PREFACE

This report covers the activities of National Centre for Agricultural Economics and Policy Research during 1996-97. There was significant upgradation of infrastructure; recruitment of scientists was accelerated; research and policy interactions gained momentum. The Perspective Plan for the Centre was finalised and approved. Several collaborative research activities were initiated. The report provides a synoptic view of these developments and also of the major research achievements during the year.

Dr. Rasheed Sulaiman V. and Dr. P. Adhiguru have compiled this report and Mrs. Umeeta Ahuja has worked hard for proper presentation of this report. Mr. Mangal Singh Chauhan & Mrs. Sonia Chauhan have helped in preparation of graphs. I am thankful to them for this effort, and to Dr. S. Selvarajan and Dr. Ramesh Chand for guiding this work.

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Dayanatha Jha
Director

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सारॉंश

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 भारतीय कृषि अनुसंधान संस्थान से व्यावहारिक रूप से संलगित है। इस केन्द्र में 15 वैज्ञानिक कार्यरत हैं। वर्ष 1996-97 में इस केन्द्र का बजट 40 लाख रूपये था।

केन्द्र की नीतियों का निर्धारण अनुसंधान सलाहकार समिति द्वारा एवम् कार्य-कलाप प्रबंध समिति द्वारा निर्धारित किये जाते हैं। संस्थान में वैज्ञानिक एवम् प्रशासनिक गतिविधियों का निरीक्षण वैज्ञानिकों द्वारा गठित समितियों द्वारा होता है।

वर्ष 1996-97 में किये गए अनुसंधान इंगित करते हैं कि कृषि अनुसंधान पर कृषि संबंधित आय का मात्र 0.49 प्रतिशत खर्च होता है। विश्लेषण यह स्पष्ट करता है कि पश्चिम बंगाल, मध्य प्रदेश, बिहार एवम् उड़ीसा में अनुसंधान संबंधित निवेश काफी कम हैं और अगली योजनाओं में इस कमी को पूरा करने की आवश्यकता है। अन्तर्राष्ट्रीय अनुभवों के आधार पर कृषि अनुसंधान पर नवीं पंचवर्षीय योजना के अन्त तक कुल कृषि उत्पाद के 1 प्रतिशत खर्च करने की सिफारिश की गई है।

धान के उत्पादन से संबंधित आर्थिक विश्लेषण यह स्पष्ट करते हैं कि वर्तमान उत्पादन परिवेश में काफी सुधार की संभावनाएँ हैं, तथा वर्तमान धान उत्पादन प्रौद्योगिकियों से भी उत्पादन में काफी वृद्धि संभव है।

धान-गेहूँ फसल चक्र से प्रभावित क्षेत्रों के आंकड़ों के विश्लेषण से यह स्पष्ट होता है कि जल संबंधी नीतियों के सुधार से कृषि उत्पादन एवम् उत्पादन की गलत मार्गदिशाओं में सुधार संभव है। इस प्रणाली से प्रभावित क्षेत्रों में उत्पादन की वृद्धि दर में गिरावट अवश्य आई है परन्तु प्रति हेक्टेयर उत्पादन अभी भी वृद्धि मार्ग पर है। यह भी पता लगाया गया है कि पशुपालन उत्तर-पश्चिम भारत में कृषि उत्पादन एवम् रोजगार की गति बढ़ाने में कारगर सहयोग दे सकता है।

अन्य अनुसंधान इंगित करते हैं कि पशुपालन एवम् गैर-कृषि रोजगार ग्रामीण क्षेत्रों में आर्थिक विषमता दूर करने में कारगर सिद्ध हो सकते हैं। कृषि भूमि के वितरण से आर्थिक विषमताएँ दूर करने में विशेष उपलब्धि होने की संभावना नहीं है।

कृषि में महिलाओं के योगदान संबंधी हमारे विश्लेषण यह स्पष्ट करते हैं कि इस क्षेत्र में हमें अल्प-आय वाले विकल्पों से अलग हट कर सोचना होगा। ग्रामीण महिलाओं में नवीन उद्यमों का परिवेश दक्षिण-पूर्व एशियाई देशों में महत्वपूर्ण योगदान दे रहा है और हमें भी पारंपरिक व्यवसायों से अलग, नई दिशाओं की ओर ध्यान देना होगा।

भविष्य में केन्द्र की अनुसंधान संबंधी नीतियों के विषय में केन्द्र ने योजना बनाई है। इस कार्य में अनेक विद्वानों के मत लिये गए हैं और इस योजना को भारतीय कृषि अनुसंधान परिषद् द्वारा स्वीकृति मिल चुकी है। इसके अंतर्गत मध्यम और दीर्घकालीन अनुसंधान कार्यक्रम दर्शाये गए हैं।

केन्द्र द्वारा 1996-97 मे चार प्रकाशन निकाले गए। इनके अतिरिक्त केन्द्र की भावी योजना, Vision 2020 भी प्रकाशित की गई। केन्द्र के वैज्ञानिक कई गोष्ठियों एवम् नीति संबंधी विचार सभाओं में भाग लेते रहे हैं और परिषद् की नीतियों पर भी समय-समय पर अपनी राय व्यक्त करते रहे हैं।

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, had a total budget of Rs. 2 lakhs in 1996-97.

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.

Research conducted during the year indicated that during the triennium ending 1994-95, the government is spending 0.49 per cent of gross domestic product from agriculture (AgGDP) on research and education, and about 0.15 per cent on extension. The annual expenditure per research worker was about Rs. 4 lakh in research and education, and Rs. 26 thousand in extension. There was substantial under-investment in research in states like West Bengal, Madhya Pradesh, Bihar and Orissa. This imbalance needs to be addressed in future allocations.

The research study of rice productivity showed that (a) yield levels of 5-6 tonnes per hectare were being realized by the most efficient farmers except in Orissa where even the best farmers could not produce beyond 2.5 tonnes, (b) that unit costs differentials were not necessarily related to yield levels - Orissa costs for the most efficient farmers were not much different from those in Punjab, though yield differential was quite high, and (c) that efficiency differential (ratio of least to most efficient) ranged from 2.5 to 4.3, in fact, it was higher in Punjab than in Orissa.

Another study on rice-wheat system refutes the assertion of plateauing or stagnation in yield of wheat and rice. What is happening is deceleration in growth of yield of these two crops in some states which is being interpreted as decline in yield.

Water management technologies supported by rational pricing policies and innovative institutional mechanisms were suggested to reduce the water use beyond 25 per cent from the current level in rice-wheat system .

In the same context, it was found that changes in crop pattern would have marginal impact in arresting problem of groundwater over exploitation, in north-west India. Even when the area share of paddy and wheat is reduced to level of early 1970's, when there was no water deficit, it would result in reducing the water deficit by about 12 percent only. Additional area brought under cultivation due to increase in crop intensity and expansion of net sown area was found to be responsible for about 62 percent of the over exploitation of ground water. Dairying was found to be the best choice for agricultural diversification in the state, both for enhancing employment and income and for reducing soil and water degradation.

The study on income and inequality indicated that livestock and wage labour helped smoothen rural income distribution mainly because these activities were concentrated among the poor households and required little or no land. Given the decreasing size of land holding, it may not be possible to improve income distribution through redistribution of land. Policy measures should emphasize development of subsidiary and non-agricultural activities that require little or no land.

On women in agriculture, our research showed that literacy and poverty reinforce each other and compel the poor working women to concentrate in low paid occupations in the informal sector. There should be a multi-pronged strategy to remove both illiteracy and poverty with a critical minimum speed. Most of the gender specific, target group oriented, programmes have not yielded much results so far. Because, under all these programmes, efforts have been directed to provide women with only those inputs' and services which perpetuate their existence in low paid occupations. It has never been thought to provide employment to them beyond sewing, weaving, embroidery, knitting etc. The focus of such programme must shift in order to enable them to take up either self-employment or wage-paid employment in the modern sector. Besides, the provision of equal pay for equal work should be strictly implemented.

Moreover, there should be efforts to promote women entrepreneurship in business on the pattern of East Asian countries.

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, (CAR 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-SAU system.

Two Policy Briefs and two workshop proceedings have been published during the year 1996-97. In addition to these, NCAP Perspective Plan (VISION 2020) has also been brought out. Centre staff have also been involved in a number of professional and policy-level interactions.

I Introduction

The National Centre for Agricultural Economics and Policy Research (NCAP) in brief, 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 : (a) technology generation, diffusion and impact; (b) sustainable agricultural production systems; (c) interaction between technology and other policy instruments like incentives, investments, institutions, trade, etc; and (d) 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 an immense 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 fifteen scientists. This includes the Director, one National Fellow, three Principal Scientists, two Senior Scientists and eight 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 Figure 1

Figure 1 Organogram of NCAP

II Research Accomplishments

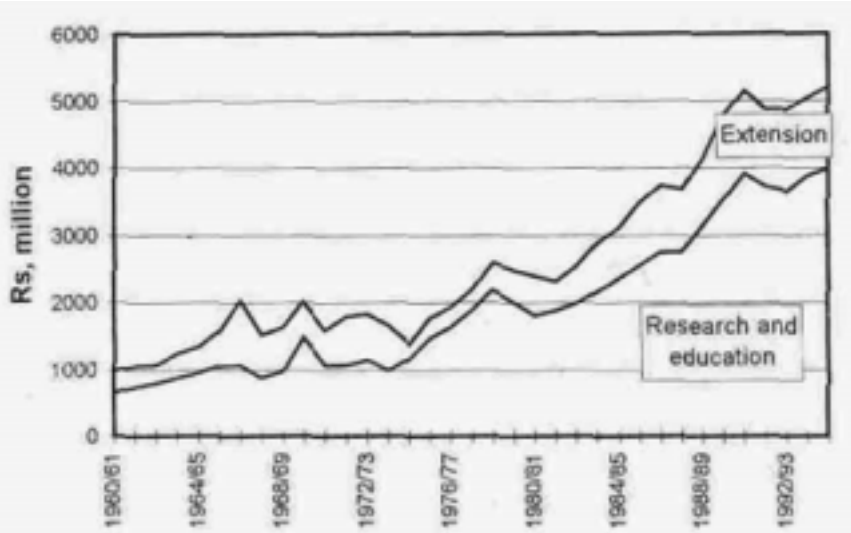
Research accomplishments during the year under the major programme areas of NCAP are given below.

TECHNOLOGICAL CHANGE

Investment in Agricultural Research, Extension and Education

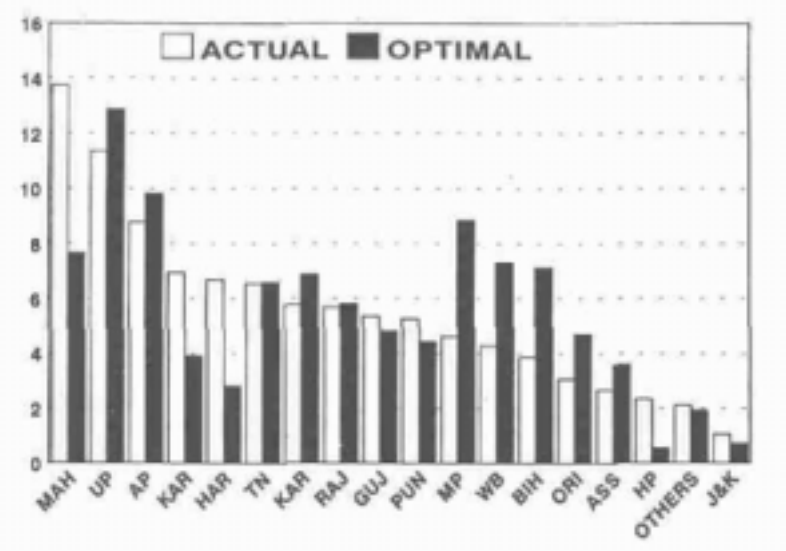
The national agricultural research system (NARS) is reassessing its priorities in the context of changing environment. In this process, it is important to begin with trends in agricultural research and extension investment and allocation pattern and make necessary adjustments in the light of new, expanded research agenda. Reliable data on investments in research and extension are not available in the country. In order to fill this information gap, a comprehensive research and extension investment data series has been compiled. Investment by the Union and State governments supported the Indian NARS. The trends in government investments (at 1981/82 prices) in research, extension and education are shown in Figure 2.

Figure 2. Trends in public real investment in research, extension and education in India (1981/82 prices)



The major up-trend in the real investment came in the 1980's. During the triennium ending 1994-95, the government spent 0.49 per cent of gross domestic product from agriculture (AgGDP) on research and education and about 0.15 per cent on extension. The annual expenditure per research worker is about Rs. 4 lakh in research and education, and Rs. 26 thousand in extension. Private sector contributes about 15 percent and 8 percent to the total investments in research and extension respectively in the country. These intensity indicators show that intensity of research and extension efforts in India is lower in comparison to developed countries(2 percent of AgGDP). It is suggested that research intensity should be increased to 1 per cent of AgGDP by the end of Ninth plan. The actual and optimal research investment based on value of output by the different states in India are given in Figure 3. The figure shows clearly that there is substantial under-investment in states like West Bengal, Madhya Pradesh, Bihar, Orissa, Assam, Uttar Pradesh, and Andhra Pradesh. This imbalance needs to be addressed in future allocations.

Figure 3. Actual and optimal research investment by states



Traditional Water Harvesting Systems

A study of sustainable resource use pattern emphasised the need for synthesis of modern methods of water appropriation and the time-proven traditional technology. A country-wide survey of the traditional water harvesting systems reveals that several indigenous techniques of water appropriation and mechanisms of improved water use efficiency, are not only forgotten but also destroyed by the modern activities, such as, residential housing colonies, recreational parks and gardens, especially in urban areas. These activities are immensely detrimental to the sustainability of water resources.

As several of the ecological functions including conservation of-flora and fauna are embedded into the traditional water harvesting techniques, the revival and improvisation of the ancient systems will help correcting the environmental damages which are caused primarily due to the modern methods. As the externality of water resource development imposes a heavy social cost, traditional knowledge of water appropriation helps reduce the social cost and ensure sustainability of water resources.

Production and Productivity of Rice

A study on production and productivity of rice in India showed that there has been steady increase in production and productivity over the last three decades (Table 1). Since mid-seventies there has been no growth in area in the main *(Kharif)* season. There is no evidence of deceleration in yield growth except in *rabi* rice which accounted for about 8 percent of the total rice area in 1994.

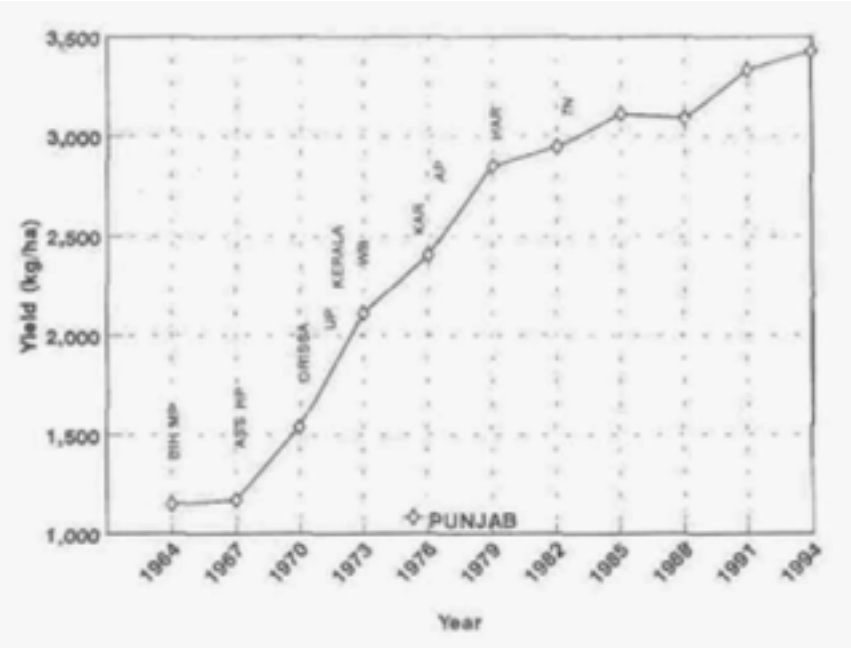
The study also revealed considerable inter-state variation in rice yields (Fig 4). States like Bihar, MP, Assam, HP and Orissa are more than 30 years behind Punjab's current yield levels. Priority to such states and suitable programmes will ensure that rice production in the country remains on the high growth path.

Table 1 : Growth rates in area, production and yield of rice (%)

Time-Period	Crop	Annual Growth rates[@]		
		Area	Production	Yield
1962-75	Total rice.	0.68	2.33	1.65
	Kharif rice	0.42	1.82	1.39
	Rabi rice	8.14	11.88	3.74
1976-85	Total rice	ns	3.30	2.65
	Kharif rice	ns	3.21	2.86
	Rabi rice	2.46	2.46	1.99
1986-94	Total rice	0.64	3.80	3.16
	Kharif rice	ns	3.79	3.31
	Rabi rice	2.67	3.96	1.28

@ : Based on triennium averages
ns : not statistically significant

Figure 4. Triennium average yield of rice (1992-1994)



An interesting dimension is revealed when efficiency gaps are examined at farmers' level. These data were obtained from the cost of cultivation schemes in selected states for 1984-85. The sample was arranged in ascending order with respect to cost of production per quintal. Table 2 *provides data for the top and bottom one-fifth of the sample with* respect to costs as well as yields.

Table 2 : Efficiency gaps in rice production in selected states

State	Parameter	Efficiency level		
		Highest	Lowest	Ratio
Tamil Nadu	Oper. cost (Rs/qtl)	65.54	281.03	4.29
	Yield (qtl/ha)	58.19	22.64	0.39
Andhra Pradesh	Oper. cost (Rs/qtl)	71.19	180.44	2.53
	Yield (qtl/ha)	47.87	19.52	0.41
Punjab	Oper. cost (Rs/qtl)	63.84	190.40	2.98
	Yield (qtl/ha)	57.16	36.92	0.64
Orissa	Oper. cost (Rs/qtl)	61.77	150.80	2.44
	Yield (qtl/ha)	24.67	13.73	0.56

Oper. cost : Operational cost per quintal of output

Source : Mishra V.N. Relative efficiency and technological change in Paddy cultivation : Indian experience, *Journal of Indian School of Political Economy,* Vol. 5(3): 1993

It can be seen that (a) yield levels of 5-6 tonnes per hectare were being realized by the most efficient farmers, except in Orissa where even the best farmers could not reach beyond 2.5 tonnes, (b) unit costs differentials are not necessarily related to yield levels - Orissa costs for the most efficient farmers were not much different from those in Punjab, though yield differential is quite high, and (c) efficiency differential (ratio of least to most efficient) ranges from 2.5 to 4.3, in fact it is higher in Punjab than Orissa. This raises questions regarding 'real' gaps. Also, regarding potential for future growth, these findings make assertions regarding yield ceilings in states like Punjab quite suspect.

SUSTAINABLE AGRICULTURAL SYSTEMS

Sustainability of Rice-Wheat Crop System in Indo-Gangetic Region

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 the yield data presented in the Figures 5 and 6 which are based on quinquennium averages during the post-green revolution period beginning 1970-71 and ending 1994-95. Except rice in Bihar, the average yield during the quinquennium ending 1994-95 is found to be higher than any of the previous quinquennia. The data for individual years shows that the highest peaks in yields of wheat and rice were recorded in 1993-94 or 1994-95. This refutes the assertion of plateauing or stagnation in yield of wheat and rice. What is happening is deceleration in growth of yield of these two crops in some states which is being interpreted as decline in yield. This is a natural outcome of the law of diminishing returns. What is needed is a breakthrough in production technology or a major effort to overcome the limiting factors to spur the growth in productivity.

Figure 5. Trend in rice yield in Indo-Gangetic states

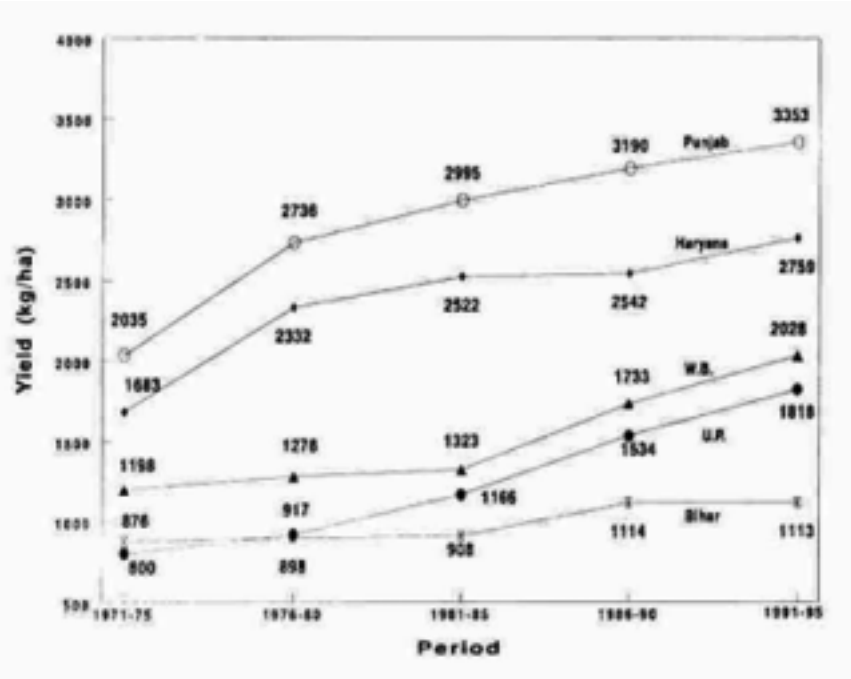
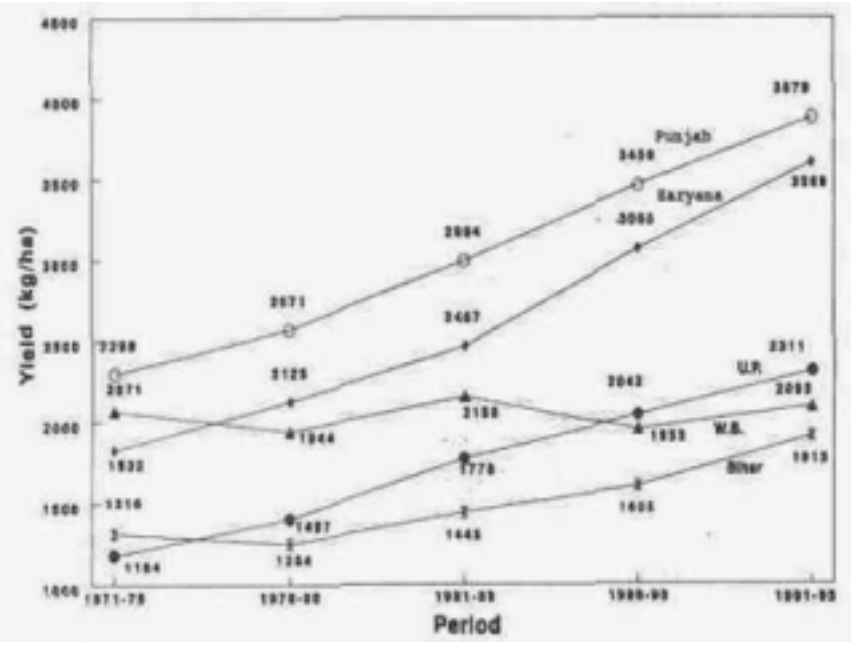


Figure 6. Trend in wheat yield in Indo-Gangetic states



Policy Analysis for Sustainable Resource Use in Rice-Wheat Cropping System

With more than 44 per cent of area under irrigated rice-wheat (R-W) double cropping system in Asia, accounted for by India, the irrigation intensive production strategies and consequent sustainability concerns assume significance while pursuing productivity-led future agricultural growth. Receding groundwater table (0.5 meter per annum) has emerged as a major concern alongwith excessive and unbalanced use of fertilizer and chemicals in parts of northern India. The conflict between the societal objective of maximizing water-use efficiency and the farmers' objective of maximizing stable income in the intensive R-W cropping system is analyzed through a systems approach by taking Karnal district in Haryana as an aggregate unit.

Water-use options for stabilising income

The expected income levels from R-W system in Karnal district and the water use needed for realizing those income levels under private and societal objectives was generated from the validated crop growth simulation based optimal solutions (Table 3). The expected income levels ranged from Rs 3.6 to Rs.4 billion (1996 values) with a corresponding coefficient of variation of only 5 to 7 percent. The water use needed for realizing these expected income levels of Rs 3.6 and Rs 4 billion was 3.44 and 3.77 billion m3, respectively with minimum income risk.

Table 3 : Compromise set for conflicting private and societal objectives for different income levels from rice-wheat system, Karnal district

Objectives	Income (billion Rs)	Income risk (billion Rs)	Water use (billion m3)
Minimizing risk	3.6	0.17	3.44
Minimizing water use	3.6	0.65	2.14
Minimising risk	4.0	0.27	3.77
Minimizing water use	4.0	0.53	3.15

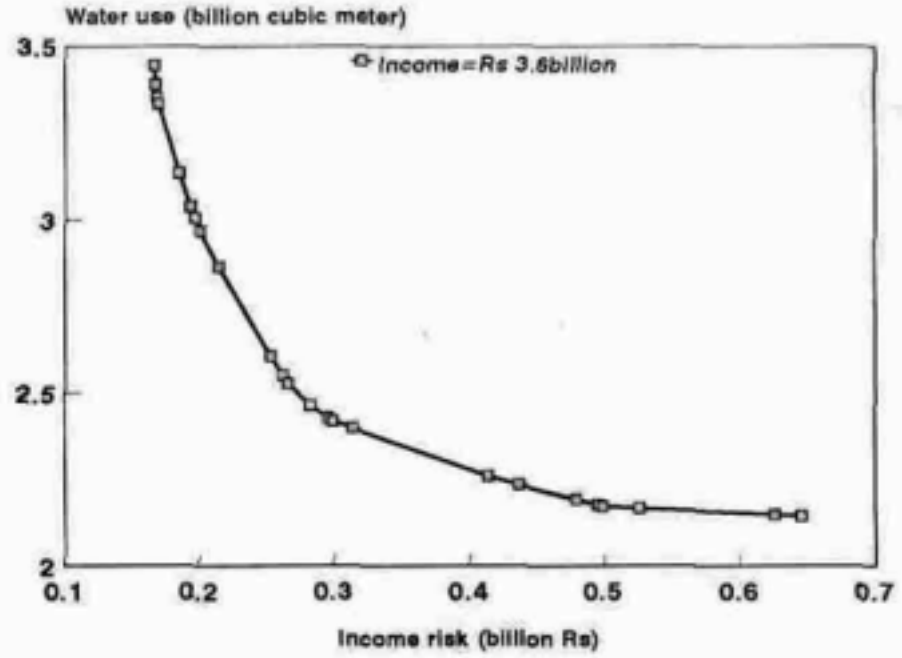
Simulation of current production scenario under private and societal objectives revealed that for realizing an income level of Rs 3.6 to Rs 4 billion, farmers tend to use more water to the extent of 0.62 to 1.3 billion m3 in order to control the yield fluctuations and thereby reduce income risk levels. Risk is measured as standard deviation of income. The implications of increased water use as an income stabilization management strategy in the R-W system deserves careful consideration in view of observed trends in groundwater depletion.

Existing resource-mix and policy implications

Tradeoff between water use and income risk is highlighted for the expected income level of Rs 3.6 billion from R-W system (Fig. 7) in Karnal district. The observed tradeoff was moderate (10:1) at the current water use levels due to favourable policy environment.

Currently, water use in R-W system is often excessive to compensate for variations in the use of other inputs. Hence, for every unit increase in the standard deviation of income, there exists a potential to reduce the water use by 10 units through appropriate production strategies without compromising income levels. The arc elasticity of income risk to water use is 0.43 for this water use range of 2.44 to 3.44 billion m3. This moderate tradeoff range also shows the potential for saving 25 per cent of water at the current level (3.44 billion m3) of its use, to realise the expected income level of Rs 3.6 billion, but rational water and energy pricing policies are needed to achieve this. Subsequently, after effecting this 25 per cent saving in water use from the present level, the tradeoff between water use and income would become acute (1.5:1). The arc elasticity of income risk to water use is 0.13 for this water use range of 2.14 to 2.44 billion m3 In this situation, for every unit increase in standard deviation of income, only 1.5 units of water use could be conserved without sacrificing the income level of Rs 3.6 billion. Therefore, water management technologies supported by rational pricing policies and innovative institutional mechanisms are needed to reduce the water use beyond 25 per cent from the current level. In either case, it is equally important to evolve pricing, marketing and subsidy policies comprehensively, and not in isolation from one another as is presently done if efficiency-based water use in R-W cropping system is to be promoted.

Figure 7. Trade off curve for expected income and income risk, Karnal district



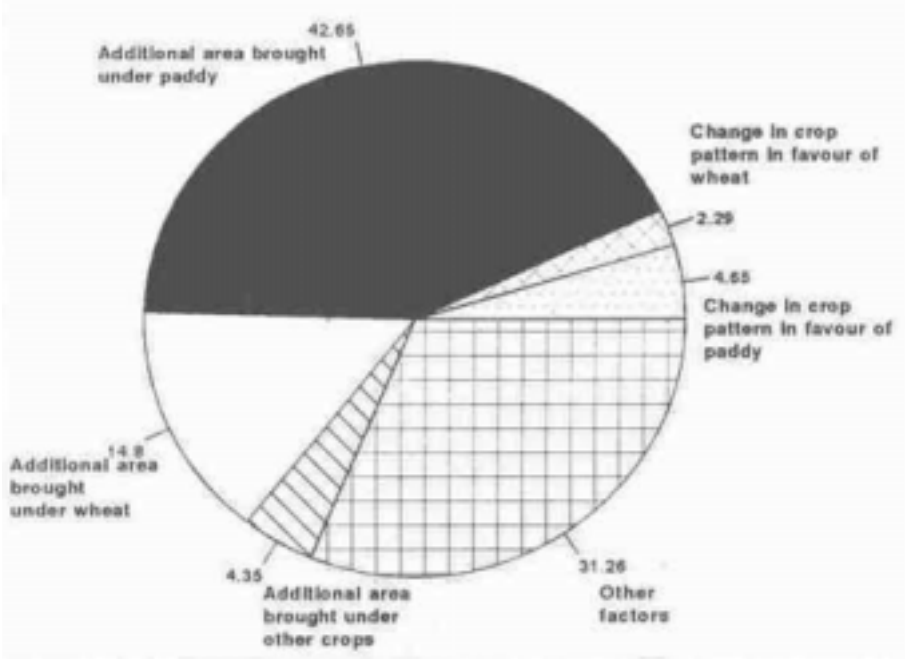
SUPPLY, DEMAND AND MARKETS

Potentials, and Prospects of Agricultural Diversification in Punjab

Agriculturally advanced states like Punjab are reported to be facing serious ecological and environmented problems and strain on natural resources associated with the green revolution technology and difficulty in sustaining growth in output and income. These developments, along with the changing economic environment, necessitate changes in production activities to face the challenges of persistent unemployment, natural resource degradation and slowdown in economic growth. In this backdrop a study on "Potentials and prospects of agricultural diversification in Punjab", initiated earlier was completed in this year.

The study found that green revolution technology has both positive as well as negative impact on natural resources. The crops (vegetables) that are capable of competing with paddy and wheat would not enrich natural resources. Thus changes in crop pattern would have marginal impact in arresting problem of groundwater over-exploitation. Even when the area share of paddy and wheat is reduced to level of early 1970's, when there was no water deficit, it would result in reducing the water deficit by about 12 percent only. Additional area brought under cultivation due to increase in crop intensity and expansion of net sown area is found responsible for about 62 percent of the over exploitation of ground water (Figure 8).

Figure 8. Contribution of various sources in over exploitation of groundwater in Punjab (in percent)



Reduction in crop intensity and rational pricing policy of water are the important instruments to put a check on depleting water resources. Dairying was found to be the best choice for agricultural diversification in the state both for enhancing employment and income and for reducing soil and water degradation.

Diversification and Rural Income Distribution

Given the unequal distribution of land, growth in agriculture alone is not sufficient to bring about substantial reduction in poverty and income inequality. Growth oriented policies thus need to be supplemented with equity oriented policies. To identify the activities that help reduce income disparities, a study was carried out in rural western Uttar Pradesh.

Table 4 : Impact of Income Sources on Income Distribution

(percent)

Income source	Income share	Contribution to total inequality	Impact of change in source of income on inequality
Agriculture	47.9	71.5	23.6
Livestock	20.1	15.8	-4.2
Farm labour	8.1	-11.8	-19.9
Non-farm labour	5.8	-2.9	-8.7
Business and artcrafts	6.4	7.9	1.5
Salaries	7.2	13.1	5.8
Transfers	4.5	6.4	1.9

Agriculture comprised the main occupational activity contributing 48 percent to household income, followed by livestock (20 percent) and wage labour. Agriculture and livestock being the dominant sources of income accounted for 72 percent and 16 percent of the inequalities in rural income. The marginal effect of changes in income sources was negative for livestock and wage labour implying

that increase in income from these sources would help smoothen rural income distribution mainly because these activities are concentrated among the poor households and require little or no land. A negative relationship existed between farm size and productivity indicating higher production efficiency on smaller farms partially counter balancing the inequalities due to uneven distribution of land. However, given the declining size of land holding, it may not be possible to improve income distribution through redistribution of land. Policy measures should emphasize development of subsidiary and non-agricultural activities that require little or no land.

INSTITUTIONAL CHANGE

Prospects of Contract Farming in India

Trade liberalisation has offered significant market-led opportunities for diversification towards high value crops. The potential for development of agro-processing sector in India has remained under-utilised due to lack of demand for processed food, industrial incentives for investment and infrastructural development. Only 2 percent of India's food output is commercially processed, compared to over 40 percent in developed countries. Inspite of the existence of latent demand, the corporate sector was not interested in agro-processing sector till recently because of fear of irregular supply of raw material, complexities in land transfer laws, government protection to small and cottage sector and lack of commodity auction centres.

Liberalisation of trade and reforms in agricultural sector have generated interest among the corporate sector to tap the unexploited potential of agro-processing and has started encouraging contract farming to ensure regular supply of raw material. Contracting distributes production and market risks between the contracting parties, provides farmers easy access to markets and sustained incomes, helps develop farm and village level infrastructure and improve market environment. Besides, contracting may produce linkage effects on local economy in terms of increased demand for hired labour, creating opportunities for employment in transport, processing, and development of agricultural infrastructure. Sometimes it is feared that contract farming encourages the growth of high value crops which tend to displace food crops which may have adverse effect on food security. However, it has been observed that it generally replaces less profitable crops rather than food crops.

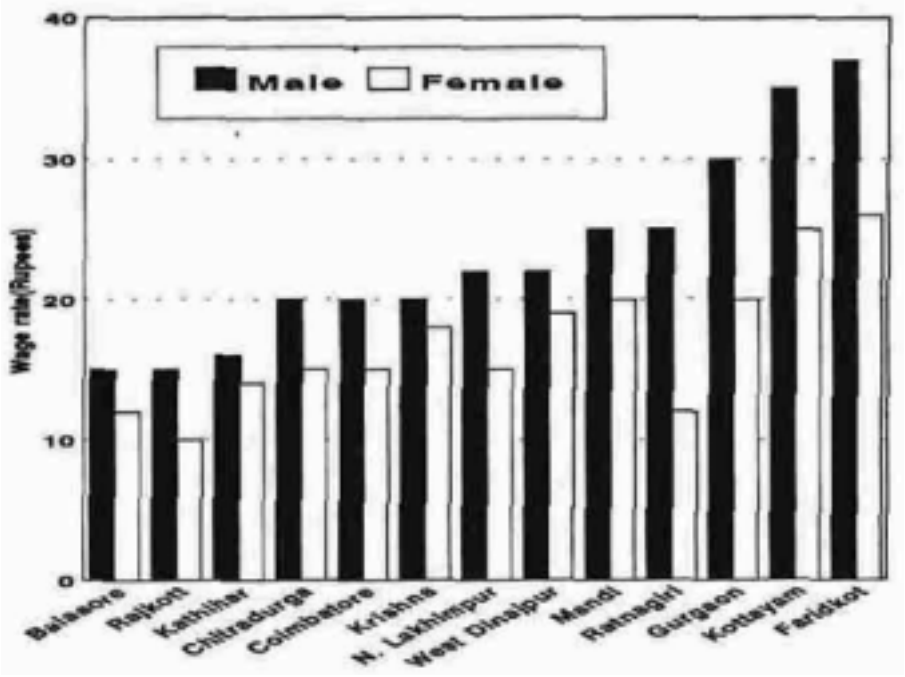
To realise the full benefits of multiplier effects of contract farming, the entry of corporate sector should be encouraged and efforts should be made to develop infrastructure for agro-processing sector, restructuring protection to small and cottage sector, liberalising land lease markets and promoting commercialisation of agriculture. The corporate sector should also devise measures of ensuring incentives, rewarding risks in new crops and new regions, provision of inputs and technical know-how to induce farmers to take up contract farming.

Employment of Women in South Asia

Women workers in South Asian countries are concentrated in low paid occupations. The main factors which contribute to low employment and low wage profile of rural women include (1) lack of higher education and training, (2) socio-cultural rigidities which prevent them to move out even if they are skilled, (3) high incidence of unemployment among men workers, (4) inadequate access of women to land, physical assets and institutional credit and (5) to some extent, "gender bias" in labour market. Figure 9 indicates the differential nature of wage rates of men and women workers in agriculture at selected centres.

Since literacy and poverty reinforce each other and compel the poor working women to concentrate in low paid occupations in the informal sector, there should be a multi-pronged strategy to remove both illiteracy and poverty with a critical minimum speed. Most of the gender specific, target group oriented, programmes have not yielded much results so far. Because under all these programmes, efforts have been directed to provide women with only those inputs and services which perpetuate their existence in low paid occupations. It has never been thought to provide employment to them beyond sewing, weaving, embroidery, knitting etc.

Figure 9. Differential wage rates of unskilled men and women agricultural labours (Peak season in 1989-90)



The focus of such programmes must shift in order to enable them to take up either self-employment or wage-paid employment in the modern sector. Besides, the provision of equal pay for equal work should be strictly implemented. Moreover, there should be efforts to promote women entrepreneurship in business on the pattern of East Asian countries.

AGRICULTURAL GROWTH AND ADJUSTMENT

Remedying Regional Imbalances in Agriculture Development

The north eastern region (NER) is one of the most agriculturally backward areas in the country. However, the region is endowed with rich natural resources including abundant water, high rainfall, fertile land, ever-green forest resources and important mineral resources. A recent analysis identifies several policy variables for correcting the imbalances prevailing in the region. Based on a detailed SWOT analysis, several feasible prospect areas for overall development are identified.. These include the following:

1. Remodelled farmers-friendly cropping pattern, e.g. a flood-escaping rabi-dominated cropping pattern.
2. Revival of traditional water harvesting and its management (including the management of ground water) for conjunctive use. Indigenous systems like field ponds, *dongs, beel* etc. in the plains and roof-top water harvesting systems in the hills must be revived and improvised. These act as efficient safety net against rainfall fluctuation.
3. Agro-ecological and socio-cultural zones for prioritising zone-specific integrated agricultural development strategies.
4. Strengthening indigenous rural institutions and empowerment to village council/district councils, headman, *gram panchayat* etc. as the basis of participatory approach in prioritising the development initiatives (with respect to modified Panchayat Raj after 73rd and 74th amendment).
5. To counter the market forced interacting against the development of the region, following alternatives may be adopted and appropriately institutionalised.

I. Inside resources-outside markets (for several natural resources including citronella, crude oil, natural gas, silk, agro-products, minerals etc.,)
II. Inside resources-inside markets (sustenance requirements, agricultural produce, forests, water, land, indigenous handicrafts etc.,)

III. Outside resources-inside markets (technology, industrial and engineering products, textiles, vegetables, fish, eggs, wheat, rice, fruits, silk, skilled man-power etc.)
IV. Outside resources-outside markets (several intermediate goods and industries etc,)

6. The introduction of a common market for inter and intra-regional transactions within the NER, in order to eliminate marketing bottlenecks.
7. Initiate (i) a Flood Prone Development Programme in line with other national development schemes such as DPAP, DDP etc. (ii) Hill area development programmes to increase the overall hill productivity.
8. Effective research and development of location specific appropriate technology.

These proposals were presented and discussed at the meeting of the *Expert Committee on Remedying Regional Imbalances in Agricultural Progress* headed by Dr. M.S. Swaminathan at Shillong on February 13-14 1997.

CURRICULUM DEVELOPMENT IN SOCIAL SCIENCES

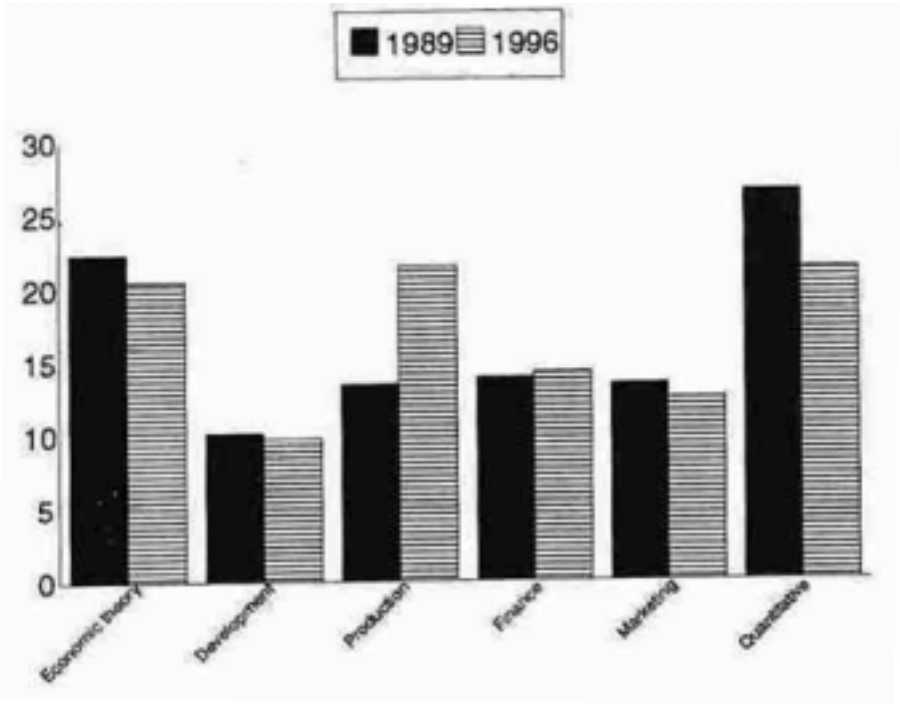
Agricultural technology management has to consider the interdependent relationships between new and existing technologies as they are directed to meet acceptable and feasible responses by individual producers. Social sciences could provide relevant screening devices for choosing the appropriate choice and mix of .technological and institutional innovations for effective agricultural technology management encompassing generation, assessment and diffusion of technologies. Social scientists have to continuously experiment, evolve and guide innovative strategies in addressing current and emerging challenges. The curriculum in social sciences, in the national agricultural education system should therefore, reflect the changing human resource development needs. A study,

followed by a seminar organised by the Centre highlighted the need for a quantitative and qualitative changes in the existing Social Sciences curriculum.

Agricultural Economics

An overview of agricultural economics curriculum within NARS emphasised that past emphasis in terms of farm management and production economics, has resulted in micro-level studies with little or no integration with regional or national level macro issues. The comparative shifts in the coverage of major areas like economic theory, development and policy, farm management and production economics, finance, marketing and quantitative methods are shown in Figure 10.

Figure 10. Temporal shift in the emphasis on major areas of curriculum

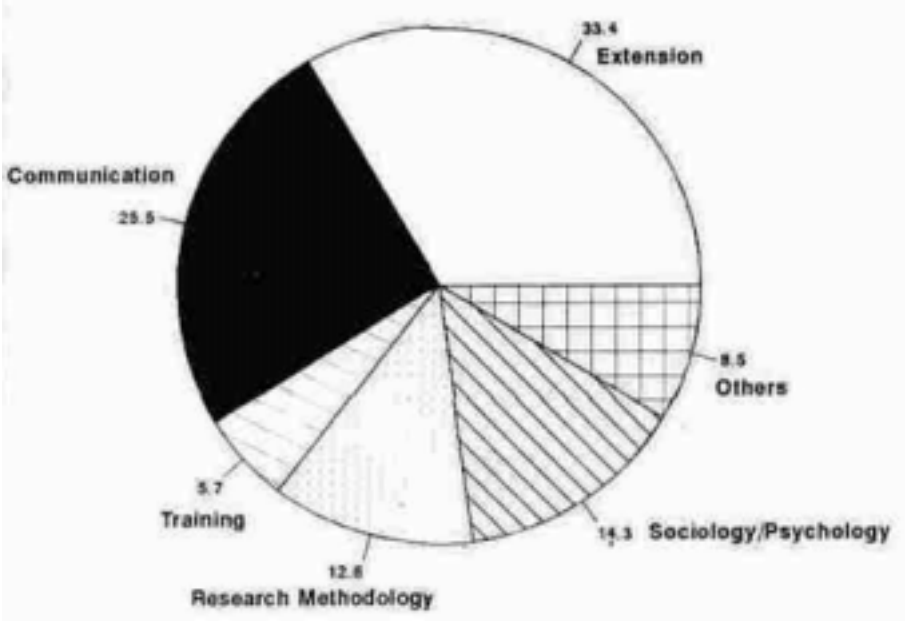


The current curriculum coverage shows an emphatic shift with increased emphasis for farm management and production economics by 60 per cent and reduced emphasis for quantitative methods by 20 per cent as compared to the coverage in 1989. Shifts in other major areas of agricultural economics curriculum are only marginal. The opposite direction of changes in coverage in major areas like farm management economics and quantitative methods coupled with the continued neglect of new and emerging areas like natural resource economics, international trade and marketing, agri-business management and environmental economics, underline the existing structural deficiency in agricultural economics education system. Existing expertise-mix in agricultural economics discipline is inadequate to meet the current and emerging areas of socio-economic concerns in the overall agricultural technology management. Restructuring the expertise-mix in human resource development to match the emerging demands is, therefore, of immediate concern. Regional centres of excellence for specific areas of specialisation need to be developed for promoting diversified expertise-mix among the teaching faculty in agricultural economics discipline. Regional, national and international training is to be planned for teaching faculty to acquire expertise in new areas like natural resources economics, environmental economics, trade and agri-business management. A dynamic curriculum based human resource development programme is an essential prerequisite for carving out a pro-active role for social scientists in agricultural technology management.

Agricultural Extension

An analysis of the existing post-graduate curricula in Agricultural Extension education from 12 universities was done to understand its composition. The average credit hour allocation under different subject areas is shown in Figure 11.

Figure 11. Average credit hour allocation in percentage under different subject areas in Post-graduate Extension curricula.



The major inadequacies in the existing curricula revealed from the analysis are as follows. (1) Many of the topics that appear in the post graduate curricula are repetitions of what is already covered or should have been covered (according to the recommendations of the Second and Third Deans Committee of ICAR) in UG courses in Agriculture. (2) The curricula lack clear focus considering the limited number of courses and the minimum credit requirement for the programme. (3) The curricula do not provide scope for any specialisation. The study calls for developing an uniform and relevant curricula to meet the present and future challenges in extension. This should be done through a total restructuring by avoiding duplication of UG areas at PG level, withdrawing credits allotted for outside minors in farm technology areas and by developing specialisation in the areas, such as, Extension management, Development communication, and Human resource management and Training.

PERSPECTIVE PLAN

The work on evolving a perspective plan for the centre, initiated last year was completed during this year. After going through several iterations based on inputs from senior professionals and colleagues and senior management of the council, the NCAP Perspective Plan (VISION-2020) was brought out during the year. Executive summary of this Perspective Plan follows:

NCAP Perspective Plan

Executive Summary

1. NCAP was established by the Indian Council of Agricultural Research in the Eighth Plan to strengthen agricultural economics and policy-oriented research in the national agricultural research system. Integration of economics in planning, design and evaluation of agricultural research, and policy-oriented research to promote science-led agricultural growth, are the twin pillars of the Centre's strategy.
2. By 2001, the full complement of 20 scientists (4 Principal Scientists, 6 Senior Scientists and 10 Scientists) as proposed in our cadre strength, should be in place. The short-term research plan is based on this premise. The 'disciplines and specialisation of staff will be governed by the research thrust and speciality areas (e.g. GIS, sustainability, information systems etc.) Persons with experience and established scientific reputation in priority areas of NCAP from India and abroad, will be invited for a period ranging from 3-12 months as visiting scientists. The Centre would have 2-3 positions of postdoctoral fellows to work on priority research areas.
3. Inadequate attention to agricultural economics in the national agricultural research system in the past has hindered the growth of the discipline and the quality of work. There is poor link with mainstream economics and therefore, very little policy influence. Because of these, HRD

gaps have emerged in areas such as international trade, macro economic policies, environmental economics, growth economics, policy modelling, etc. These constrain the capacity of the system to cope with the emerging problems. A reorientation of work along these lines on the part of agricultural economists in NARS will greatly contribute to the overall efficiency of the system. This will require support and leadership. NCAP is uniquely placed to play the leadership role. Through its linkages with the agricultural universities, it can achieve a more relevant blend of micro and macro perspectives in policy analysis. Efficiency in management of the agricultural technology sector is the prime task of the ICAR-SAU system. Economists can contribute to this by research on identification of research needs, planning, prioritization and resource allocation, and other agricultural research policy areas. Understanding technology transfer and constraints inhibiting this process is critical. Both national and international issues are relevant in this context. The third broad area relates to efficiency of modern inputs (water, agricultural chemicals, plant varieties and hybrids, etc.) used in agriculture and animal production systems, where adoption lags, technical inefficiencies, effects of input price policies, and socio-economic constraints need to be researched. Finally, monitoring and evaluation of the impact of technological change in terms of growth, equity, sustainability, and internationality would be essential.

4. While market studies have very broad relevance, those by the ICAR-SAU system need to concentrate on growth related areas such as high-value products, commodities with export potential, and factor-product market constraints. There is poor understanding of supply, demand, price and market conditions, especially for commodities which were traditionally minor but will now become important. Because of their better understanding of the underlying production and technology conditions, the ICAR-SAU group is specially suited for such work. Relatedly, the impact of price policy on these parameters on the one hand, and the effects of quality enhancement, processing, grading, etc. on prices and incomes on the other, constitute important research areas.
5. The ICAR-SAU system is an important source of information with regard to the health of our natural resources, specific agents causing degradation, and technological options available to counter these. The social science group within the system must address the economic and social dimensions of this problem. This is a frontier area and NCAP must play a catalytic and leadership role in developing capacity in this field. Specifically, impact assessment, trade-off between productivity growth and sustainability, environment-adjusted costing of technologies and projects are important research areas. A lot of work is being done outside the NARS and NCAP should play a role in integrating such work in ICAR-SAU research agenda.
6. The paradigms which governed institutional development and agricultural transformation have undergone a sea change in recent years. Private initiatives and private sector participation have become key words. Serious empirical studies on this theme, particularly relating to agriculture, are» needed. On the other hand, new demand and constraints have emerged in several areas (like investments, financing, marketing and trade, agro-processing etc.) where public intervention is needed. Several innovations have pubic goods attributes, these are not amenable to private initiative and require group action. Moreover, even in the public sector, the interface between policies, economics, politics, sociology and technology is changing and this poses new challenges to institutional and organisational development, such as better management of public systems, management of CPR and technologies, role of panchayats, etc. There is need to document, understand and analyse these phenomena so that a more relevant paradigm is evolved.
7. Agricultural growth pathway is defined by the interaction of technology, policies, incentive structure, investments, and resource endowments. Understanding these forces, their pattern and determinants, is essential for agricultural planning. Agricultural development needs to be studied in a longer term perspective emphasising farm-non-farm linkages, structural change in agriculture, and other adjustment processes characterising agricultural transformation. Longitudinal, field level studies in all major agro-ecological zones of the country are needed to keep track of these developments and interpret their implications for agricultural technology and other policies. This tradition has, unfortunately, gone out of vogue and the Centre could revive such basic research by helping ICAR and SAUs initiate this activity on a sustained basis. The following major research themes for NCAP are derived from the above.

- 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

8. In HRD, three major initiatives are planned : First, the Centre will develop a documentation and dissemination unit which will service the needs of agricultural economists working in ICAR/SAU system. Second, NCAP will play an expert advisory role in curricula development for graduate and post-graduate training in agricultural economics in SAUs and deemed universities, particularly in areas such as trade, management and natural resources. Third, the Centre will offer training programmes on its own and in collaboration with other institutions in India and abroad.
9. Strengthening policy research capabilities through research and training activities outlined above would improve the existing situation. Publications of the Centre will also contribute to this. In addition, the Centre will organise seminars/conferences on important themes and make explicit attempt to convey policy messages arising out of ICAR's work.
10. Linkage with other policy research institutions such as Agro-Economic Research Centres, ICSSR Institutes, Universities, international agricultural research centres (IARCs), agro-biological divisions in (CAR institutions, policy making government units in Ministries of Agriculture, Rural Development. Commerce and Finance; and Planning Commission are being initiated and strengthened. Concerted efforts will be required to develop these over the next five years on a priority basis. Seminars, workshops, training programmes, collaborative research, wide dissemination of policy related research findings and views, and greater personal interaction will be the mechanisms for achieving this end. Multi-disciplinary research will be a major strategy, so as to fully exploit the Centre's comparative advantage.
11. The Centre will be guided in its policies by a high-powered Research Advisory Committee (RAC) comprising mostly of and chaired by eminent professionals outside the system. Routine management of the Centre will be guided and supervised by the Management Committee (MC) constituted by the Council.
12. At 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-SAU system.

III Institutional Activities

a. RAC, MC and SRC Meetings

Research Advisory Committee (RAC)

Research Advisory committee of the Centre comprises of the following members.

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

Dr. V.S. Vyas
Chairman
Institute of Development Studies
Jaipur

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

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

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

Prof. Anil K. Gupta
Indian Institute of Management,
Ahmedabad

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

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

Dr. Dayanatha Jha
Director
NCAP
New Delhi

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

Dr. K.K.S. Chauhan
164, Pocket 'B '
Sheikh Sarai,
Phase-I
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.

Management Committee (MC)

The Management Committee of the Centre comprised of the following members.

Dr. Dayanatha Jha (Chairman)
Director
NCAP
New Delhi

Dr. P.N. Bhat (till July 1996)
Officer on Special Duty Indian
Council of Agricultural Research,
New Delhi

Dr. J.C. Kalla (till July 1996)
Director
National Academy of Agricultural
Research Management,
Hyderabad

Dr. R.K. Pandey (till July 1996)
Principal Scientist
Indian Agricultural Statistics Research Institute,
New Delhi

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

Sh. Naresh K. Arora (till July 1996)
Assistant Accounts and Finance
Officer, NCAP, New Delhi

Dr. Bhogendra Jha (since Aug. 1996)
Ex-Member of Parliament
Madhubani, Bihar

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

Dr. Karam Singh (since Aug. 1996)
Professor Department of Economics and
Sociology
Punjab Agricultural University,
Ludhiana

Dr. Katar Singh (since Aug. 1996)
Director
Institute of Rural Management
Ananad, Gujarat

Dr. P.V. Subba Rao (since Aug. 96)
1-2-597/14
Lower Tank Bund Road
Hyderabad

Sh. R. Narayan (since Aug. 1996)
Director Directorate of Agricultural Marketing 20, Old
Secretariat, Delhi

Dr. Rajvir Singh (since Aug. 1996)
Principal Scientist
National Dairy Research Institute
Karnal, Haryana

Chief Finance & Accounts officer
Indian Agricultural Research Institute
New Delhi

Dr. B.C. Barah (since Aug. 1996)
Principal Scientist
NCAP, New Delhi

Dr. S. Selvarajan (since Aug. 1996)
Principal Scientist
NCAP,
New Delhi

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:

Sixth Management committee meeting (June 22, 1996)

The committee reviewed the progress of on-going research projects and approved the new project proposals. The Committee emphasised the need to work on development of small ruminant sector in India and appreciated NCAP's initiative to develop a collaborative project with Central Sheep and Wool Research Institute, Avikanagar and Central Institute for Research on Goats, Makhdoom. The Committee requested NCAP to organise atleast two seminars on important topics wherein experts working on policy issues outside the ICAR system are also invited to participate, so as to provide strong stimulus to economists in NARS and for better integration with mainstream policy research. Budget Estimates 1995-96 and Revised Estimates 1996-97 was also approved by the Committee.

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.

Staff Research Council (SRC) Meetings

Eleven meetings of the SRC were held during the period. Progress of ongoing research programmes were reviewed in these monthly meetings. In addition, new research proposals and proposals for seminars/workshops were also discussed. Programme Leaders for the four priority areas of NCAP as enunciated in perspective plan have been identified as under:

Technological change in agriculture	Dr. Dayanatha Jha
Sustainability of agricultural systems	Dr. B C Barah
Supply, demand and markets	Dr. Ramesh Chand
Agricultural growth and adjustment	Dr. T. Hague

b. Guest lectures

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

"Risk analysis and risk management in rice systems" by Dr. Sushil Pandey, International Rice Research Institute, Philippines (22, May 1996).

"Plant genetic resources : some socio-economic issues" by Dr. Detlef Virchow, University of Kiel, Germany (14, November 1996)

"Economics of hill agriculture and hill economy" by Prof. D.S. Thakur, Himachal Pradesh Krishi Viswa Vidyalaya, Palampur (14, January 1997)

"Investment priorities of Indian agriculture" by Dr.Shangan Fan, International Food policy Research Institute, Washington (4 Februaryl 997)

"The East Asian miracle" by Dr. S. Hirashima, Faculty of International Studies, Meiji Gakuin University, Yokohama, Japan (12 March 1997)

c. NCAP Publications

Two Policy Brief and two workshop proceedings have been published during the year 1996-97. In addition to these, NCAP Perspective Plan (VISION 2020) has also been brought out.

Policy Briefs

Policy Brief 3: Funding Agricultural Research

Policy Brief 4: Intellectual Property Rights and Indian Agriculture

Workshop Proceedings

Vision of India's Rice Trade

Social Science Education in Agriculture-Perspective for Future

d. Seminars / workshops / meetings

A national seminar on Vision of India's rice trade was organized at the Centre in collaboration with International Rice Research Institute on 25, April 1996. This involved scientists, and private sector trade representatives. The main recommendations of the workshop are highlighted below.

NCAP also organised a seminar on "Export potentials of agricultural commodities in Bihar", in collaboration with Bihar Agricultural Marketing Board at Patna op 17-20, December 1996.

As part of the Founders day celebration, a brainstorming session on "Economic liberalisation and Indian agriculture", was organised at NCAP on 1st March 1997. Several officials of the Ministry of Agriculture and economists from different institutions in around and Delhi attended this discussion. *

In addition to above seminars, NCAP 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.

NATIONAL SEMINAR ON VISION OF INDIA'S RICE TRADE

Recommendations

- Plan for a stable level of about two million tonnes of rice exports through 2001
- Ensure demanded quality in both basmati and non-basmati consignments
- Streamline procedures and invest in milling, transport, storage and port infrastructure. Assess east coast ports potential
- Pursue aggressive marketing and promotion strategies to improve image in established markets and to gain foothold in potential markets. Markets of East Asia and developing countries need targeting
- Indigenous aromatic varieties, good quality non-basmati, organically produced rice and perhaps Japonica rice are good candidates for export
- Develop and institutionalise strong market intelligence service. Trade must lead this effort
- Develop strong linkage between trade and agricultural research system
- Accord high priority to productivity enhancing rice research to improve export competitiveness and ensure food security. Hybrid rice, new plant type, lowland rice, quality enhancement and by-product utilization are priority research themes

e. Policy Interaction

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.

Dr. T. Haque served as a member of the National task force on Agriculture; Planning Commission working group on Land reforms, Land use and Land management for the Ninth Plan; and High level Committee set up by the Ministry of Rural Areas and Employment, Government of India, to look into the functioning of Computerisation of land records in U.P.

Dr. B.C. Barah, was appointed member of the subgroup for the Ninth Five year plan on Drinking water supply mission, Ministry of Rural Development, Government of India. He was also a special invitee to the committee on Eco-regional technology mission for the North Eastern India constituted under the Expert Committee on Remedying regional imbalance in agricultural progress set up by the Ministry of Agriculture and Cooperation, Government of India.

Dr. S. Selvarajan 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.

f. Special Lectures

Name	Title of the Lecture	Venue
Dr. B.C. Barah	Environmental concern for agricultural development (Micro level data for macro policy analysis). (26-27, July 1996)	Institute of Development Studies, Jaipur
	Emergence of ground water market and ecological implication in the drought prone areas. (11-25, Feb. 1997)	Centre of Advances Studies in Agricultural Economics, Indian Agricultural Research Institute, New Delhi
	Agricultural planning in districts. (16-27, December 1996)	National Informatics Centre, New Delhi
Dr. P.S. Birthal	Land tenure policies and changing agricultural structure in India. (11-25, Feb. 1997)	Centre of Advances Studies in Agricultural Economics, Indian Agricultural Research Institute, New Delhi
Dr. S. Selvarajan	Economic dimensions of conjunctive water use planning in command areas. (28 Feb, 1997)	Indian Institute of Public Administration, New Delhi
	Policy intervention analysis in irrigation command areas. (16 Jan, 1997)	Water Technology Centre, Indian Agricultural Research Institute, New Delhi
	Sustainable soil and water resources management. (17 Feb, 1997)	Centre for Advance 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
Dr. T. Haque	Policy Issues in Agriculture. (August, 1996)	Division of Agricultural Economics, Indian Agricultural Research Institute, New Delhi
	Employment of women in South Asia. (10 Sept., 1996).	India International Centre, New Delhi
	Child labour in Agriculture. (July, 1996)	National Institute of Rural Development, Hyderabad

g. Participation in Seminars and Workshops

Name	Theme and Duration	Place
Dr. B.C. Barah	National seminar on Environmental economics, organised by the Centre for science and environment. (26 June, 1996)	India International Centre, New Delhi
	National seminar on Contingent valuation methods for natural resource management, organised by the Institute of Development Studies, Jaipur. (July 1996)	Himachal Pradesh Krishi Viswa Vidyalaya, Shimla
	Annual conference of the Agricultural economics research association. (17-18 Sept., 1996)	National Dairy Research Institute Karnal
	Water resources of national capital region; problems and alternatives. (22-23 Nov., 1996)	National Trust for Art and Cultural Heritage (INTACH), New Delhi
	Annual workshop of project directorate on cropping systems research. (January, 1997)	Narendra Dev University of Agriculture and Technology, Faizabad
Dr. P.S. Birthal	Annual conference of the Agricultural economics research association. (17-18 Sept., 1996)	National Dairy Research Institute, Karnal
Dr. Dayanatha Jha	International conference on the Impact of rice research. (3-5 June, 1996)	Bangkok, Thailand
	National seminar on Agricultural development perspective for the Ninth five year plan. (13-15 June, 1996)	Indian Institute of Management, Ahmedabad
	Seminar on strategies for Production of dryland crops. (20 July, 1996)	Federation of Indian Chamber of Commerce and Industry, New Delhi
	Annual conference of Agricultural economics research association. (17-18 Sept., 1996)	National Dairy Research institute, Karnal
	India-IRRI dialogue. (27-29 Sept., 1996)	New Delhi
	Annual conference of Indian society of Agronomy. (12 Dec., 1996)	CCS Haryana Agricultural University, Hissar
	Annual conference of Indian society of Agricultural economics. (2-4 Jan., 1997)	Kerala Agricultural University, Thrissur, Kerala

Dr. Ramesh Chand	Annual conference of Indian society of Labour economics. (22-24, Dec., 1996)	V.V. Giri Labour Institute, NOIDA
	International conference on Cooperative development and peace in Asia. (7-13 March, 1997)	Centre for Research in Rural and Industrial Development, Chandigarh
	Annual conference of Agricultural economics research association. (17-18 Sept., 1996)	National Dairy Research Institute, Karnal
	India-IRRI dialogue. (27-29 Sept., 1996)	New Delhi
	National seminar on the Role of financial institutions in the promotion of agri-exports. (19-20 Dec., 1996)	Indian Institute of Foreign Trade, New Delhi
	Annual conference of Indian society of Agricultural economics. (2-4 Jan., 1997)	Kerala Agricultural University, Thrissur, Kerala
Dr. Rasheed Sulaiman V	National seminar on Participatory technology development. (21-22 November, 1996)	Kerala Horticulture Development Programme, Trivandrum
Dr. S, Selvarajan	Annual conference of the Agricultural economics research association. (17-18 Sept., 1996)	National Dairy Research Institute, Karnal
Dr. T. Haque	International seminar on Labour market flexibility. (18-20 Sept., 1996)	India International Centre, New Delhi
	Seminar on export potentials of agricultural commodities in Bihar. (November, 1996)	Bihar Agricultural Marketing Board , Patna
	Symposium on policy reforms in agriculture. (18-21 Dec., 1996)	Indian Agricultural Statistic Research Institute, New Delhi
	Cooperative *vis-a-vis* Contract farming. (7-8 Jan., 1997)	Indian Social Institute, New Delhi
	National seminar on Land reforms. (23-25 January, 1997)	National Institute of Rural Development, Hyderabad
Dr. Vinod Kumar	Annual conference of the Agricultural economics research association. (17-18 Sept., 1996)	National Dairy Research Institute. Karnal

IV Awards and Accomplishments

Dr. Dayanatha Jha, has been elected as the President of the Agricultural Economics Research Association; member, Editorial Board, *Indian Farming;* member, Research Advisory Committee of the Indian Society of Agricultural Economics; member, Project Screening Committee of ICAR; member Research Advisory Committee of the Institute of Economic Growth, New Delhi; and member of the UNDP Evaluation Committee on Hybrid rice research.

Dr. T. Haque served as member of the Indian Council of Social Science Research Review committee to look into the performance and functioning of social science research institutions; member Academic Council, State Institute of Rural Development, Haryana; member, Research Advisory Committee of the Ministry of Rural Areas and Employment, Government of India and Banker's Institute or Rural Development, Lucknow; member, Policy Advisory Group of Lal Bahadur National Academy of Administration, Mussorie.

Dr. Ramesh Chand has been elected as Editor, *Agricultural Economics Research Review* for the year 1996-97.

V Training and Visits

a. Training

Name of the official	Theme	Duration	Place of training
Scientific			
Dr. P. Adhiguru	Foundation course for Agricultural research service	5.7.96 to 2.12.96	National Academy of Agricultural Research Management, Hyderabad
	Orientation training on the Impact of watershed management and sustainable rainfed agriculture	10.2.97 to 16.2.97	Ralegaon Sidhi, Pune
Dr. P.S. Birthal	Seminar on the Control of health hazards in the modernizing process of agriculture and rural area	30.9.96 to 2.12.96	Kitakyushu International Centre, Kitakyushu (Japan International Co-operation Agency)
Ms. P.A. Lakshmi Prasanna	Foundation course for Agricultural research service	5.7.96 to 2.12.96	National Academy of Agricultural Research Management, Hyderabad
Ms. Rajni Jain	Fast track to the Internet	8.8.96	National Institute of Information Technology, New Delhi
	Foundation course on Agriculture research service	26.8.96 to 25.1.97	National Academy of Agricultural Research Management, Hyderabad
Dr. Vinod Kumar	Foundation course for agricultural research service	7.1. 97 to 5.5.97	National Academy of Agricultural Research Management, Hyderabad
Administrative			
Sh. Inderjeet Sachedeva	Agricultural research financial information system (ARFIS) package	14.10.96 to 15.10.96	National Centre for Integrated Pest Management, New Delhi
	Usage of the pay roll & general provident fund package	5.12.9610 11.12.96	National Academy of Agricultural Research Management, Hyderabad
Sh. Narander Kumar	Financial rules for Head of the office	23.9.96 to 4.10.96	Institute of Secretariate Training and Management, New Delhi
	Computerisation of monthly accounts	18-4-96 to 20-4-96	National Academy of Agricultural Research Management, Hyderabad
Sh. N.K. Arora	Agricultural research financial information system (ARFIS) package	14.10.96 to 4.10.96	National Centre for Integrated Pest Management, New Delhi
Sh. Ravinder Kumar	Agricultural research financial information system (ARFIS) package	14.10.96 to 4.10.96	National Centre for Integrated Pest Management, New Delhi
	Usage of pay rolls and general provident fund (GPF) package	5.12.96 to 11.12.96	National Academy of Agricultural Research Management, Hyderabad
Sh. Sushil Kumar Yadav	Problems in the use of Hindi implementation	17. 12.96 to 19.12.96	National Academy of Agricultural Research Management, Hyderabad

b. Visits abroad

Name of the official	Purpose	Place	Duration	Outcome
Dr. P.S. Birthal	To participate in the seminar on the Control of health hazards in the modernizing process of agriculture and rural areas	Kitakyushu International Centre, Kitakyushu	30 Sep.-2 Dec, 1996	Attended the seminar-cum training
Dr. Dayanatha Jha	To attend the international conference on the Impact of rice research	Bangkok	3-5 June, 1996	Presented the paper on Rice Production and Impact of Rice Research in India
Dr. S.Selvarajan	To attend Socio economic methodology workshop in agricultural and natural resource research	Overseas Development Institute, London	29 April-3 May, 1996.	Methodological refinement of ongoing Project
	To participate in Systems approaches planning meeting	International Rice Research Institute, Philippines	9-1 3 Dec. 1996	Sys Net Proposal for India on 'Modelling land use options for meeting agricultural and environmental goals for the state of Haryana', formulated
Dr. T. Haque	Discussion on 'Sustainable rainfed agriculture' project	International Food Policy Research Institute, Washington	27 Nov.-10 Dec. 1996	Refinement of the project
	Discussion on 'Sustainable rainfed agriculture' project	Overseas Development, Institute London	10-13 Dec. 1996	Refinement of the project

VI Personnel and Budget

A. 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	2	4
4.	Scientist	10	8	2
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	1*	1
10.	Junior Stenographer	1	1	-
11.	Junior Clerk	2	2	-
12.	Technical Assistant	4	4	-
13.	Driver	1	1	-
14.	S.S. Grade	2	2	-
	Total	**36**	**28**	**8**

* Till Jan 1997

b. Budget

Expenditure pattern during the year 1996-97 is shown in Table 6 below:

Table 6 Expenditure during 1996-97 (in lakh Rs.)

S.No	Head of Account	Plan	Non-Plan	Total
1.	Pay and Allowances	8.20	13.06	21.26
2.	Travelling Expenses	1.15	-	1.15
3.	Works	4.00	-	4.00
4.	Other Charges	26.60	-	26.60
	Total	**39.95**	**13.06**	**53.01**

VII Visitors

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

Dr. Peter Hazell, Director, International Food Policy Research Institute, Washington

Dr. Sudhir Wanmali, Director, Outreach Programme, International Food Policy Research Institute, Washington

Dr. Mahbub Hossain, Director, Social Sciences Division, International Rice Research Institute, Las Banos, Philippines

Dr. Sushii Pandey, Agricultural Economist, International Rice Research Institute, Las Banos, Philippines

Dr. John Farrington, Director, Rural Resources & Poverty Programme, Overseas Development Institute, London

Dr. Robert Tripp, Research Fellow, Overseas Development Institute, London

Dr. David Lee, Associate Professor, Cornell University, Ithaca, USA

Dr. Murari Singh, Senior Statistician, ICARDA, Syria

Dr. A. Haque, Economist, Economic Research Service, United States Department Agriculture, Washington

Dr. H. Inagaki, Director, ESCAP-CGPRT Centre, Bogor, Indonesia

Dr. P. Pingalli, Head, Economics Programme, CIMMYT, Mexico

Dr. T.G. Kelly, Economist, International Crop Research Institute for Semi Arid Tropics Asia Centre, Hyderabad

Dr. D.B. Smith, Food & Agric. Policy Research Institute, Ames, Iowa, USA

Dr. S. Chaudhary, Ames, Iowa, USA

Dr. S. Mohanty, Ames, Iowa, USA

Dr. James R McWilliam, Consultant, Australia

Dr. R.G. Nambiar, Professor, Indian Institute of Management, Ahmedabad

Dr. Derek Byerlee, World Bank, Washington

Dr. IP. Abrol, Facilitator, Rice-Wheat Consortium, for Indo-Gangetic Region, New Delhi

Dr. Deepak Ahluwalia, Economist, World Bank, New Delhi

Dr. B.M. Desai, Professor, Indian Institute of Management, Ahmedabad

Dr. O.K. Marothia, Member, Commission on Agricultural Costs And Prices, Govt. of India

Dr. R.S. Paroda, Director-General, ICAR

Dr. E.A. Siddiq, Deputy Director-General, (Crop Science), ICAR

Dr. G.B. Singh, Deputy Director General (Soils and Agronomy), ICAR

Dr. M.L. Madan, Deputy Director-General (Animal Sciences), ICAR

Dr. J.C. Katyal, Director, Central Research Institute for Dryland Agriculture, Hyderabad

Dr. S.N. Puri, Director, National Centre for Integrated Pest Management, New Delhi

Dr. K. Krishnaiah, Director, Directorate of Rice Research, Hyderabad

Dr. M.P. Yadav Director, National Research Centre for Equines, Hissar

VIII Technical Programme

Title of Project	Project Leader	Year of start	Likely year of termination
Potential of diversification towards high value crops in Indian agriculture	Dr. Gordhan Singh Dr. T.Haque	1996	1998
Economic potential of biological substitutes for agrochemicals	Dr. P.S.Birthal	1996	1998
Emerging trends and regional variations in public investment in agriculture: Implications for growth and equity	Dr. Ramesh Chand	1996	1997
Agricultural research prioritisation and resource allocation	Dr. Suresh Pal Dr. Dayanatha Jha	1996	1997
Scope of privatising farm extension in India	Dr. Rasheed Sulaiman V	1996	1998
Agroclimatic regional resource management for sustainable agricultural development	Dr. S.Selvarajan	1996	1999
Economic analysis of irrigation water use planning under uncertainty: a multistage optimisation modelling approach	Dr. S.Selvarajan	1996	1999
Interaction and impact of infrastructure, technology and policy variables on agriculture development	Dr. T.Haque	1995	2000
Sustainable rainfed agriculture in collaboration with IFPRI, ODI, ICRISAT, CRIDA	Dr. T.Haque	1996 .	1998
Socio-economic issues in cropping systems research	Dr. B.C.Barah	1996	1997

IX Publications

Research Papers

Barah, B.C., "Floods, environment and poverty, an economic analysis of disaster relief financing in Assam" in the P C Goswami commemorative volume on agricultural development of Assam, Gauhati University, 1996.

Birthal, P.S. and R. P. Singh, "Access of rural households to institutional credit : a study in eastern Uttar Pradesh", *Agricultural Economics Research Review,* Vol. 9(1): 21-35,1996.

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Birthal, P. S., C. B. Tiwari and M. K. Singh, "Factors influencing rural households' consumption of poultry products in western Uttar Pradesh", *Indian Journal of Poultry Science,* Vol. 32(3): 204-9,1996.

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Selvarajan, S. and A. Ravishankar, "Foodgrain production and consumption in India: Shifts, trends and implications for food security", *Agricultural Economics Research Review,* 9(2): 142-155, 1996.

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Sulaiman, V.R., "Agricultural education in India - problems and policy imperatives", *Journal of Rural Reconstruction,* 29(2):23-43, 1996.

Vinod Kumar and S.B. Aggarwal "Resource use efficiency and returns to scale in milk production", *Ind. J. Dairy Sciences,* Vol. 49(1), 1996.

Books

Barah, B.C., *Traditional water harvesting systems,* New age international publishers, New Delhi, 1996.

Ramesh Chand, *Agricultural diversification and development of mountain regions,* M.D. publications, New Delhi, pp. 416, 1997.

Presentations in conferences and symposia

Alex, J.P. and Sulaiman V.R. "Participatory technology development -implications for research and extension", presented at the national seminar on Participatory technology development, Kerala horticultural development programme, Trivandrum, 21-22 Nov., 1996.

Barah, B.C. and A.K. Neog, "Prospects of agricultural development in flood-prone eco-system (An analysis of backward agriculture in the North Eastern India)", presented at the IV annual conference of the Agricultural economics research association (India) held at National Dairy Research Institute, Karnal, 17-18 Sep.,1996.

Barah, B. C., "Socio economic issues in cropping system research", presented at the PDCSR annual workshop at Faizabad, Jan., 1997.

Birthal, P. S., "Nutrient consumption patterns in rural areas of western Uttar Pradesh", presented in the IV annual conference of the Agricultural economics research association (India) held at National Dairy Research Institute, Karnal, 17-18 Sept., 1996.

Hague, T. and P.S. Birthal, "Prospects of contract farming in India", presented in the seminar on 'Cooperative vis-a-vis contract farming' held at Indian Social Institute, New Delhi, 7-8 Jan., 1997.

Haque, T. "Employment potentials of women in South Asia", presented at the *International Seminar on Labour Market Flexibility,* New Delhi, 18-20 Sept., 1996.

Haque, T. "New economic policy and land reforms in India", presented at the *National Seminar on Land Reforms* held at National Institute of Rural Development, Hyderabad, 23-25 Jan., 1997.

Haque, T. " Export-potentials of agricultural commodities in Bihar", presented at the seminar on *"Export potential of agricultural commodities in Bihar "* organised jointly by NCAP, Bihar Agricultural Marketing Board and A.N. Sinha Institute, Patna, 17-20 Dec., 1996.

Haque, T. "Land reforms and poverty alleviation", presented in the seminar on *Strategy of poverty alleviation in the Ninth Plan,* Planning commission, August, 1996.

Jha, Dayanatha and P. Kumar. "Rice production and impact of rice research in India" at the *international conference on Impact of rice research,* Indian Rice Research Institute, Bangkok, 3-5 June., 1996.

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Purohit M. C. and B. C. Barah, " Market based instruments for pollution abatement- a case study of NCR", presented at the national seminar on Environmental economics organised by the Centre for Science and Environment, India International Centre, New Delhi, 26 June., 1996.

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Sombilla, M., P.L. Pingali and Dayanatha Jha, "2020 Vision for Asian agriculture, food and environment : an action plan", presented at the Second International Crop Science Congress, New Delhi, 17-24 Nov., 1996.

X List of Staff Members

Scientific

Dr. Dayanatha Jha	Director
Dr. T.Haque	ICAR 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. Pratap S. Birthal	Scientist
Dr. Rasheed Sulaiman V	Scientist
Dr. Vinod Kumar	Scientist
Dr. P.Adhiguru	Scientist
Mr. B.C.Roy	Scientist
Ms. Rajni Jain	Scientist
Ms. P.A. Lakshmi Prasanna.	Scientist
Mr. Anjani Kumar	Scientist

Administrative

Sh. Narander Kumar	Assistant Administrative Officer
Sh. Naresh Arora	Asst. Finance & Accounts Officer
Sh. Mohan Swarup Vasisht	Assistant
Ms. Usha Sehgal	Stenographer (Till Jan. 97)
Ms. Umeeta Ahuja	Jr. Steno
Sh. S.K. Yadav	Senior Clerk
Sh. Ravindra Kumar	Junior Clerk
Sh, Inderjeet Sachdeva	Junior Clerk

Technical

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

Supporting

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