 2-3 years.
- Adhoc processing of proposals by NATP/PMU for funding under NATP using improved PME. NATP/PMU requires mechanism for screening proposals according to PME criteria.
- Simultaneously build awareness for replication throughout system through a series of workshops

### **Training**

- Workshops and appreciation course to sensitize top-level research managers.
- More in-depth training for selected scientists and economists in methods for research priority setting and evaluation.
- Key role for NAARM in training in PME, assisted by NCAP, IARI, IASRI and other institutions with capability (including non-ICAR/SAU). Need specific courses, incorporation into orientation courses and materials for SAD curricula.
- Collaboration with international institutions in selected areas (ISNAR, IFPRI, ICRISAT etc) for priority setting methods and evaluation of natural resource management.

## **Trends in Food Taste, Preference and Composition of Food Basket: A Global Synthesis**

Dr. Barah, B.C. from the Centre was requested to coordinate a symposium on 'Global Trends in Food Taste, Preferences and changing Composition of Food Basket'. Case studies from India, South Africa and sub-Saharan Africa, Japan, Taiwan, Spain, Germany and the United States of America were discussed in the symposium which was organised by the International Association of Agricultural Economists at

Sacramento, California, USA (10-16 Aug., 1997). Significant aspects of the papers and issues emerged during the discussion are indicated below.

The pattern of food consumption varies across regions, continents, income classes, age groups, races and over time. These changes are influenced by a large array of socio-economic and physiological factors, which are ignored in the conventional food consumption behaviour models. Moreover, the questions in relation to food security, trends on individual, social and global welfare, health and environmental hazards, income-expenditure relationship, poverty, inequality and agricultural diversification assume greater importance.

The changing preference for ready-to-eat and fast food, specially in the high income consumer groups leads to over-consumption beyond their normal physiological requirement. On the contrary, low income countries confront issues of food security in relation to deprivation, inaccessibility, non-availability and lack of purchasing power and entitlement. Several countries of Asia and Africa are the victim of these food-related distresses.

The recent trends in global consumption pattern are highly illuminating which have brought about interesting questions such as whether all spending on food are beneficial, how to educate people to eat well, social cost of over consumption and relationship between diversification of food basket and agricultural diversification. Methodological questions also arise in this context, because, in addition to economic variables like income, prices and food availability in conventional consumption models, a large array of socio economic factors have become crucial. The gender, age structure, literacy, knowledge, information, class composition, role of individual decision makers, quality and method of food production, innovative marketing strategies and advertising are emerging important factors affecting food consumption behaviour. The recommendations on emerging issues for further research are given below.

## Recommendations

### ***Areas of future research on consumption pattern***

- Technological advancements and resultant implications for changing demand in human physical labour and thereby, calorie demand structure
- Diversification of food basket leads to agricultural diversification. Grains are diverted from direct human consumption to animal feed. Prime agricultural land are converted to fishery ponds, poultry farms, cattle ranching and other livestock activities. Food and feed are competing with each other rather fiercely.
- The recent shift in consumers' preferences and those of women favours more towards processed food derivatives and animal product based items which are rich in protein and fat. The processed and transformed cereals (such as cake, flakes etc.) are often of lesser nutritional value. Over consumption also increases the diet-related health care costs and thereby affecting overall social welfare.
- Younger population tend to prefer variety of processed food, but, older people stick to conventional social food and less variety. Increased frequency of the intake of modern foods and spread of fast food outlets has induced increased spending on food significantly. Home food as a social entity is increasingly substituted by growing preference for 'food away from home', specially in more developed countries.
- Alongwith income/expenditure, and prices as determinants of food consumption, non-economic factors are emerging as major determining factors in the choice of food variety.
- Internationalism and liberalisation of food trade play important role in changing preference and food consumption behaviour.

### **Impact of Removal of Quantitative Restrictions (QRs) on Agricultural Imports on India's Agriculture Sector**

This Workshop was organized on 10 Sept., 1997. A policy paper on the theme was published and needed information and material was shared with ICAR and MOA to formulate strategy to face the situation arising out of removal of quantitative restrictions on agriculture. The main recommendations are highlighted below.



## Recommendations

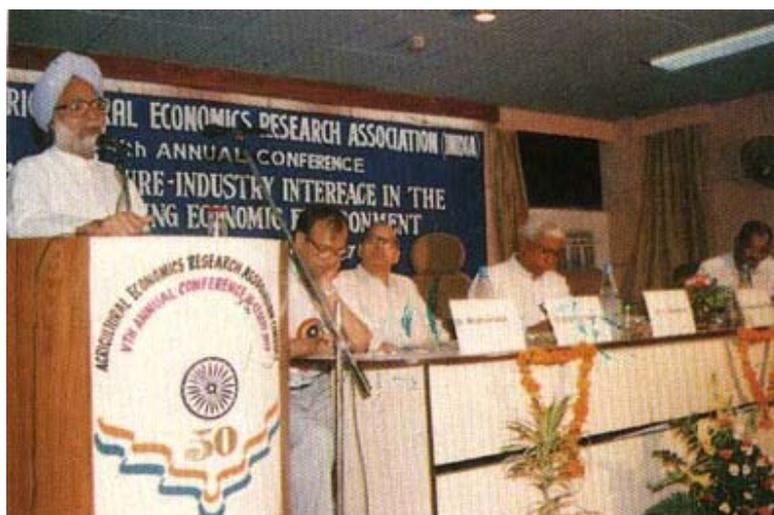
- Flow of imports would depend mainly on two interrelated factors; one, price difference net of tariff and c.i.f. and two, difference in cost of production between exporting and importing nations. When cost of production is lower in exporting country it can profitably go for exports even if the price in importing market is not higher than the price in exporting country. Thus, to guard against imports the following condition need to be fulfilled: Product price and cost of production in our market should not be higher than those in exporting country.
- Imports to India would not be attractive in the case of rice, tea, sunflower oil and cotton. In the case of wheat and maize, situation in some years can turn favourable for imports depending upon domestic and international supply position. There is a strong possibility of rise in imports of sugar and edible oils after removal of QRs which would exert downward pressure on the domestic prices.
- Removal of QRs on imports would pave the way for entry of private trade in import business which at present is almost monopolised through canalization by state agencies. Experience shows that the state agencies often fail to get the signal on soaring domestic prices on time. On the other hand, private trade is prompt to respond to changes in the market forces. Removal of restrictions on agricultural imports by private trade would promote competition and would benefit the consumers.
- While agricultural exports have been liberalised to some extent during the last 5 years, restrictions on imports have remained more or less unchanged. This seems to have hit domestic consumers both ways; rise in domestic prices due to increase in share of exports in production and denial of access to low priced farm imports.
- Removal of QRs on imports would lead to some imports even if domestic prices are somewhat lower compared to the prices in exporting country. The section of our society in high income bracket is non- sensitive to price but they prefer high quality, well packaged, hygiene and reliable food. MNCs can win over consumers in this group by selling well advertised branded produce.
- The best protection against imports is that the growth in supply keeps pace or is higher than the growth in domestic demand and efficiency of production improves continuously. If our agricultural output fails to increase at 3 per cent or higher rate per annum, then imports would become our compulsion.
- Our producers are at a disadvantage, in respect of infrastructure, compared to their counterparts in developed world from where we import. Development of infrastructure is essential to improve efficiency in production and marketing. Capital outlay for infrastructure development for agricultural sector has been on a decline during the last 10-15 years in almost all the states. This has adverse impact not only on long term growth but also on production efficiency.
- Import liberalisation would throw formidable challenge to compete with international technologies. Facing this challenge would require vigorous efforts in domestic R&D. Since private sector in India hardly plays a role in the area of agricultural technology generation, public sector institutions need to be strengthened further.
- Several items covered under QRs in the long list of nearly 800 agricultural items are inconsequential as far as their imports and international trade are concerned. It would make no material difference to prune the list and make immediate unilateral announcement to take unimportant items out of QRs. This would help in scoring some point in WTO and improve our image about liberalisation as required under the GATT.
- The current obsession to remain self sufficient in all agricultural commodities must be rationalised. The strategy should be to identify the items in which we have edge over our competitors or in which we want to acquire this advantage, and then aggressively promote production of such items.
- The fact that prices of most of agricultural commodities in our country are lower or almost at par with international prices should not make us complacent. The price advantage is only marginal in most of the commodities and any slack in supply growth can reverse the situation. Agricultural output must grow at more than 3 per cent annually to keep check on imports becoming profitable or our necessity.

## Agriculture-Industry Interface

Vth national conference of Agricultural Economics Research Association (India) on *Agriculture-Industry Interface in the Changing Economic Environment* was organised jointly with IASRI on 16-17 Sept. 1997. The main recommendations of the conference are highlighted below.

### Recommendations

- Need for realistic demand projection for critical farm inputs.
- Foster agricultural diversification as well as specialisation to support agro-based industries.
- Remove existing infrastructural bottlenecks hampering growth of agro-industries.
- Establish agro-processing industries in regions of production for maximum capacity utilisation.
- Agricultural research should be tuned to industrial requirements of raw material.
- Promote eco-friendly agriculture to take advantage of increasing world demand for organic food.
- Renovate existing transfer of technology system to suit the changing agro-economic environment.
- Harmonise agricultural growth, food security, income distribution and interregional disparities.
- Consumer surveys for assessing domestic demand for processed food.
- Rationalise market intervention and trade control measures as to improve interaction between price policy, technology and industry.
- Strengthen input regulation measures and linkages between public and private sector research.





### **Land Use Planning**

National Workshop on Land Use Planning was jointly organised by NCAP and the Planning Commission, Govt. of India on 28-29 Nov. 1997. The workshop was inaugurated by Prof. Y.K. Alagh, Hon'ble Minister of State for Science and Technology and Power. Nearly eighty participants including senior policy makers, administrators and academicians attended the workshop. The recommendations of the workshop are summarised below.



## Recommendations

- Land use patterns will be largely governed by market forces. However, keeping in view the need for conservation of land, water and other natural resources for sustainable development, suitable policy direction and planned intervention from time to time would be necessary.
- Due to both population growth and urbanisation, there will be growing demand for conversion of agricultural lands to non-agricultural uses. It is, therefore, important to develop a long term perspective plan on the type of land to be allocated for urbanisation/industrialisation in various regions. Besides, proper urban planning would reduce the extent of conversion of prime agricultural lands to non-agricultural uses.
- Existing land laws stand in the way of efficient use of land in many regions. While land laws can be region specific, liberalisation of land lease market would contribute significantly to productivity improvement and overall rural development.
- Under unbridled market forces, there is a growing problem of land degradation in many regions, due to over-exploitation of land, water, forest and other natural resources. Therefore, there is need for appropriate land use planning through participatory watershed development approach involving village panchayats, pani-panchayats, NGOs' self help group etc.
- The village commons continue to erode in almost all the regions due to lack of care by the local people in the absence of proper specification of rights and diminution of traditional values for community action. The village panchayats as well as local NGO's should be strengthened and activated to protect common property resources.
- All types of lands and locations are not equally suitable for profitable, albeit alternative enterprises. Hence, cluster approach to development, based on agro-climatic as well as techno-economic potentials of each region would be essential.
- There is need for delineation of efficient cropping zones for evolving potential based research planning by utilising the existing net work of agricultural research stations.
- There is need for a shift in research paradigm by moving away from commodity oriented research to farming system oriented research. Such a change should be total encompassing agricultural research, administration, management, and operationalisation within the system.
- There is need for a strong monitoring mechanism to document the on-going land use changes whether driven by market or policy or both.
- The existing data base on land use is highly inadequate. Therefore, strengthening of the data base, using both traditional cadastral surveys, modern remote sensing techniques, GIS and computerisation of land records would be necessary. In fact, the available techniques for data collection should be complementary to each other.

## XII Distinguished Visitors

Dr. Abrol, I. P Facilitator, Rice-Wheat Consortium for the Indo-Gangetic Plains, New Delhi.

Dr. Andy Hall, Socio-Economics and Policy Division, International Crops Research Institute for the Semi-Arid Tropics, Hyderabad.

Dr. Balasubramanian, V, Co-ordinator, Crop and Resource Management Network, International Rice Research Institute, Las Banos, Philippines.

Dr. Blarrel, B., World Bank, Washington, D.C. Dr. Bruno Dorin, Director, CSH, New Delhi.

Dr Carl E. Pray, Department of Agricultural Economics and Marketing, Rutgers University, USA.

Dr. Chaudhri, D. P University of Wollongong, Department of Economics & Child Labour Studies Cluster, Australia.

Dr. Darnell B. Smith, FAPRI Managing Director, Iowa State University, Centre for Agricultural and Rural Development, USA.

Dr. Desai, B. M Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad.

Dr. Derek Byrlee, World Bank, Washington, D.C. Dr. Deepak Ahluwalia, World Bank, New Delhi.

Dr. Ercole Zerbini, Animal Scientist/Team Leader, International Livestock Research Institute, (ICRISAT), Hyderabad.

Dr. Govert Gijsbers, International Service for National Agricultural Research, The Hague, Netherlands.

Dr. Hirashima, S., Faculty of International Studies, Meiji Gakuin University, Yokohama, Japan.

Dr. Inagaki, I., Director, CGPRT Centre, Bogor, Indonesia.

Dr. Kaul, G. L, OSD (NATP), Indian Council of Agricultural Research, New Delhi.

Prof. Kotovosky, G. G, Institute of Oriental Studies, Moscow.

Dr. Jain, T.C, The World Bank, New Delhi.

Dr. Jodha, N. S., International Centre for Integrated Mountain Development, Kathmandu, Nepal.

Dr. John Farrington, Overseas Development Institute, London.

Dr. John M. Kerr, International Food Policy Research Institute, Washington, D.C.

Dr. Junichi Taniuchi, First Secretary, Embassy of Japan, New Delhi.

Dr. Koichi Fujita, Associate Professor, Department of Agricultural Economics, The University of Tokyo.

Dr. Madan, M. L. DDG (AS), Indian Council of Agricultural Research, New Delhi.

Dr. Marothia, D. K, Member, CACP, New Delhi.

Dr. McWilliam, J. R, Agricultural Research Consultant, Em. Professor (Agronomy), Australia.

Dr. Michel Griffon, Director, CIRAD, France.

Dr. Paroda, R. S, Director General, Indian Council of Agricultural Research, New Delhi.

Dr. Peter Hazell, International Food Policy Research Institute, Washington, D.C.

Dr. Rajagopalan, V., Former Vice Chancellor, Tamil Nadu Agricultural University, Coimbatore.

Dr. Rathore, L. S, Director, Department of Science & Technology, National Centre for Medium Range Weather Forecasting, New Delhi.

Dr. Robert Tripp, Overseas Development Institute, London.

Dr Ronald Ng, Sr. Operations Technology Development Specialist, The World Bank, Washington, DC.

Dr. Samrendu Mohanty, Project Coordinator, Iowa State University, Centre for Agricultural and Rural Development, USA.

Dr. Sharma, V. P, Centre for Management in Agriculture, Indian Institute of Management, Vastrapur, Anand, Gujarat.

Dr. Shangan Fan, International Food Policy Research Institute, Washington, D.C.

Dr. Singh, G. B DDG, (SA&AF) Indian Council of Agricultural Research, New Delhi.

Dr. Singh, K. D, Director, Food and Agriculture Organization of the United Nations, Rome.

Dr. Sudhir Chaudhary, Iowa State University, Centre for Agricultural and Rural Development, USA.

Dr. Sushil Pandey, International Rice Research Institute, The Philippines.

Dr. Uma Lele, World Bank, Washington, D.C.

## XIII Personnel

### Posts

The details of the positions sanctioned, filled and remaining vacant at NCAP are given in Table 5.

**Table 5 : Positions sanctioned, filled and vacant**

S. No	Post (Category wise)	Positions sanctioned	Positions filled	Positions vacant
1.	Director	1	1	-
2.	Principal Scientist	4	3	1
3.	Senior Scientist	6	3	3
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	-
	<b>Total</b>	<b>36</b>	<b>32</b>	<b>4</b>

\* Adjusted against the position of Stenographer

## List of Staff Members

### Scientific

Dr. Dayanatha Jha	Director
Dr. T. Haque	National Fellow
Dr. S. Selvarajan	Principal Scientist
Dr. Ramesh Chand	Principal Scientist
Dr. B.C. Barah	Principal Scientist
Dr. G. Singh	Senior Scientist
Dr. Suresh Pal	Senior Scientist
Dr. P.S. Birthal	Senior Scientist
Dr. Rasheed Sulaiman V	Scientist
Dr. Vinod Kumar	Scientist (till April 1997)
Ms. Rajni Jain	Scientist
Dr. P. Adhiguru	Scientist
Ms. P. A. Lakshmi Prasanna.	Scientist
Mr. B.C. Roy	Scientist
Mr. Anjani Kumar	Scientist (since Jan. 1997)
Dr. Sant Kumar	Scientist (since Aug. 1997)
Mr. Ravishankar, A	Scientist (since Aug. 1997)
Dr. M.B. Dastagiri	Scientist (since Dec. 1997)

### Administrative

Mr. Narander Kumar	Assistant Administrative Officer
Mr. Naresh Arora	Asst. Finance & Accounts Officer
Mr. M.S. Vasisht	Assistant
Ms. Usha Sehgal	Stenographer (Till Jan. 97)
Ms. Umeeta Ahuja	Junior Stenographer
Ms. Seema Parmar	Junior Stenographer
Mr. S. K. Yadav	Senior Clerk
Mr. Ravindra Kumar	Junior Clerk
Mr. Inderjeet Sachdeva	Junior Clerk

**Technical**

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

**Supporting**

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

## XIV Budget

Expenditure pattern during the year 1997-98 is shown in Table 6 below.

**Table 6 : Expenditure during 1997-98 (Feb.)**

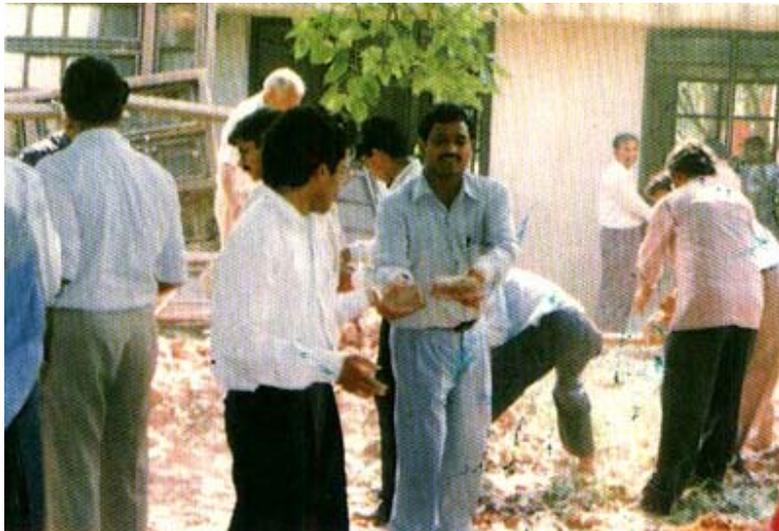
*(in lakh Rs.)*

<b>Head of Account</b>	<b>Plan</b>	<b>Non-Plan</b>	<b>Total</b>
Pay and Allowances	11.46	17.62	29.08
OTA	-	0.05	0.05
Travelling Expenses	1.04	-	1.04
Works	6.28	-	6.28
Other Charges	19.04	-	19.04
<b>Total</b>	<b>37.82</b>	<b>17.67</b>	<b>55.49</b>

## **XV Special Infrastructure Development**

Scientific, technical and staff strength has expanded during the year. In-house and outreach activities have been intensified and new collaborative programmes have been initiated during the year. Modest office facilities to provide additional working space were planned through renovation and expansion within the limited space available for the Centre. For effective communication, efficient administration and quick coordination, intercom facilities were provided by networking all the additional scientists and staff of the Centre joined during the year. Independent desktop computing facilities is provided in a phased manner depending upon the requirements and available budgetary support through in-house and external sources. LAN and WAN connectivity is planned by linking with IASRI and currently Electronic Mail facilities and Internet accessibility have become functional. The Centre is moving towards a modest level, self-sufficiency for the computing and communication requirements of every scientist as well as automating the administration and other support and service systems. Attempts are being made to acquire independent office space and staff quarters, additional transport and national networking facilities in the Ninth Plan and the National Agricultural Technology Project.

Shram Daan was organised on 10 April, 1997 for beautifying the surroundings of the Centre.



**A view of Shram Daan**

# वार्षिक प्रतिवेदन

1997-98

## सारांश

राष्ट्रीय कृषि आर्थिकी एवम् नीति अनुसंधान केन्द्र की स्थापना भारतीय कृषि अनुसंधान परिषद् द्वारा मार्च 1991 में हुई। यह केन्द्र भारतीय कृषि सांख्यिकी अनुसंधान संस्थान के परिसर में स्थापित है एवम् इस संस्थान से व्यावहारिक रूप से संलग्न है। इस केन्द्र में 15 वैज्ञानिक कार्यरत हैं। वर्ष 1997-98 में इस केन्द्र का बजट 51.86 लाख रुपये था।

केन्द्र की नीतियों का निष्कारण अनुसंधान सलाहकार समिति एवम् कार्य-कलाप प्रबंध समिति द्वारा किया जाता है। संस्थान में वैज्ञानिक एवम् प्रशासनिक गतिविधियों का निरीक्षण विभिन्न उद्देश्यों के लिए गठित समितियों द्वारा होता है।

वर्ष 1997-98 में प्रतिपादित वर्तमान एवं संभाव्य अनुसंधान क्षेत्रों जैसे कृषि अनुसंधान एवं प्रसार निवेश का विश्लेषण, रसायनिक जीवनाशी का कृषि में प्रयोग, फसल एवं फसल विधियों की संशोधिता, कृषि प्रकार एवं नियोजन, ऊँची कीमत वाली फसलों के प्रति विविधीकरण, फलों एवं सब्जियों का प्रसंस्करण, प्रत्यक्ष ग्रामीण ऋण व्यवस्था एवं कृषि में राजकीय निवेश प्रवृत्ति एवं आंचलिक विभिन्नतायें समाहित हैं।

कृषि अनुसंधान एवं प्रसार निवेश का अध्ययन प्रदर्शित करता है कि देश में अनुसंधान एवं प्रसार पर कृषि आय का क्रमशः 0.42 एवं 0.20 प्रतिशत निवेश हुआ। यह निवेश मुख्यतः सरकारी निवेश है। गैरसरकारी निवेश शोध एवं प्रसार कार्य में क्रमशः 15 प्रतिशत एवं 8 प्रतिशत रहा। विश्लेषण यह स्पष्ट करता है कि कृषि शोध एवं प्रसार सम्बंधित साधन बटवारे में बिहार, उत्तर प्रदेश, मध्य प्रदेश, आसाम एवं उड़ीसा को प्राथमिकता दी जानी चाहिए।

धान-गेहूँ फसल चक्र अनुसंधान पर राष्ट्रीय कृषि तकनीकी परियोजना के अंतर्गत निवेश के आर्थिक लाभों के विश्लेषण में यह पाया गया कि संभावित आर्थिक लाभ की दरें बहुत ही आकर्षक हैं। फसल सुधार एवं संसाधन प्रबंध पर अनुसंधान निवेश को बराबर प्राथमिकता देनी चाहिए, क्योंकि इन दोनों अनुसंधान कार्यों की संभावित आर्थिक लाभ की दरों में कोई विशेष अंतर नहीं है।

बादानी खेती से सम्बंधित शोध एवं प्रसार को भविष्य में और अधिक प्रभावशाली बनाने के लिए संस्थागत कारकों जैसे किसानों की भागीदारी, मूलभूत एवं इकरारनामों द्वारा अर्जित धन के बीच समन्वय तथा उचित प्रोत्साहन एवं पुरस्कार नीति आदि सुधारों की आवश्यकता है। इसके अतिरिक्त अध्ययन में वैज्ञानिकों एवं प्रसार अभिकर्ताओं की विशिष्ट क्षमताविकास में सहयोगी तकनीकों जैसे सामूहिक कार्यक्रम, परियोजना चक्र प्रबंध, बादानी खेती तकनीकों के विकास एवं प्रसार से सम्बंधित समस्याओं के निवारण आदि की आवश्यकता को चिन्हित किया गया।

भारतीय कृषि में रसायनिक जीवनाशी के उपभोग का विश्लेषण प्रदर्शित करता है कि हरित क्रांति के प्रथम दशक में जीवनाशी उपभोग की वृद्धि दर खाद्य उत्पादन की वृद्धि दर की अपेक्षा ज्यादा रही। लेकिन बाद के दशक में जीवनाशी उपभोग की वृद्धि दर खाद्य उत्पादन की वृद्धि दर से कम हो गई। इसका मुख्य कारण रोग प्रतिरोधी एवं समन्वित कीट नियंत्रण तकनीकों विकास एवं प्रसार कार्यक्रमों को प्राथमिकता दिया जाता रहा है। कृषि उत्पादन में खाद्य वृद्धि को ध्यान में रखते हुए परिस्थितिकी-सहयोगी तकनीकों पर आधारित कृषि को महत्व दिया जाना अति आवश्यक है।

धान-गेहूँ फसल चक्र की उत्पादकता विश्लेषण से विदित होता है कि गेहूँ की उत्पादकता वृद्धि दर पश्चिम बंगाल में काफी अस्थिर रही, जबकि बिहार राज्य में वृद्धि दर में काफी बढ़ोतरी दर्ज की गयी। इसके विपरीत अन्य प्रांतों में हाल के वर्षों में औसत उपज की वृद्धि दर कम हो गयी। गंजाय प्रांत में उपज की वृद्धि दर सबसे कम रही। यह वृद्धि दर 1970 के दशक में धान एवं 1980 के दशक में गेहूँ के लिए और भी धीमी रही।

गेहूँ उत्पादन के विभिन्न प्रणालियों के जीव-आर्थिक समाकलन (Simulation) से यह सिद्ध होता है कि गेहूँ की दर से सुआई करने पर लगभग 1.6 लाख टन उत्पन्न, 7.2 लाख हे. मीटर सिंचाई जल तथा ऊर्जा की अतिरिक्त आवश्यकता पड़ती है। ये अतिरिक्त संसाधन वर्तमान गेहूँ क्षेत्र के औसतन आधे क्षेत्र की उत्पादकता को 4 टन प्रति हे. बनाये रखने के लिए आवश्यक हैं। भावी कृषि विकास में भटती हुई उपज वृद्धि दर, कम होता हुआ भूजल-स्तर तथा मृदा-पोषकों में असंतुलन जैसी चुनौतियां महत्वपूर्ण होंगी।

एक अध्ययन से यह तथ्य सामने आया है कि बादानी कृषि के वर्गीकरण के लिए जिसमें विकास नीतियों का समरूप प्रभाव हो, न केवल सामान्य वर्षा, मृदा प्रकार तथा फसल-वृद्धि की सम्पराधियों को शामिल किया जाये, बल्कि पौधों, उत्पाद एवं फसल बाजार, जनसंख्या तथा आधारभूत सुविधाओं से सम्बंधित अन्य सामाजिक-आर्थिक संरचनात्मक कारकों को भी शामिल किया जाना चाहिए। इस प्रकार कृषि परिस्थितिकी, सामाजिक व आर्थिक पहलुओं को समाहित करते हुए, 13 राज्यों के 201 वर्षा-आधारित जिलों का 15 कृषि क्षेत्रों में वर्गीकरण दर्शाया गया है।

कर्नाटक में किये गये एक अन्य विश्लेषण से यह तथ्य प्रकाश में आया है कि यदि अधिक आय वाली फसलों को फसल चक्र में शामिल किया जाये तो अधिक लाभ होगा। उदाहरणार्थ, धान्य फसलों के अतिरिक्त पुष्प उत्पादन, सब्जी उत्पादन, रेशम कीट पालन अथवा फल और सब्जी उत्पादन। अधिक आय व रोजगार वाले कृषि व्यवसाय के प्रोत्साहन के लिए कृषकों का रुझान, बाजार एवं आधारभूत सुविधाओं से सम्बंधित व्यवधानों को चिन्हित किया गया है।

फल व सब्जी संशोधन उद्योग के एक अध्ययन से पता चलता है कि संशोधन इकाइयों के वितरण तथा आधारभूत ढाँचे के स्तर में राज्य स्तर पर काफी विभिन्नताएं हैं। बिहार, जिसका कुल उत्पादन में हिस्सा 13 प्रतिशत है, में केवल 1.3 प्रतिशत ही संशोधन इकाइयां हैं। संशोधन इकाइयों का नवोनीकरण, अन्य स्थानों पर नई इकाइयों का निर्माण तथा उचित ढाँचागत सुविधाओं के विकास पर विशेष बल देने की आवश्यकता है।

भविष्य में केन्द्र के अनुसंधान कार्यक्रम के मार्गदर्शन के लिए एक योजना बनाई गयी है। इस कार्य में अनेक विद्वानों के मत लिये गए हैं और इस योजना को भारतीय कृषि अनुसंधान परिषद् की स्वीकृति मिल चुकी है। इसके अंतर्गत मध्यम और दीर्घकालीन अनुसंधान कार्यक्रम दर्शाये गए हैं।

सर्प 1997-98 के दौरान केन्द्र ने दो नीति पत्र तथा एक नीति सारोस प्रकाशित किया है। केन्द्र के वैज्ञानिकों ने विचार गोष्ठियों व नीति संबंधी सभाओं में सक्रिय भाग लिया। इसके अलावा केन्द्र ने कई महत्वपूर्ण गोष्ठियों जैसे अनुसंधान में प्राथमिकताओं का निर्धारण, कृषि आयात-निर्यात नीति, कृषि-उद्योग सहसम्बंध एवं कृषि भूमि नियोजन का आयोजन किया।