

CONTENTS

I Introduction

[Location](#)

[Faculty](#)

[Management](#)

II Growth

[Budget](#)

[Personnel](#)

III Activities 1991-95

[Research](#)

[NCAP Publications](#)

[Seminars](#)

IV Activities 1995-96

[Research](#)

[NCAP Publications](#)

[Seminars/Workshops/Meetings](#)

[Policy Interactions](#)

[Human Resource Development](#)

V General Information

[Distinguished visitors](#)

[Research papers presented published by the scientists](#)

[Awards](#)

[Committees](#)

[Personnel](#)

PREFACE

This is the first printed version of the Centre's annual activities. Though nominally established in 1991, systematic professional work could be initiated only in 1995-96. Acquisition of space, development of basic infrastructure including support services, and initiating recruitment processes were the priorities during the earlier period. A brief account of the activities during these years is also provided.

Dr. Rasheed Sulaiman V. has compiled and edited this volume. Umeeta Mansukhani and Usha Sehgal have worked hard for proper presentation of this report. Their contributions are gratefully acknowledged.

July
New Delhi

1996

Dayanatha Jha
Director

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 original mandate of the Centre included :

- Agricultural policy analysis and research
- Research priorities and allocation of research resources in the ICAR
- Economic analysis of major agro-biological research programmes and technologies of the ICAR and
- Interplay of technology, institutions and ecology in growth, equity and sustainability.

The Technical Advisory Committee of the Centre which has been constituted recently, has articulated a vision which necessitates recasting of the mandate to better reflect the expected role. The proposed mandate covers :

- 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. Though insufficient and in need of major renovations, 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 seven faculty members. This includes the Director, one National Fellow, two Principal Scientists, one Senior Scientist and two Scientists.

MANAGEMENT

The Centre is guided in its policies by a high-powered Technical Advisory Committee (TAC) comprising mostly of eminent professionals outside the system. Prof. Y.K. Alagh, Vice-Chancellor, Jawaharlal Nehru University, New Delhi, is the Chairman. Planning, research thrusts and strategies, initiatives in human resource development, approaches to improve policy dialogues and evaluation are being guided by the TAC. The first meeting of the TAC was held on 28th August, 1995.

The Centre is supervised by the Management Committee (MC) as constituted and mandated by the Council. Two meetings of the MC were held at NCAP on 25 August 1995 and 30 December 1995. A number of internal committees, such as Staff Research Council, Budget Review Committee, Library Committee and Publications Committee have been constituted to assist decentralized management.

II GROWTH

BUDGET

After a token allocation in 1991-92, the Eighth Plan provided Rs. 2 crore for the Centre. Table 1 shows the expenditure pattern from 1992-93 to 1994-95. The expenditure pattern during the year 1995-96 is given in Table 2.

Table 1
Expenditure during 1992-93 to 1994-95 (in lakh Rs.)

	Plan Period	Plan	Non-Plan	Total
1.	1992-93	9.82	0.51	10.33
2.	1993-94	20.99	5.93	26.92
3.	1994-95	28.97	4.29	33.26

Table 2
Expenditure during 1995-96 (in lakh Rs.)

Sl. No	Head of Account	Plan	Non-Plan	Total
1.	Pay and Allowances	6.87	5.55	12.42
2.	Travelling Expenses	1.20	-	1.20
3.	Works	4.17	-	4.17
4.	Other Charges	37.62	-	37.62
	Total	49.86	5.55	55.41

PERSONNEL

The growth in personnel during the period since its inception is given in Table 3.

Table 3
Growth in personnel

Plan Period	Number of staff in different categories			
	Scientific	Technical	Administrative	Supporting
1992-93	2	-	-	2
1993-94	3	-	3	2
1994-95	3	4	9	2
1995-96	6	3	9	2

III ACTIVITIES 1991-1995

As seen from Table 3, the Centre was functioning with skeletal scientific staff till 1993-94. More staff at technical and administrative levels joined the Centre in subsequent years. Physical and functional establishment of the Centre was the major preoccupation in these early years. However, the Centre made some significant contributions in mandated areas during this period. A brief note on the achievements during the above period is given below.

RESEARCH

Completed Projects

Impact of Tenancy Reforms on Production and Income Distribution - A Case Study of Operation barga in West Bengal.

The progress made by West Bengal in bringing the bargadars (tenants/share croppers) on record has been remarkable. The Left Front Government launched Operation barga - a crash programme for recording bargadars in collaboration with the groups of beneficiaries and with the active support of the peasant organisations in 1978. Over 14 lakh bargadars have been recorded so far out of an estimated number of about 20 lakhs.

Operation barga has bestowed on the bargadars the legal protection against eviction by the landlords. In addition, they have been entitled to the due share of the produce. Measures have also been taken to extend the package of economic assistance to the bargadars. An empirical analysis of the impact of Operation barga on agricultural production, productivity, employment, income including its distribution and on the qualitative improvement in the utilisation of barga land was conducted during the period 1986-88 in the three districts of Birbhum, Burdwan and Jalpaiguri in West Bengal.

The bargadars and the agricultural labourers belonging to the economically depressed class constituted 44.87 percent of the population of the three districts taken together. Most of the bargadars were small and marginal farmers. Although farms under barga cultivation had almost the same access to irrigation facilities as others, it is reported that in many cases the recorded bargadar farms did not receive adequate irrigation in times of need. In the case of recorded land-owning bargadars, the cropping intensity on the leased-in land was lower than that on owned land. The owner-operated farms had registered the highest yield in 47.87 percent of the villages in the case of local paddy followed closely by the unrecorded bargadar (47.37 percent). Similarly, the highest yield of HYV paddy was recorded on the unrecorded bargadar farms and owner operated farms in 57.89 percent and 51.06 percent of the villages respectively. In other crops too, the highest yields were obtained either by unrecorded bargadars (wheat, mustard and jute) or other cultivators (potato, boro paddy).

Most of the landless bargadars did not have any capital or bullock of their own. Although the recorded bargadars received short-term crop loans they did not get badly needed consumption loan. The unrecorded bargadars got consumption and all other types of assistance from their land owners, but were deprived of any assistance, financial or otherwise, from the land owners when they got their tenancy rights on barga land formally recorded.

It is stated in the Share Tenancy Act that 50 percent of the gross produce will be received by the bargadar for offering manual labour on barga-operated farm, while 25 percent of the gross produce will go to the landowner as rent. The Act further provides that the remaining 25 percent of the gross produce will be distributed between the land owner and the bargadar in proportion to their share in cost of material inputs.

It was found that about 21 percent of the total recorded bargadars were not getting even the legally admissible 50 percent of the produce as their share. Even though bargadars, supplying bullock labour and cowdung manure to cultivate their barga-are legally entitled to receive more than 50 percent of the crop share, it was observed that in practice more than 60 percent of them had to remain satisfied with 50 percent or less of the produce as their share. It is to be noted that 77 percent of the bargadars who

received 50 percent of the crop as their share supplied bullock power for farming operations implying that only about 23 percent of the bargadars received 50 percent of the crop in compensation for their manual labour only. Thus the performance of Operation barga in terms of one of its objectives to ensure the bargadars of their legal share of the produce was highly unsatisfactory, even after a decade of its implementation, though the situation of unrecorded bargadars was worse.

The analysis in respect of cropping pattern, cropping intensity, input use pattern, land and labour productivity, net return per hectare and return/cost ratios revealed that the land-owning cultivators got a higher yield and higher return than those obtained by the bargadars on their barga land. Interestingly, the performance of the land-owning bargadars was better on their own land as compared to their barga land.

Operation barga appeared to have offered tenurial security and occupancy rights to the bargadars on the land they used to cultivate on lease. They also got subsidised input loan for cultivation on their barga land. But lack of incentives and opportunities for developing entrepreneurial and managerial inputs on the barga-operated land remained an inherent weakness in the barga system of cultivation which the Operation barga could not remove.

During the post-Operation barga period new tenancy patterns emerged to suit the requirements of the socio-economic and political power structure of the rural society. Seven different types of tenancy pattern depending on cost share and crop share were identified. Only 19.4 percent of the total bargadars received their entitled share of the produce. It is rather unfortunate that more than 80 percent of the bargadars did not receive their entitled crop share even after a long time of the implementation of the Operation barga.

The study concluded that Operation barga, albeit partly successful in bringing about a change in the tenancy pattern, did not succeed in augmenting production and productivity on the barga land where the bargadars had been receiving the stipulated crop share. Furthermore, the crucial input of entrepreneurship continue to remain low because of the inherent conflict of interest in crop sharing mechanism coupled with the fact that the bargadars, especially the landless ones, intrinsically lack this input. However, the most remarkable achievement of the programme was that it enhanced social status of the bargadars and security of tenancy.

The unsatisfactory performance of even those bargadars who received their crop share as stipulated in the Act, was due mainly to their poor resource base and lack of access to modern technology and to capital market with the resultant inability to acquire material resources. Moreover, the imperfections in input markets also generally contributed to the poor performance of the bargadars. The State Government should take serious note of these short-comings and modify the tenancy laws to overcome them as early as possible.

Production Prospects and Constraints to Higher Productivity of Pulses in Madhya Pradesh

India is the largest producer of pulses in the world. Once a net exporter it is presently one of the largest importers of pulses. Over the period from 1951 to 1992, the net per capita per day availability of pulses has fallen from 60.7 grams to 33.4 grams. It is significant to note that the area, production and yield of pulses witnessed increase only during the first decade (1950-51 to 1960-61) and declined or stagnated thereafter.

Historically, Madhya Pradesh has been the major pulse producing state in the country. The primary purpose of this study is to diagnose the dimensions and magnitude of the problems inhibiting production and productivity of pulses in this state.

Madhya Pradesh ranked first both in terms of area (19.8 percent) and production (20.9 percent) of pulses in India. Over 20 percent of the Gross Cropped Area (GCA) of Madhya Pradesh is under pulses. It ranked sixth after Uttar Pradesh, Bihar, Haryana, West Bengal and Gujarat in terms of average yield.

The share of pulses in GCA of Madhya Pradesh remained around 20 percent during the Pre-HYV and Post-HYV periods. The share of pulses in the Gross Irrigated Area (GIA) in 1989-90 is only 12.8 percent.

About a dozen different pulse crops are grown in Madhya Pradesh. However, pigeonpea in kharif and chickpea (bengalgram) in rabi are the most important ones, followed by blackgram (uradbean) in kharif and lentil in rabi. Pigeonpea and Chickpea together account for 60 percent of the area and 74 percent of the production of total pulses. While the area under kharif pulses is declining the rabi pulse area is on the increase.

Except blackgram in kharif, all pulses performed better in the eighties as compared to their performance in the seventies. In terms of production and yield, pigeonpea and lentil performed very well though the area under pigeonpea showed a negative growth. On the other hand, even though the yield of chickpea had shown a nominal negative growth the area recorded a significantly high growth rate. Thus growth performance of the pulses in general showed a conflicting scenario.

An analysis of production stability for the different states reveals that Madhya Pradesh ensures long-run production stability without losing its comparative advantage. Madhya Pradesh is thus one of the most important regions where pulse development programmes are likely to succeed in the long run.

The relative price support to pulses has been constantly on the rise after 1982-83. The rising support price ratios for pulses reflect the policy intention to promote pulse cultivation. However, pulse production did not rise commensurate with the increase in the support prices.

Though the growth in the wholesale prices of pulses in Madhya Pradesh during the seventies and the eighties was the highest as compared to its competing crops (cereals and oilseeds), the price variability in pulses was also the largest. The high annual fluctuations in price of pulses indicating a higher risk might have turned the farmers away from pulses and in favour of other competing crops like oilseeds and cereals which did not exhibit high price fluctuations.

Non-availability of seeds of high-yielding varieties in the desired quantities is perhaps one of the major constraints in the expansion of pulses. Although more than 200 improved varieties of pulses have been released since 1970's, its impact hardly gets reflected in the yield. The rate of growth of yield of pulses was 0.03 percent over the past four decades. Varieties with better yield advantage and desirable characteristics to suit the varied agro-climatic conditions need to be developed in pulses.

The fertiliser use in pulses was very low with chickpea receiving the highest priority and pigeonpea and least. Use of fertilisers, especially in kharif pulses, was low. Although efforts to popularise Rhizobium inoculants have been going on for a long time and several public and private sector units are manufacturing them, the adoption of these biofertilisers is found to be very negligible.

Agricultural markets in Madhya Pradesh could not be termed efficient as the price differentials over different locations exceeded the transportation costs. Lack of an effective system of market intelligence and existence of different grades and qualities contributed to these spatial imperfections. Appropriate reporting with quality differences and graded produce could go a long way to reduce the high price differentials, spatial as well as temporal.

There are about 10,000 Dal mills in the country out of which one thousand are in Madhya Pradesh alone. The industry in Madhya Pradesh continues to be as traditional as ever with no technical improvements in the process. The major problems of present day mills are low recovery, separation of whole pulse from dehusked whole pulse, high cost of milling, especially due to oil treatment, frequent breakdowns and high cost of maintenance. Though modern and efficient methods of milling have been developed by government institutions, manufacturers are not coming forward to fabricate these new designs on commercial scale. It is high time that Government organisations like agro-industries corporations in different states initiate actions to commercially manufacture these improved pulse milling machineries.

Bringing more area under pulses in the long run depends upon a favourable price regime (with less variability) and through technological breakthroughs that make higher yields realised on the farmers' fields. At present wide gaps exist between the yields of improved varieties on the research farms and those obtained on the farmer's fields. The new production technologies might not have reached the farmers in a meaningful way or they might be inappropriate to the agro-ecological and socio-economic conditions of the farmers. These aspects need further in-depth investigation.

complementary and understanding the comparative advantage of each helps in avoiding duplication. This division of labour would enable the public sector to move away from some areas and use the resources so freed to focus more on basic research, frontier technologies, sustainability research, and so on.

Private sector research is nascent in India. Appropriate conditions must be created before a vibrant private system emerges. These relate to : (a) liberalization of the economy; (b) massive investment in basic (roads, markets, power, etc.) as well as modern (communication, information, specialized transport, cargo and shipping, etc.) infrastructure; (c) efficient patenting, registration, copyright and licensing laws; and (d) direct incentives to private firms to undertake R & D activities.

In conclusion, the national research system is still evolving its perspective as though it is a monopoly supplier of research findings. Hence, themes like value addition, food processing, and hybrid seed production are emphasised in discussions on future research thrusts. In the absence of formal interface with the private sector, the national agricultural research system may completely miss out of complementarities, resulting in duplication of effort.

Privatising Farm Extension

Extension services which were mostly public funded worldwide until a decade back are increasingly coming under private domain. The increasing inability of the governments to adequately fund its extension machinery and the entry of private sector in agricultural extension activities are the real forces behind the search for alternative approaches such as 'cost sharing' and 'privatisation'. India has also started thinking on these lines recently, emphasising the involvement of NGO's, private sector and farmers' associations in sharing, augmenting and supplementing public sector extension efforts. However the role played by non-governmental agencies (producers, co-operatives, input agencies, agricultural processing firms, private consultants, etc.) in extension activities at present in India is limited, though private sector participation is on an increase.

An analysis of the functions performed by the private/commercial agencies reveals their interest in performing only those extension activities which immediately benefit them. They are least interested in undertaking long term strategic extension functions such as educating the people. Moreover, the private/commercial firms are interested to invest money mostly in high value crops, large farm sector and in areas with adequate infrastructure. Information on agriculture is mostly a public good in India and so the private agencies are not interested to get involved in a big way as opportunities to make profits are limited. Scope for any kind of cost recovery by the public extension system is also practically non-existent, considering the peculiarities of Indian agriculture.

The lessons learnt through a review of the experiences of other countries due to an unbridled 'private extension' and/or undue haste in 'cost recovery' are as follows. The emergence of competing information sources result in contradictory message flow due to glorified advertisements and sales promotion techniques leading to unnecessary confusion among the clients. The commercial interests of these private agencies jeopardise the efforts presently being made by public research and extension systems towards developing eco-friendly and sustainable agriculture. The human resources development (HRD) role of organising, motivating and guiding farmers groups for an effective empowerment of rural community is effectively sidelined for activities that can generate partial costs or profits. Eventually the contact between the farmers and extension agents will further decline. The inevitable fall out of such an arrangement will further increase regional imbalance as commercial agencies concentrate their activities on areas with favourable infrastructure which allows them to generate good profits in a shorter period of time.

The tasks before the Indian Extension System are more complex than what was earlier as it has to ensure a sustainable increase in production and productivity. The public funded extension in the country, though faced with a number of constraints in terms of operational funds, well trained manpower and transportational facilities, is engaged in the task of technology transfer through education and arranging inputs. Available evidence from both India and abroad shows that returns to investment in extension compare favourably with those on expenditure on other public services. The ground realities of Indian agriculture call for the strengthening of the national agricultural extension system.

In the irrigated areas, a part of the financial burden of providing extension support can be transferred on the farmers provided such services are clearly identified and the mechanism for sharing the costs are appropriately devised. The resources that can be generated/saved from these favourable areas should be effectively used in resource-poor areas which may have to be continuously provided with extension support free of cost for some time more.

The farmers will be ready for cost sharing only when the benefits of such an arrangement outweigh their costs. Extension has to take on the challenge of organising farmers' groups and help them in guiding, operating and controlling their own extension organisations. It may be feasible then to share some of the costs involved in extension with these farmers' groups. Till that time the scope for cost recovery is almost nil. However, these measures can be tried on experimental basis in a few resource-rich areas and high value crops. The ideal policy should be to have a good mix of public, private, voluntary and co-operative extension efforts.

Some other research programmes were also initiated mostly in collaboration with economists at other ICAR institutes. Several research papers were also published by the NCAP scientists.

NCAP PUBLICATIONS

The Centre initiated publication of Policy Papers based on ICAR-sponsored and its own research and Policy Briefs articulating professional views on important themes. Two Policy Papers and two Policy Briefs were published.

Policy Paper 1	:	Impact of Tenancy Reforms on Production and and Income Distribution - A Case Study of Operation barga in West Bengal.
Policy Paper 2	:	Production Prospects and Constraints to Higher Productivity of Pulses in Madhya Pradesh.
Policy Brief 1	:	Privatising Agricultural Research.
Policy Brief 2	:	Privatising Farm Extension - Need for a Cautious Approach.

SEMINARS

Seminar on Prioritisation of Agricultural Research in ICAR System (15 February, 1994)

This programme discussed the methodology and preliminary results of the collaborative study on priorities in agricultural research. The Seminar was attended by senior management scientists from ICAR and senior professionals. The analysis presented in the seminar, based on normative scoring model incorporating efficiency, sustainability, etc, estimated how research resources should be allocated between commodities and states.

Dialogue on Economic Problems Related to Research on Crops (21-22 December, 1994)

This dialogue with the agricultural economists working in different crop research institutes of ICAR focused on providing an orientation to these scientists and brought out research issues and constraints confronting different crops. The meeting highlighted the complementary role of NCAP in improving the quality of research done by economists at different institutes.

IV ACTIVITIES 1995-96

RESEARCH

Completed Projects

Application of Domestic Resource Cost Analysis for Rice

Nominal Protection Coefficient (NPC) has been widely used in assessing the exportability of crops. However, the most useful indicator in the assessment of tradability is the domestic resource cost ratio. It simply represents the domestic cost of obtaining (saving) an incremental unit of foreign exchange. It is called domestic resource cost ratio (DRCR) when both the foreign exchange and the domestic cost are measured in the domestic currency. It is the ratio of the social domestic cost to the net social value of the tradable goods.

DRCR values have been calculated using data from the comprehensive cost of cultivation scheme. The results show that Orissa ranks first followed by Karnataka, Madhya Pradesh, West Bengal, Andhra Pradesh, Uttar Pradesh, Punjab, Tamil Nadu and Haryana in terms of efficiency in the use of domestic resources to earn (save) foreign exchange through rice export. It is interesting to note that there is a high positive correlation between the DRCR and the rice yield (correlation coefficient =0.70) implying that the states with a lower yield of rice needs less domestic resource to earn a unit of foreign exchange than the states with higher yield. It is, therefore, necessary to direct rice research with a focus on the low-yielding states without increasing the existing domestic resource cost ratio. This, in effect, implies an increase in yield without any corresponding rise in the use of domestic (non-tradable) resources. In other words, further increases in rice yields would be relatively less costly in these states and this would maintain India's comparative advantage in rice trade. The fact that most of these states grow mainly rainfed rice, makes the research challenge tougher.

DRCR values only suggest that a low domestic resource cost can earn a much higher value in foreign exchange through export, these can not say whether the country should export even if there is no surplus. Research and developmental planning should focus on these low-yielding rice states so as to generate surplus through the productivity route.

Apart from the values of the relevant co-efficient, it is important to note that in order to make Indian rice more attractive in the international market and at the same time to create an exportable surplus, the real price of rice has to come down. If the domestic price of rice is reduced without a reduction in the cost, rice production would fall leading to a decline in the export surplus and defeating the very purpose. If, however, a reduction in the domestic price of rice is accompanied by a reduction in cost, our objective would be achieved. The cost reduction calls for technology upgradation which, in turn, requires more investment in rice research. Quality improvements, so crucial in international market, should also be addressed by research.

GATT and Agricultural Exports

A study on GATT and Agricultural Exports concluded that in order to strengthen India's competitive advantage in the international market, it has to increase investment in research so that productivity and thereby production and marketable surplus could be increased to meet the domestic and international demand. Efforts to improve the quality of exportable commodities as per international standards also have to be taken up. Infrastructural facilities also have to be developed so as to facilitate the movement of agricultural produce from farms to markets.

Small Farms and Surplus Generation - A Case of West Bengal

Small and marginal farms constitute more than three-fourths of Indian farm holdings. Marginalisation of holdings has been showing a rising trend due to increasing pressure of population on land. Implementation of land reforms has also contributed to this process of marginalisation. The present study

conducted in West Bengal where land reforms are better implemented analyses the economic sustainability of the small and marginal farms with different crop-enterprise options. The proportion of the total number of holdings belonging to the marginal and the small categories as well as the percentage of total area operated by these holdings are much higher in West Bengal than those at the national level.

An analysis of the costs and returns associated with the different crop rotations on the small and marginal farms revealed that these were not economically sustainable. The returns consistent with an optimal use of the available resources on the small and marginal farms albeit much higher than the existing levels were also found to be inadequate for economic sustainability. The results showed that the optimal income from an average marginal farm of 0.4 ha was not adequate to keep the farmers above the level of poverty. The situation is slightly better in case of a marginal farm with the maximum land area of 1.0 ha. The position of the small farm, though a little better, did not present a case of optimism in respect of economic sustainability even with an unconstrained supply of working capital.

The rural people remain tied to agriculture for their livelihood due to the slow rate of expansion of employment in other sectors. Even under the most optimistic assumptions, surplus generation on these section of farms could not be expected. The situation may worsen further with the swelling in the number of small and marginal farmers and with the resultant decrease in the size of holdings. The study concludes that the small size *per se* is responsible for lack of economic sustainability irrespective of high-yielding technology and intensity of cropping. Important issues emerging from the study such as : the need for measures to prevent further marginalisation; the scope of co-operative farming and diversification; the possibilities to encourage on-farm capital formation; faster growth in non-farm sector to absorb agricultural surplus labour; and the role of suitable price policy are also discussed.

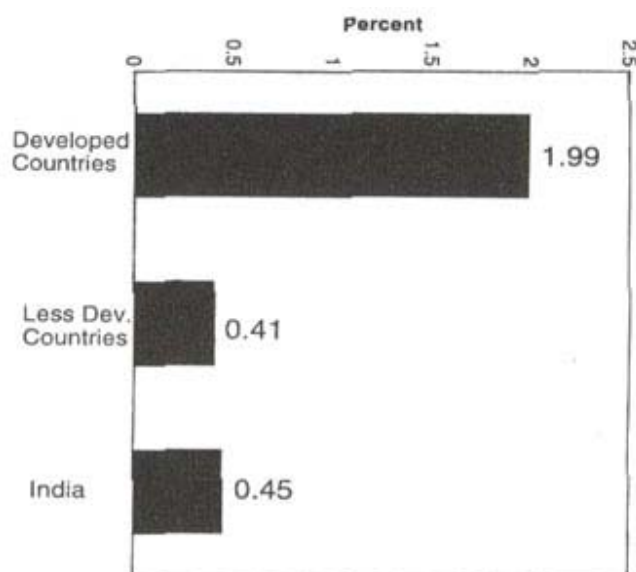
Funding Agricultural Research

Technology-led growth requires investments in technology generation (agricultural research), extension, education, physical and institutional infrastructure. Empirical studies show that agricultural research has been the primary source of total factor productivity growth in India. Public investment in agricultural research is, therefore, crucial.

A large and diverse country like India cannot depend on borrowing technologies from other countries. Also, despite the current enthusiasm for privatization, private sector cannot meet these needs fully for several reasons. Research output is often a public good. Market failures are common and appropriability of benefits is restricted, thus limiting incentives for private initiative. Also private sector is mainly driven by short-term profit considerations, longer term or sustainability concerns are rarely accorded priority. Therefore, even in highly developed countries, strong public research systems have to be supported. Need for this kind of support to agriculture is recognised under WTO provisions also.

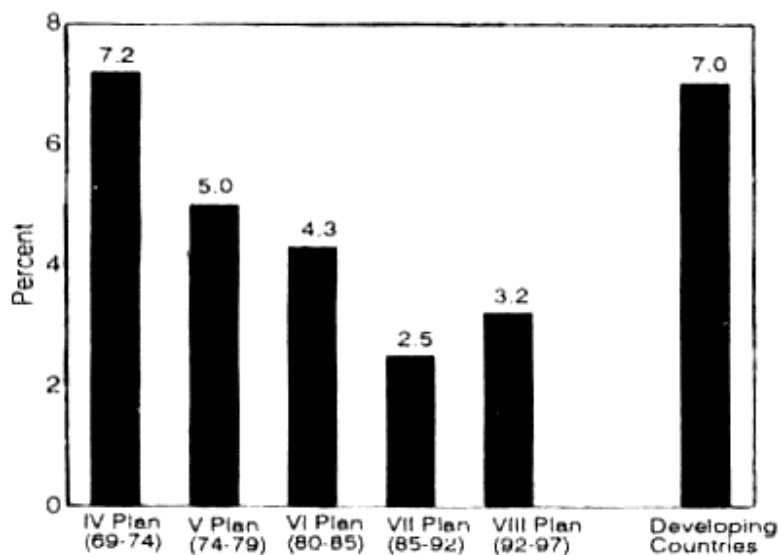
A norm of 2 percent of agricultural GDP for agricultural research has been suggested. For India, Fig. 4 indicates that less than 0.5 percent of agricultural GDP is spent on research. At Independence, this was less than 0.1 percent, rising to 0.12 percent in 1960, and about 0.2 percent towards the end of sixties. After a spurt through the seventies, it has hovered around 0.45-0.50 percent since early eighties. This implies that research investments have barely kept pace with growth of agriculture; there has been no special accent on jacking up research investment intensity over the last 15 years,

**Fig. 2 :
Agricultural Research investment as percent of agricultural GDP**



It has been estimated that in developing countries as a group, research investments account for about 6-8 percent of total public spendings on agriculture. Fig. 3 illustrates the situation with regard to allocation of plan funds in India since the Fourth Five Year Plan.

**Fig. 3 :
Share of agricultural research and education in public spending on agriculture**



Over the Ninth and subsequent plans, these trends must be corrected and a target level of 7-8 percent of total agricultural outlay for agricultural research and education must be established. With concomitant growth in private sector spendings, this will help align total spendings on agricultural research with the needs of the agricultural sector. An aggressive R & D investment strategy is absolutely vital for agricultural growth in an internationally competitive environment.

Strengthening national research system over the next decade implies selective expansion of scientific manpower in frontier and neglected fields, higher priority to human resource development, emphasising

relevance and quality, higher priority to raising operational funding per scientist, upgradation and maintenance of infrastructure and support systems, developing support mechanisms for improving backward and forward linkages, strengthening prioritization, monitoring evaluation and policy analysis capabilities, and promoting greater private sector participation with adequate safeguards.

On-going Projects

Research Prioritisation in Indian Agriculture

Several economic forces have emerged over the recent past which necessitate a careful evaluation of agricultural research priorities at national and regional levels. This study spells out relative research priorities in terms of regions (state) and individual commodities. Data on output, prices and values for 68 commodities (57 crops, 8 livestock, 2 fisheries, 1 agro-forestry) in each of the 25 state units were collected from different published sources centred round the year 1990. These provided the benchmark for further analyses.

A modified congruence approach was used in this study. It begins with an initial baseline of value of output (VOP) shares and then modifies these successively to incorporate other goals (like poverty alleviation, sustainability, export orientation, etc.) and arrives at a final baseline (FBL). Both extensity and intensity dimensions are considered in these calculations.

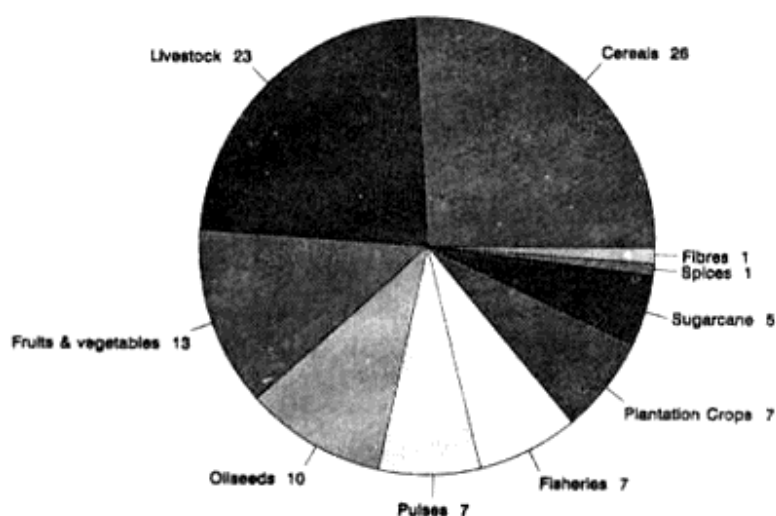
An analytical review of ICAR's plan expenditures data since the IV Plan (1967-74) indicated that : (a) agricultural extension and transfer of technology projects have claimed disproportionate attention; (b) in general, ICAR has responded well to national priorities, focusing on areas (like pulses, oilseeds, dryland, export crops) where stress and opportunities have developed or are likely to develop; and (c) decline in emphasis on agricultural education has probably been a critical error of judgement. As a long-term institution building process, sustained support is absolutely crucial for this activity. The aggregative plan expenditures data do not permit more detailed scrutiny.

The final results on regional (statewise) research resource allocation indicated that in order to achieve the goals of poverty alleviation, regional equity, sustainability and enhancing export potential, some readjustments in VOP-based allocation. The predominantly dryland states of Andhra Pradesh, Madhya Pradesh and Karnataka would also need adjustment of a similar magnitude. These additional resources would come from the northern states of Uttar Pradesh, Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir and from Gujarat, Kerala and Goa. For West Bengal in the eastern zone and Rajasthan and Maharashtra in the dry zone, research resources should be allocated on the basis of VOP.

Results on commodity-based allocations are presented in Figure 4, in terms of commodity groups. These indicate that 25.6 percent of research resources should go to cereals, 22.7 percent to livestock, 13 percent to fruits and vegetables and about 10 percent to oilseeds. Fisheries, plantation crops and pulses would claim 7-8 percent each. In terms of shift between efficiency (VOP) and a comprehensive (FBL) goals structure, cereals and sugarcane will need to surrender some resources to provide additional support to research on pulses, fibres, oilseeds, fruits and vegetables, spices and agro-forestry.

Fig. 4 :

Relative Research Priorities by Commodity Groups



In terms of individual commodities, the results indicate a shift away from :

Wheat, bajra, barley, rapeseed and mustard, castor, cotton, sugarcane, coconut, cashew, rubber, sapota, apple, tobacco, pepper, cardamom, raw wool, milk, marine fisheries to :

rice, sorghum, small millets, ragi, gram and other pulses, groundnut, linseed, sesamum, safflower, soyabean, sunflower, jute, mesta, tea, coffee arecanut, pineapple, litchi, banana, papaya, orange, citrus, grapes, guava, mango, ginger, turmeric, garlic coriander, okra, green chillies, onion, cabbage, cauliflower, green peas, tomato, poultry, beef, eggs, sheep, goat, inland fisheries, agro-forestry.

The above reallocation is between VOP and FBL results and both are normative. What is really relevant is the difference between current allocation and FBL. There are indications that discord between VOP and current research resource allocations is quite substantial. As such, the magnitude of adjustments required may be far more than what is indicated by this study.

A commodity x region (state) exercise is relevant for decisions on location of research activities. The present analysis in terms of commodity groups, indicates that bulk of cereals research should be done in Uttar Pradesh, Madhya Pradesh, Punjab, Bihar, Andhra Pradesh and West Bengal. Some should be done every where except Himachal Pradesh, Kerala and Jammu & Kashmir. Pulses research should be mainly conducted in Madhya Pradesh, Uttar Pradesh, Maharashtra, Orissa, Rajasthan and Andhra Pradesh. Similar prescriptions have also been provided with respect to other commodity groups. Similarly, results have also been provided for commodity-wise allocation in each of the 25 states. These should be useful to research managers at the state level.

The most significant data constraint confronting us has been the one on current research resource allocation - at the central, state and zonal levels. Reallocation and redeployment has no operational significance in the absence of such data.

Interaction and Impact of Technology, Infrastructure and Policy Variables on Agricultural Development in India

The objectives of this study, sponsored by ICAR under the National Fellows programme, are to analyse agricultural performance across agro-ecological zones and identify how technology, institutions and infrastructure interact in explaining observed growth patterns.

Data collection work has been initiated in selected districts. A review paper on Impact of Technological changes on Agricultural Growth and Employment has been prepared. The main findings were as follows:

- There are huge untapped technological potentials for productivity growth in almost all regions of the country which need to be utilised through appropriate infrastructure and policy support.
- Appropriate water management is the most critical determinant of agricultural development in eastern India. Due to lack of consolidation of holdings, inadequate drainage and lack of other land improvement measures, the problem of water logging in the *kharif* season and water scarcity in the *rabi* season constrain the adoption of new technologies for productivity growth.
- The provision of strong credit support to small and marginal farmers for technology adoption would be another important area requiring immediate attention in the context of eastern India.
- The overall impact of technological changes on employment of agricultural workers has been positive, although the upward shift in the production function was such that growth of output per hectare was at a much faster rate than that of labour use.

Potential of Diversification towards High Value Crops in Indian Agriculture

This study aims at examining the current status of agricultural diversifications and various socio-economic constraints to diversification towards high-value crops. Assessing the likely impact on equity and sustainability is another objective of this study.

This project is being pursued in collaboration with various SAUs and social science institutes in the country. The collection of secondary data is in progress.

Scope for Privatising Farm Extension

The basic objective of this research project is to understand the present status of private extension services in the country. The study is also expected to provide valuable insights on information needs of farmers and their ability and willingness to pay for extension services.

Information for this study will be collected from the four states, namely, Maharashtra, Kerala, Bihar and Rajasthan. This project is being undertaken in collaboration with National Academy of Agricultural Research Management (NAARM).

Economic Analysis of Irrigation Water Use Planning under Uncertainty: A Multi-stage Optimization Modelling Approach

The overall objectives of the project, funded by A.P. Cess fund are: (i) to develop and integrate irrigation scheduling, crop planning and resource allocation models for optimal use of water and other resources; and (ii) to evaluate trade-offs and suggest policy options for sustainable development of rice based production systems in canal command areas.

A review of irrigation scheduling and crop planning models designed to allocate limited irrigation water to crop growing seasons and plan for optimal crop acreages/resource allocations respectively is currently in progress. The present study is proposed to adopt a more refined soil-plant-atmospheric relationship based soil moisture-plant growth response component, while

incorporating inter-crop competition for canal water, ground water and other restricting resources alongwith appropriate extension strategies in a multi-stage optimization framework. For this purpose, simulation and mathematical programming models will be integrated for evaluating optimal water use policy options and extension strategies for sustainable production in Lower Bhavani Project main canal command area. The model application will be done in collaboration with Tamil Nadu Agricultural University, Coimbatore.

Projects under discussion

1. IFPRI-NCAP Collaborative Research on Sustainable Rainfed Agriculture
2. Emerging trends and regional variations in agricultural investments and their implications for agricultural growth and equity
3. Economic potential of biological substitutes for agro-chemicals
4. Economic evaluation of brackish water aquaculture system in India in collaboration with Central Institute of Brackishwater Aquaculture (CIBA), Madras.

NCAP PUBLICATIONS

Three policy papers and one policy brief have been published during the year 1995-96. In addition to these, a Workshop Proceedings has also been brought out.

Policy Paper 3	:	Research Priorities in Indian Agriculture
Policy Paper 4	:	GATT and Agricultural Exports - Hopes and Realities
Policy Paper 5	:	Small Farms and Surplus Generation - A case of West Bengal
Policy Brief 3	:	Funding Agricultural Research
Workshop Proceedings 1	:	Small Farm Diversification - Problems and Prospects.

SEMINARS/WORKSHOPS/MEETINGS

National Seminar on Small Farm Diversification : Problems and Prospects (21-22 May, 1995)

This Seminar attracted high level participation from all over the country. Issues related to diversification and their policy implications were discussed. The Seminar also suggested ways and means, especially policy changes required to make small and marginal farmers economically viable. The main recommendations of the Seminar are indicated below.

- The sustenance of smallholder agriculture depends on horizontal and vertical diversification involving adoption of high yielding, high income generating and environment friendly crop and non-crop enterprises.
- The challenge of small farm diversification demands concentrated research effort for development of appropriate technology keeping in view the demand in domestic and international markets. Public and private sector efforts must compliment each other in this area.
- Public support for development of infrastructure including markets, roads, transportation, power, cold storage, irrigation and credit would be crucial for small farm diversification.
- Provision of remunerative prices and crop insurance would be necessary to induce small farmers to diversify in favour of high value enterprises like fruits, vegetables, flowers and livestock. More efficient market infrastructure, storage and local processing will be helpful.
- Strong industry-agriculture linkage through development of agro-processing units and contract farming would help promote small farm diversification.
- A cluster approach to diversification would be required. The Indo-Gangetic plain region of the country could concentrate on food production both for self-reliance, food security and exports, while the arid and semi-arid zones of the country could emphasise horticulture or animal husbandry-led diversification.
- Land lease market should be liberalised to facilitate the entry of corporate sector in agriculture. This will also help specialization on small farms and promote diversification.

National Workshop on Post-Graduate Teaching in Social Sciences (March 13-14 1996)

Eminent economists, professors and senior faculty members from the disciplines of Agricultural Economics and Agricultural Extension from SAUs and deemed universities of ICAR participated in this workshop. Curricula needs, research training, area specialisation and institutional and policy support needs were discussed in the workshop. Proceedings of this workshop would be brought out by July 1996. The significant recommendations are indicated below.

- The Post-graduate curricula in Agricultural Economics and Agricultural Extension being followed at present can not cope with the emerging professional demand and thus needs to be restructured. In Agricultural Economics, economic theory, decision analysis, trade and agribusiness should become the central focus. Courses in institutional economics, history of economic thought, natural resource and environmental economics need to be strengthened. In Agricultural Extension, emphasis should be given on participatory extension methodologies, programme development, monitoring and evaluation, training in modern communication and instructional technologies including media production, application of computer in extension, management of extension organisation including NGOs and entrepreneurship development.
- Specialisation in Agricultural Economics could be in the areas of agricultural and resource economics, agricultural marketing, agricultural development and policy, agribusiness management etc. In the case of extension education, development communication, extension management and human resource management are the recommended areas for specialisation. Specialisation could be through separate programmes as well as thesis research. Job analysis studies to know the market demand is favoured.
- Existing faculty need to be trained in emerging areas. Establishing and strengthening potential centres of excellence in different regions, recruitment of teachers from diverse disciplinary backgrounds and bringing experts through the visiting faculty scheme are the recommended strategies to enrich post graduate faculty.
- In the case of multi-campus SAUs, post graduate programme in social sciences should be confined to a single/main campus, wherein enough infrastructural and academic support is normally available.
- Inadequate budgetary and infrastructural support to social science divisions is a matter of serious concern. Separate norms and standards for apportioning resources and grants for social science divisions needs to be developed and implemented.
- Practical training could be improved through attaching students with farm families, development organisations or industry for prescribed periods. Special travelling allowance (TA) grant for taking student to fields, rural areas, markets, agro industries, and other development institutions needs emphasis. Urgent measures to fill vacant teaching positions are essential. Teaching departments need to be equipped with computer lab, data bank, audiovisual aids and networking facilities.
- Board of Studies/academic councils should have peers from outside. Statutory changes for this, if necessary, are to be adopted.

In addition to the above two workshops, NCAP organised scientific meetings on important issues. These are as follows.

Preliminary Meeting on "Agenda for Socio-Economic Research on Rice-Wheat Systems" in collaboration with Rice-Wheat Consortium for Indo-Gangetic Plains on January 2 1996.

Two meetings of the ICAR sub-group on "Socio-Economics, informatics and policy issues" for finalising the IX Plan proposals on February 16, 1996 and March 15, 1996.

POLICY INTERACTIONS

Senior staff of the Centre have been actively participating in policy discussions relating to agricultural development. These activities have generated professional and academic interest among the policy makers, researchers and administrators and have contributed to making the Centre's presence visible in the profession.

Advisory Committee meeting of the Agro-Economic Research Centre, Visva-Bharati in July 1995. (Dr. C.C. Maji)

Member Secretary, Sub-group on Socio-economic, informatics and policy issues constituted by ICAR for the IX Plan (Dr. D. Jha). He served as member of the Johl Committee constituted by the ICAR on "Partnerships, Resource Generation, Training, Consultancy, Contract Research/Contract Service and Incentive and Reward Systems", and of the steering Committee of National Agricultural Technology Project.

Member, National Task Force on Agriculture (Dr. T. Haque). He also served as Member, Committee on Rationale for Fixation of Support Prices for Agricultural Commodities, Ministry of Agriculture, Government of India, Member, Sub-Group on Land reform, land use and Land Management constituted by Planning commission, Government of India, and Member, Academic Committee, Haryana Institute of Rural Development, Nllokheri.

Member, Sub-group on Socio-economic, Informatics and Policy aspects constituted by ICAR for IX Five Year Plan, Feb-April, 1996.(Dr. S. Selvarajan)

HUMAN RESOURCE DEVELOPMENT

In pursuit of its disciplinary leadership mandate, the Centre has, through collaborative research and seminars/conferences, initiated processes aimed at developing partnerships with ICAR/SAU economics units. The Centre has also established partnership links with International Agricultural Research Centres like IFPRI, IRRI and ICRISAT.

The Project Screening Committee of Scientific Panel of ICAR has recommended Centre's input for improving the methodology and policy content of research projects supported by A P Cess Funds and this process has also been initiated.

Training

In this effort, it is participating in training programmes organised by the Centre for Advanced Studies, Division of Agricultural Economics at the Indian Agricultural Research Institute.

Post-graduate Teaching and Research

Scientists at NCAP are also associated with post graduate teaching and research at IARI. Dr. S. Selvarajan is guiding two Ph.D students and also teaching P.G Courses at IARI.

Lectures

Lectures on various themes were delivered by NCAP Scientists as given below.

"Indian Agriculture - Future Challenges" at National Defence College, New Delhi on March 13, 1996. (Dr. T. Haque). He also gave a lecture on "Role of Technological innovations in Agricultural Development" at Division of Agricultural Economics, IARI, on November 30, 1995 and on "Land Reform and Resource Development in the wake of Economic Liberalisation: on March 21, 1996 at University of Viswa Bharati, West Bengal.

"Agricultural Research Prioritization Models-Mathematical Programming and Simulation Models", to the participants of Training course on (Agricultural Research Evaluation and Impact Assessment, Division of Agricultural Economics, IARI, New Delhi, Feb 13-27, 1996(Dr. S. Selvarajan). He also gave a lecture on "Economic Appraisal of Minor Irrigation projects in a Command area" to the participants of Economic Analysis of Irrigation projects, Indian Institute of Public Administration, New Delhi, Feb 19-Mar 2, 1996.

"A critique on the methods of measuring Economic Diversification" to the participants of the training programme on Agricultural Research Evaluation and Impact assessment, Division of Agricultural Economics, IARI, New Delhi, Feb 13-27, 1996. (Dr .Ramesh Chand)

Participation in seminars, conferences and workshops

Dr. Dayanatha Jha served as Chairman of the Working group on Policy Needs at the Workshop on HRD for Agriculture; Teaching, Training and Research Needs, held on August 4-5, 1995 at IARI New Delhi.

Dr. Jha and Dr. Rasheed Sulaiman V participated in the workshop on "Education for Agriculture beyond 2000 held on October 13-14 1995 at National Academy of Agricultural Sciences, New Delhi.

Dr. Jha participated in the Seminar on "Accountability in the National Agricultural Research System held on 22 November 1995 at IARI, New Delhi.

Dr. T. Haque served as a resource person at the International Workshop on "Impact of Technological Changes on Agricultural Workers in South Asia", Colombo, October 1995. He served as a resource person at the National Workshops on Child Labour in Rural Areas, NIRD, October 1995 and February 1996; as a Discussant at the National Seminar on Impact of WTO on Agriculture and Rural Development, NIRD March, 1996, as a resource person at the National Consultation on Strategy for Removing Economic Backwardness of Bihar, Dec. 1995 and at the National Seminar on Problems of Agricultural Workers Bharatiya Kisan Mazdoor Union .New Delhi, July, 1995. He also served as a Chairperson at the National Consultation on Rural Housing, Vigyan Bhavan, New Delhi, August 1995.

Guest Lectures

The following lectures were delivered by eminent scientists at NCAP during this period.

"Impact of Technological Changes on Agricultural and Rural Development" by Dr. T. Haque, National Fellow, NCAP on 18, October 1995.

"GATT and Rice Exports" by Dr. Prabhu Pingali, Economist, IRRI, Philippines on 21 December 1995.

"Overview of Brackish water Aquaculture Systems in India" by Dr. M. Krishnan, Central Institute of Brackishwater Aquaculture, Madras on 14, January 1996.

"International Rice Research: A Medium-Term Perspective" by Dr. Mahboob Hossain, Head, Socio-Economics Programme, IRRI, Philippines on 5, February 1996.

"Japanese Agricultural Development" by Dr. S. Hirashima, Professor, Department of International Studies, Meiji Gakuin University, Yokohama, Japan on 23 March 1996.

V GENERAL INFORMATION

DISTINGUISHED VISITORS

Dr. Derek Byerlee, Principal Economist, Agriculture and Natural Resources Department, The World Bank, Washington, B.C., USA

Prof. R.E. Evenson, Economic Growth Centre, Yale University, Connecticut, USA.

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

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

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

Dr. Mahbub Hossain, Head, Socio-economic Programme, International Rice Research Institute, The Philippines.

Dr. Prabhu Pingali, Economist, International Rice Research Institute, The Philippines.

Dr. R.K. Singh, Liaison Officer, International Rice Research Institute, Regional Office, New Delhi.

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

Dr. Sarath G. Ilangantileke, International Potato Centre, Regional Office, Delhi.

Dr. S. Hirashima, Professor, Meiji Gakuin University, Yokohama, Japan.

Dr. S.L. Mehta, Deputy Director General (Education), Indian Council of Agricultural Research, Krishi Anusandhan Bhawan, New Delhi.

Dr. Uma Lele, Advisor, Agricultural Research, The World Bank, Washington, D.C., USA.

Five member S & T Delegation from the National Academy of Science of Kyrgyzstan on 26 March 1996

RESEARCH PAPERS PRESENTED / PUBLISHED BY NCAP SCIENTISTS

Maji, C.C. and A. Bhattacharya "GATT and Agricultural Exports-Hopes and Realities" NCAP Policy Paper - 4, NCAP, New Delhi 1995.

Maji, C.C., T. Haque and A. Bhattacharya "Small Farms, Employment and Surplus Generation - A Case of West Bengal", NCAP Policy Paper - 5, NCAP, New Delhi, 1995.

Maji, C.C. and Kazi M.B. Rahim "An Investigation into Small Farm Diversification : Some Case Studies in West Bengal", in T. Haque (Ed) Small Farm Diversification : Problems and Prospects, National Centre for Agricultural Economics and Policy Research, New Delhi.

Jha, Dayanatha, P. Kumar, Mruthyunjaya, S. Pal, S. Selvarajan and Alka Singh, "Research Priorities in Indian agriculture", NCAP Policy Paper - 3, New Delhi 1995.

Jha, B.K. and D. Jha, "Farmers attitude towards risk in the Greenbelt of India", Journal of Rural Development, 14(3), 1995.

Jha, B.K. and D. Jha, "Constraints in small farm diversification -A study in Kurukshetra district of Haryana (India)", in T. Haque (Ed) Small Farm Diversification : Problems and Prospects, National Centre for Agricultural Economics and Policy Research, New Delhi.

Jha, Dayanatha, "Privatizing agricultural research", NCAP Policy Brief No. 1, New Delhi. May, 1995.

Jha, Dayanatha, "Human Resource Development : Teaching Needs", presented in workshop on HRD for Agriculture: Teaching, Training and Research Needs, IARI, New Delhi.

Sulaiman, V. R. "Privatising Farm Extension - Need for a cautious approach", NCAP Policy Brief No. 2, New Delhi, May 1995.

Sulaiman, V.R. and D. Jha "Management of Agricultural: Education beyond 2000- Problems and Perspectives", presented in the Workshop on *Planning Education beyond 2000*, National Academy of Agricultural Sciences, New Delhi.

Sulaiman, V.R. "In Defence of Public Funded Extension" *Triangulations*, 1 (1), 1996

Haque, T. "Impact of Technological Changes on Agricultural Growth and Employment in South Asia", Proceedings of the International Seminar, held at SLFI, Colombo, Sri Lanka, September, 1995

Haque, T. "Role of Land Reform in Rural Development in the wake of Economic Liberalisation", *Kurukshetra*, Annual Number, October, 1995. New Delhi

Haque, T. "Diversification of Small Farms in India", in T. Haque (Ed) *Small Farm Diversification: Problems and Prospects*, NCAP, New Delhi, March 1996.

Haque, T. and D. Jha "Agricultural Growth, Employment and Rural Poverty" in Proceedings of the Seminar on Structural Reform and Agricultural Employment, Indian Society of Labour Economics, Patna, December, 1995

Haque, T. "Land Reform and Rural Development : A Case of Bihar" in Proceedings of the National Seminar on Development of Bihar, Patna, November, 1995.

Haque, T. "Impact of Land Reforms on Agricultural Workers" in Proceedings of the National Seminar on Problems of Agricultural Workers, Bharatiya Kisan Mazdoor Union, New Delhi, 1995.

Haque, T. (1996), *Sustainability of Small Holder Agriculture*, Concept Publishing Company, New Delhi.

Singh, P. and M.K. Singh (1995) "Structure of Rural Income Inequality: A Study in Western Uttar Pradesh", *Indian Journal of Agricultural Economics*, Vol. 50 (2): pp. 168-175.

AWARDS

Dr. Pratap Singh was awarded the O.K. Desai Prize by Indian Society of Agricultural Economics for his article "Contractual Arrangements in Agriculture of a Developing Economy" which was adjudged as the best paper in agricultural stream published in *Indian Journal of Agricultural Economics* during 1994.

COMMITTEES

Technical Advisory Committee

1. Dr. Y.K. Alagh,
Vice- Chancellor,
Jawaharlal Nehru University,
New Delhi. Chairman
2. Dr. V.S. Vyas,
Director,
Institute of Development Studies,
Jaipur. Member
- 3.- Dr. S.N. Mishra,
Director,
Institute of Economic Growth,
Delhi. Member
4. Dr. S.S. Acharya,
Chairman, Commission on Agricultural Costs and Prices.
Government of India. Member
5. Dr. G.S. Ram,
(Economic and Statistical) Advisor ,
Directorate of Economics and Statistics,
Government of India. Member
6. Prof. Anil Gupta,
Indian Institute of Management,
Ahmedabad. Member
7. Dr. S.S. Johl,
C-21, Gurdev Nagar,
Ludhiana,
Punjab. Member
8. Dr. Mruthyunjaya,
Assistant Director General, ICAR. Member
9. Dr. C.C. Maji,
Director, NCAP
(till August 31, 1995). Member
10. Dr. Dayanatha Jha,
Principal Scientist,
NCAP. Member Secretary

Management Committee

1. Dr. C.C. Maji
Director,
NCAP.
(till August 31, 1995) Chairman
2. Dr. D. Jha
Director,
NCAP.
(from October 20, 1995) Chairman
3. Dr. P.N. Bhat
Officer on special Duty,
Indian Council of Agricultural Research,
New Delhi. Member

- | | | |
|-----|--|------------------|
| 4.. | Dr. J.C. Kalla,
Director,
NAARM,
Hyderabad, | Member |
| 5. | Dr. R.K. Pandey,
Principal Scientist,
Indian Agricultural Statistics Research Institute,
New Delhi. | Member |
| 6. | Dr. Paramatma Singh,
Professor,
Division of Agricultural Economics,
Indian Agricultural Research Institute,
New Delhi. | Member |
| 7, | Sh. Naresh Arora,
Assistant Accounts and Finance Officer,
NCAP, New Delhi. | Member |
| 8. | Sh. Narendar Kumar
Assistant Administrative Officer
NCAP, New Delhi. . | Member Secretary |

Budget Review Committee

- | | |
|--|------------------|
| Dr. G. Singh,
Sr. Scientist | Chairman |
| Dr. Pratap Singh
Scientist | Member |
| Sh. Narendar Kumar
Assistant Administrative Officer | Member |
| Sh. Naresh Arora
Assistant Finance and Accounts Officer | Member |
| Sh. Mohan Swarup Vashisht
Assistant | Member Secretary |

Publications Committee

- | | |
|--|------------------|
| Dr. T. Haque,
National Fellow | Chairman |
| Dr. S. Selvarajan
Principal Scientist | Member |
| Dr. Ramesh Chand
Principal Scientist | Member |
| Dr. Rasheed Sulaiman V
Scientist | Member Secretary |

Library Committee

Dr. Ramesh Chand Principal Scientist	Chairman
Sh. Khyali Ram Jat Technical Assistant	Member
Dr. Rasheed Sulaiman V Scientist	Member Secretary

PERSONNEL

Scientific

Dr. C.C. Maji	Director (upto 31 August 1995)
Dr. Mruthyunjaya	Director (officiating 1 Sept 1995 to 19 October 1995)
Dr. Dayanatha Jha	Director (from 20 October 1995)
Dr. T. Haque	ICAR National Fellow
Dr. S. Selvarajan	Principal Scientist (from 24.1.1996)
Dr. Ramesh Chand	Principal Scientist (from 19.2.1996)
Dr. G. Singh	Senior Scientist
Dr. Pratap Singh	Scientist (from 11.1.1996)
Dr. Rasheed Sulaiman V	Scientist

Administrative

Sh. Narender Kumar	Assistant Administrative Officer
Sh. Naresh Arora	Assistant Finance & Accounts Officer,
Sh. Mohan Swarup Vasisht	Assistant
Mrs. Usha Sehgal	Stenographer
Ms. Umeeta Mansukhani	Jr. Stenographer
Sh. Kuldeep Kumar Hans	Senior Clerk
Sh. Ravindra Kumar	Junior Clerk
Sh. Inderjeet Sachdeva	Junior Clerk
Sh. Satinder Singh Kataria	Driver

Technical

Sh. Khyali Ram Jat	T-II-3
Sh. Mangal Singh Chauhan	T-II-3
Ms. Sonia Verma	T-II-3
Ms. Lalita Sablania	T-II-3 (upto 23.9.95)

Supporting

Sh. Mahesh Kumar

S.S. Gr.I

Sh. Sanjay Kumar

S.S. Gr.I