R E P O R T

OF THE

STEERING COMMITTEE ON AGRICULTURE AND ALLIED SECTORS

FOR

FORMULATION OF THE ELEVENTH FIVE YEAR PLAN (2007-2012)

PLANNING COMMISSION
GOVERNMENT OF INDIA
APRIL 15, 2007

Letter of Transmittal

PROF. C.H. HANUMANTHA RAO
Chairman,
Steering Committee on Agriculture & Allied Sectors
For the 11th Plan (2007-12)

April 15, 2007

Dear Dr. Ahluwalia,

I have great pleasure in forwarding, herewith, the Report of the Steering Committee on Agriculture for the Eleventh Five Year Plan. This Report is unanimous.

With warm regards,

Yours sincerely,

C H Hanumantha Rao

(C.H. Hanumantha Rao)

Dr. Montek Singh Ahluwalia
Deputy Chairman,
Planning Commission

ACKNOWLEDGEMENTS

The Steering Committee records its sincere thanks to Dr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission for extending the opportunity to the Committee to look into the performance of agriculture sector and suggest 'ways ahead'.

It is our pleasure and privilege to thank all the members of the Committee for sparing time for their active participation in the deliberations and making valuable suggestions for finalisation of this Report.

The Committee wishes to place on record its appreciation for the contribution it received from Shri. B. N. Yugandhar, and Dr. Kirit Parikh, Members, Planning Commission in deliberating the subject maters on rainfed agriculture and water management respectively.

The Committee benefited much from the suggestions it received from the representatives of the Farmers' Organisations, Chairpersons of the 12 Working Groups set up by the Planning Commission on Agriculture and Allied Sectors for 11th Five Year Plan, the Conveners of the Working Groups of NDC Sub-Committee on Agriculture and Related Issues as also Chairman, Working Group on Water Resources and Rainfed Areas Development.

The Committee also expresses its gratefulness to the Secretaries and Senior Officers of the Department of Banking, Ministries of Agriculture, Water Resources, Food Processing Industries, Agro and Rural Industries and Chairperson, NDDB for their active participation in the deliberations and valuable suggestions.

This Report could not have been completed without the contribution of Prof. Ramesh Chand in drafting of the report.

The cooperation extended by the Planning Departments of the Governments of Andhra Pradesh and Tamil Nadu and the Administrative Staff College of India (ASCI), Hyderabad in facilitating meetings of the Committee at Hyderabad and Chennai is thankfully acknowledged.

We are also thankful to the officers and staffs of the Agriculture Division of the Planning Commission for organizing the meetings and their contributions in the preparation of this Report. Thanks are particularly due to Shri L. Rynjah, Sr. Adviser (Agriculture), Dr. V. V. Sadamate, Adviser (Agriculture) and Convener of the Committee.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF Appendix Tables

I. CONSTITUTION OF THE COMMITTEE AND TERMS OF REFERENCE (TOR)

1.1 Planning Commission vide its Office Order M-12043/5/2006-Agri. dated 25.10.2006 and Office Order M-12043/5/2006-Agri. dated 19.03.2007 issued with the approval of the Deputy Chairman, Planning Commission, constituted the Steering Committee on Agriculture and Allied Sector for formulation of the Eleventh Five Year Plan (2007-2012). The Committee was Chaired by Dr. C.H. Hanumantha Rao. The other Members of the Committee are Prof. V.S. Vyas, Dr. A. Vaidyanathan, Dr. G.S. Kalkat, Prof. Abhijit Sen, Prof. V.L. Chopra and Prof. Ramesh Chand (Co-opted).

1.2 Broadly, the Committee was assigned the tasks (i) to review the recommendations of various Working Groups set up by the Planning Commission, (ii) to consider Reports of the National Commission on Farmers (NCF) and of Sub-Committees of NDC on Agriculture and (iii) to suggest plans and schemes for Eleventh Plan.

1.3 The Steering Committee was serviced by the Agriculture Division of the Planning Commission.

The notifications detailing Composition and TORs are Annexed.

II. MEETINGS HELD AND INTERFACES CONDUCTED BY THE COMMITTEE

2.1 Meetings held

In all, the Committee met on eight occasions on the following dates:

- First Meeting (New Delhi) – 7th November, 2006
- Second Meeting (Hyderabad) – 27th November, 2006
- Third Meeting (Chennai) – 10th December, 2006
- Fourth Meeting (New Delhi) – 16-17th January, 2007
- Fifth Meeting (New Delhi) – 10th February, 2007
- Sixth Meeting (New Delhi) – 27th February, 2007
- Seventh Meeting (New Delhi) – 24th March, 2007
- Eighth Meeting (New Delhi) – 12th April, 2007

2.2 Interfaces Organized

2.2.1 The Steering Committee interfaced in detail on 10th February, 2007 with (i) the Chairmen and Member Secretaries of XIth Plan Working Groups (12) on Agriculture and Allied Sectors set up for formulation of Eleventh Five Year Plan and (ii) the Member-Conveners of NDC Sub-Committee Working Groups (6) on Agricultural and related Issues.

2.2.2 The purpose of the interface was primarily to obtain the feedback on the outcomes, both on programmatic interventions and financial implications, which emerged in their Interim/ Final Reports.

2.2.3 In the Fourth Meeting held on 16-17 January, 2007, Steering Committee interacted with the Secretaries of the selected Departments mainly to appreciate their programmes/ activities, performance in the Tenth Plan and projections for the Eleventh Plan. The following officials were consulted in detail for the purpose:

- Dr. P.K. Mishra, Secretary, D/o Agriculture and Cooperation.
- Ms. Charusheela Sohoni, Secretary, D/o AHD&F.
- Dr. Mangla Rai, Secretary, D/o Agriculture Research & Education and DG, ICAR.
- Shri Vinod Rai, Secretary, D/o Banking.
- Shri P.I. Suvrathan, Secretary, M/o Food Processing Industries.
- Shri S. Manoharan, Additional Secretary, M/o Water Resources.
- Shri S.K. Pulipaka, Joint Secretary, M/o Agro and Rural Industries.

2.2.4 Coffee growers representing (i) The United Planters Association of Southern India (UPASI), Coonoor, (ii) The Karnataka Growers Federation and (iii) The Karnataka Planters Association Chikmagalur, Karnataka interacted with Chairman of the Steering Committee on 9th February, 2007. Shri C.R. Kariappa, Vice President, UPASI and other delegates submitted Memorandum highlighting constraints of Coffee Planters including technology support, market linkages, plantation labour welfare measures and support for Multi State Coffee Co-operatives.

2.2.5 The Steering Committee also interacted with representatives of Farmers' Organizations basically to capture their views/ submissions on current farming scenario including the production performance/ constraints, market and price related issues, redressal of farmers distress and farm credit and technology dissemination related issues. The interface with the following was held on 27th February, 2007.

- Shri Vinod Pandey, President, Kisan Morcha
- Shri K. Vardarajan, Gen. Secretary, Kisan Sabha
- Shri Atul Kumar Anjan, Gen. Secretary, Kisan Sabha and Former Member, NCF
- Dr. Kishen Bir Choudhary, Gen. Secretary, Bharat Krishak Samaj
- Shri P. Chengal Reddy, Secretary, Consortium of Indian Farmers Association
- Shri Hemant Kumar, Karnataka Rythu Sangha

2.2.6 The Steering Committee also interacted with (i) Dr. Kirit S. Parikh and Shri B.N. Yugandhar, Members, Planning Commission (16-17 January, 2007) on the subject matters of Irrigation Management and Rainfed area development strategies respectively and (ii) Ms. Amrita Patel, Chairperson, NDDB on 27th February, 2007.

2.2.7 Notes submitted by Shri A.M. Gokhale, Special Adviser to Dy. Chairman, Planning Commission (on Jhum cultivation) and Dr. C. Prasad, Former DDG, ICAR (on National Extension Council) were also considered by the Committee in its meeting held on 12th April, 2007.

Executive Summary

The Steering Committee, in this Report, attempts to highlight the major concerns; identify the causes underlying the present dismal state of agriculture in the country; and suggests a road map for reviving agriculture with a view to placing it on a high, inclusive and sustainable growth path.

I. CONCERNS

Deceleration in Growth

Over the last 50 years, deceleration in the growth of agricultural output was not witnessed for such a long period as seen after 1994-95. Another disquieting feature is that some of the sunrise sectors, e.g. livestock, fisheries and horticulture also started showing deceleration. These growth rates are lower than the growth rates in rural population and workforce in agriculture, implying that per capita income in agriculture is declining. Per capita availability of pulses- a major source of protein in the country- showed a sharp decline.

Degradation of Natural Resources

Land resources are getting degraded through soil erosion, salinity and alkalinity, and chemicalization. Productive capacity of land is declining due to nutrient mining, imbalance in the application of soil nutrients, neglect of micro nutrients and inadequate application of organic fertilizers.

Even after fully exploiting the available water resources, water supply can match the demand only if there is a big improvement in the efficiency of irrigation. Water table in several states is getting depleted at a fast rate as water withdrawal is exceeding its recharge. Large investments needed for pumping out water from deeper aquifers are reducing crop profitability and making farming unviable for smaller farms.

Equity

Slow growth in agriculture with no significant decline in labour force has created a serious disparity between agriculture and non- agriculture. Practically all the growth so far has come from the expansion of irrigation and increased productivity of irrigated land; rain-fed agricultural productivity has been more or less stagnant. This is mainly due to the low and highly fluctuating productivity and the low risk- bearing capacity of the rain-fed farmers.

The out-migration of men, driven mainly by rural distress, has added to the misery for rural women left behind who have had to share greater work burden in their fields without the necessary rights on land, access to resources, knowledge and skills.

More than 80% of agricultural holdings in India are of less than 2 hectares and more than 60% of farmers operate less than 1 hectare each. As employment opportunities in the non-

farm sectors are growing very slowly, there is very little shift of labour force from agriculture. Improving the viability of smaller holdings by providing access to technology, inputs and credit through appropriate institutions remains a big challenge.

Efficiency

Efficiency in resource-use encompasses production, marketing, processing, transport, etc. Farmers in India are at a considerable disadvantage in this respect. To be able to compete in a liberalized trade regime, there is need for a paradigm shift from merely maximizing growth to achieving efficient growth. Moreover, efficient use of resources, including water and chemical inputs, is essential for sustainability.

Vulnerability

With the rise in capital-intensity in agriculture, in the face of natural calamities and other man-made disasters, vulnerability of farmers has increased considerably. Farm harvest prices of various commodities often fall below MSP in the markets where public procurement is not effective. As the institutional arrangements for meeting income losses are either non-existent or very weak, farm households often turn to private sources which lead to indebtedness and loss of productive assets.

II. CAUSES

Public and private investment in infrastructure, including irrigation, technological change, diversification and fertiliser are the four major sources of agriculture growth in India. The progress on these fronts slowed down since the 1990s.

Rural Infrastructure

Burgeoning farm subsidies are impinging upon the government's ability to invest in key areas. Even a one-fourth reduction in these subsidies could enable the government to nearly double its investments in critical areas like irrigation and other infrastructure.

Apart from their misuse and leakages, subsidies in several cases are doing more harm than good through the over-use of irrigation water and imbalances in the use of plant nutrients resulting in wastage and inefficiency.

Degradation of Natural Resources

The main reasons for degradation of natural resources are the increasing pressure of human and animal population on natural resources, policies like free power for irrigation leading to the overexploitation of water resources and the lack of participatory management of natural resources. Fertilizer subsidy has distorted prices in favour of nitrogenous fertilizer causing nutritional imbalances in many areas, adversely affecting land productivity.

Failures in Conservation and Improvement of Rain-fed Land

Watershed development is a major strategy to make sustainable use of natural resources in rain-fed areas. But projects are mostly planned and implemented by government departments in a piecemeal and fragmented manner without actively involving the beneficiary communities.

Technology Development and Dissemination

Agricultural research is under-funded. ICAR and its network has been frequently reviewed by eminent experts, but its highly centralized, hierarchical and bureaucratic set-up has not responded to the need for change. The available resources have not been optimally utilized for lack of clearly stated strategy and rational prioritization of research agenda.

Frontline demonstrations by various departments provide clinching evidence of large gaps between what can be attained at farmers' fields with improved technology and what is obtained with the existing practices, clearly pointing to the large potential for raising output through the effective dissemination of technology, especially in the eastern Gangetic Plains. But this is not happening because of the absence or weak Research-Extension-Farmer linkages. Also, realization of demonstration trials yields at farmers' fields on a large scale would require technologies adaptable to wider regional variations.

The flow of improved varieties and production technology for rain-fed crops and regions with relatively low rainfall has been uneven. Research has tended to focus mostly on breeding varieties of individual crops for increasing the yield potential by more intensive use of water and bio-chemical inputs, to the neglect of cropping systems and practices for prudent, efficient and sustainable use of land, water and chemical inputs.

Market Infrastructure and Regulation

In low productivity regions having a large potential, e.g. Bihar, East Uttar Pradesh, Orissa, Assam, Chattisgarh and West Bengal, marketing infrastructure is underdeveloped and private trade is exploitative. As such, the incentives for the adoption of new technology are very weak. On the other hand, the potential of private sector to contribute to agriculture growth and benefit farmers through participation in marketing and processing remained largely unrealized because of various types of restrictions and regulations.

Status of Women Farmers

Since women are not formally recognized as farmers but are seen merely as helpers on family farms, agricultural extension agents seldom contact women. Second, existing institutions, including farmers' cooperatives, are structured with male farmers in mind, both in terms of location and forms of interaction. Given social norms and domestic responsibilities, women are far less mobile and less able to use these male dominated institutions effectively.

Imperfections in Land Market and the Plight of Small Farmers

The small farmers genuinely interested in cultivation do not have resources to purchase land. Land that is leased out is on oral tenancy for short periods which discourages productive investments in land by the tenants. This is harming equity as well as efficiency.

III. THE WAY FORWARD

Accelerating Growth

There is a need for stepping-up public investments in agriculture to 4% of GDP Agriculture. This would imply that public investments, at 1999-2000 prices, should be raised annually by 12% during 11th Plan. To ensure speedy completion of irrigation projects, the poorer states where the potential for the development of irrigation is high, need to be assisted liberally.

Demand Driven Diversification

The emerging scenario of increasing diversification offers an opportunity for raising farm incomes significantly as the employment elasticity for these activities is quite high. Private sector engaged in agro-processing and agro-business can promote diversification both by providing inputs and assured market for output through contract farming.

Input Provisioning

Supply of seed needs urgent attention as quality of seed is the basic determinant of productivity. Seed production and distribution needs revamping by strengthening public sector seed agencies and by involving private trade in seed multiplication and distribution. Quality checks on inputs are becoming important as the unscrupulous trade fleecing farmers by selling spurious seed, fertilizer and chemicals has been on the rise.

Land and Water

Major emphasis is needed on water conservation and recharging schemes, including restoration and renovation of traditional water bodies, as an integral part of watershed development with the involvement of local communities and NGOs.

Institutional changes to improve overall water governance need to be reinforced by creating strong incentives for individual users to make prudent and economical use of water. Increasing the effective cost of water for individual users and aligning the relative costs for different uses to serve social priorities is essential. This calls for a great deal of effort to raise the awareness of public at large, including the elected representatives, about the consequences of defective pricing and poor cost recovery, and convince them that there is considerable scope for economizing the use of water without adversely affecting their incomes.

At least one model project in each state for surface system should be implemented during the Eleventh Plan for physical modernization, especially distribution network and installation of

control structures and volumetric supply gauges; and entrusting management of the systems to an autonomous organization of elected representatives at all levels, with power to decide and enforce rules of allocation and levy and collection of water charges.

Rain-Fed Areas

The emphasis in production should be on farming system approach that integrates crop, livestock, agro-forestry, and horticulture. Wherever possible, agriculture development programmes in rain-fed areas should converge on watershed.

Soil health cards, giving regularly updated information on major and micronutrients should be issued to all the farmers by strengthening soil testing labs in all parts of the country. Production and sale of bio-fertilizers, e.g. compost, organic manure and micro nutrients should be encouraged on a large scale through informal as well as organized production systems by providing appropriate incentives.

The current controversy on the role and authority of different central ministries in the NRA is both pointless and counter productive. It is much more important to focus on decentralization of planning and implementation along with the necessary resources, through coordinated effort by the relevant departments, down to the grass roots level. The existing guidelines for Watershed Development need strengthening to ensure (a) proper social mobilization and institution-building in the initial stages of the programme so as to ensure community participation on a sustained basis; (b) adequate attention to equity and livelihood concerns of the poor; and (c) convergence of the programmes undertaken by different Ministries at the watershed level with a view to raising agricultural productivity.

Technology

Research priorities need to shift towards enhancing the yield potential in the rain-fed areas by evolving, through recourse to modern biotechnologies, varieties that are drought and pest resistant, and by evolving cropping systems suited to varying agro-climatic conditions.

The key issue in technology is how to make the agriculture research system deliver to the end-users. There is an urgent need to develop technologies keeping the ground situations in mind. Greater interaction with the user-farmers and researchers needs to be fostered for developing technologies which can receive ready acceptance.

Making research responsive to the needs of the farmers calls for complete functional and financial autonomy to ICAR and SAUs, with measures to ensure greater accountability for performance both by research personnel and research institutes.

Outlay for agricultural research and education should be increased to at least one per cent of agricultural GDP. National fund should be created for strategic research which should be planned, managed and monitored by high level expert scientific committees at Centre and in each state. Research agenda setting and management should be decentralized at the agro-climatic region level.

Agricultural Extension

Measures urgently required to revamp the extension system are : (a) allocation of more resources for extension; (b) closer and frequent interactions between research and extension; and (c) result oriented performance evaluation of extension staff.

Extension system has to employ a variety of approaches spanning Rural Knowledge Centres (RKCs), ITC based extension, farmer- to- farmer extension, involvement of PRIs, NGOs and private sector. Women farmers' access to knowledge should be ensured through the women extension workers, especially in the remote hilly and tribal areas where women farmers predominate.

A position of a Development Commissioner of the rank of Additional Chief Secretary should be created in each state, duly supported by the Central Zonal Agricultural Production Commissioners, to coordinate the working of all the concerned departments which should be made accountable to him.

Agricultural Credit

There is a need to increase the supply of institutional credit, through cooperatives, commercial banks and micro finance institutions on easy terms and conditions. The cost of credit delivery borne by farmers should be brought down and interest rate should be kept reasonably low. Though credit flow in the recent years has shown high increase, the flow to agriculturally underdeveloped areas and small and marginal farmers is far from satisfactory.

Cooperative Credit Societies, that are autonomous and democratic, are the most potent means for making available institutional credit to the innumerable small and marginal farmers. Therefore, the current restructuring of cooperative credit, on the lines of the recommendations of A. Vaidyanathan Committee, should be implemented speedily and rigorously.

The coverage of operational holdings should be increased significantly, with sub-targets for the less developed states and small and marginal farmers. Strict norms should be put in place to curb the practice of old accounts being closed and shown as new accounts.

Since small and marginal farmers have no alternate sources of finance, the share of direct accounts with a credit limit of Rs. 25,000 in total direct finance may be targeted at a substantially higher level.

Steps should be taken to improve the absorptive capacity of backward states in utilizing RIDF by relaxing norms for matching contribution.

Subsidies on Irrigation and Fertilizers

Local- level community institutions should be empowered to levy and collect economic rates for surface irrigation and for power used for pumping water, linked to the volume of water consumed as determined by the local institutions, and use the revenues so collected for development at the local level. Metering devices can be installed at the village level or at the farm level, wherever feasible.

Balanced use of fertilizers should be promoted either by redistributing the prevailing amount of fertilizer subsidy over NPK or by increasing subsidy on P and K in such a way that farmers are induced to use NPK in the right proportion.

Ensuring Remunerative Prices

In the Eastern and Central region, having large potential, like Bihar, East Uttar Pradesh, Orissa, Assam, Chattisgarh and West Bengal, MSP should be ensured through effective procurement.

In each state, a few crops having a potential for growth should be selected and MSP made effective for them through public procurement by developing the necessary marketing infrastructure.

Insurance Against Risks in Agriculture

There is a scope for improving the coverage of NAIS in terms of regions and crops, substitution of long term yield rate as a bench mark and ensuring prompt payment of the indemnities. Decision to devolve the area of damage assessment from blocks to smaller units may be done with care, as the costs of such decentralization and the moral hazards will be very high compared to the likely benefits.

All commercial banks, RRBs and the Cooperative Banks should make crop insurance mandatory for all agricultural loanees, especially because such insurance can indirectly contribute to the viability of rural banking.

Some of the successful insurance products like Rainfall Insurance have recently been developed by ICICI-Lombard General Insurance Company and by IFFCO-Tokyo General Insurance Company. Necessary incentives should be devised for insurance companies to design suitable products for agriculture sector.

Better Deal for Women Farmers

Enhancing women's rights in land, providing infrastructure support to women farmers, and advancing legal support on existing laws, will get recognition for women as farmers and enable them to access credit, inputs, and marketing outlets. Second, women's names should be recorded as cultivators in revenue records, on family farms, where women operate the land having ownership in the name of male members.

The gender bias in the functioning of institutions for information, extension, credit, inputs and marketing should be corrected by gender-sensitizing the existing infrastructure providers. Women's cooperatives and other forms of group effort should be promoted for the dissemination of farm technology as well as for marketing of produce.

Land Markets and Prospects for Small Farmers

Small farmers should be assisted to buy land through the provision of institutional credit, on a long-term basis, at a low rate of interest and by reducing stamp duty. At the same time, they should be enabled to enlarge their operational holdings by liberalizing the land-lease market. The two major elements of such a reform are: security of tenure for the tenants during the period of contract; and the right of the land owner to resume land after the period of contract is over.

Special programmes need to be designed and implemented to enable small farmers to improve their capacity to go for high value commercial activities in crop production, dairy, poultry, fisheries etc. These farmers should be provided liberal assistance for meeting capital requirement to take up such activities.

Because of the increased pressure from small and marginal farmers on the limited land for their livelihood, there is no justification, at this stage, for encouraging corporate farming by relaxing the existing ceiling on land ownership.

The ultimate solution to the small farmer problem lies in the shift of labour force to non-farm occupations. For this, the growth of rural non-farm sector through the development of agro-processing and other rural industries is essential. The development of rural infrastructure e.g. roads, communications and power under the on-going programme of Bharat Nirman should be given the highest priority.

Participation of Private Trade

Private sector can play a major role not only in post-harvest handling and distribution of produce but also by forging appropriate arrangements such as contract farming with farmers, particularly for high value crops. Recently, some corporate houses have ventured into opening chains of retail food stores in urban centres which, apart from providing fresh and better quality products to consumers, have also benefited farmers through higher prices - in some cases assured by advance contracts. This is important in a context where farmers face serious marketing constraints, although the evidence so far suggests that transaction costs involved tend to exclude small farmers.

Agricultural Statistics

The formats of TRS Scheme as well as the ICS Scheme need to be thoroughly reviewed and changed for bringing about a lasting improvement in the basic system of Agriculture Statistics.

An alternative methodology for estimation of production of the horticultural crops as recommended by NSC should be followed. The economic contribution of post-harvest activities such as trade, processing, packaging and the related activities in the periphery of agriculture need to be captured as GDP share of agriculture and allied activities.

IV. CONCLUDING REMARKS

India has an impressive record of taking the country out of serious food crisis to self-sufficiency and self- reliance even when the population of the country doubled since 1971. This success was achieved through the favourable interplay of infrastructure, technology, extension and policy backed by strong political will. Therefore, **the Steering Committee is of the considered opinion that it should be possible to reverse the process of deceleration in agriculture growth and step it up significantly during the 11th Plan period.**

The basic causes for deceleration and the policy initiatives needed to reverse this process have been long known, as brought out by a number of scholars and knowledgeable persons on the subject. Recently, the National Commission on Farmers in its comprehensive Reports has highlighted the factors inhibiting the growth of Indian agriculture and undermining the welfare of the farmers. Thus, we have before us a clear road map for reviving Indian agriculture and placing it on a high growth path. **What is needed is requisite awareness of the relevant issues on the part of the decision-makers at the state and central level and, above all, the political will to act decisively and accord high priority to agriculture by implementing the major recommendations. The institutional mechanisms to initiate and monitor purposive action need to be put in place at the highest level both at the Centre and the States.**

I
INTRODUCTION

Since more than 50 percent of workforce is still engaged in agriculture as its principal occupation, agriculture continues to remain the predominant sector of Indian economy in terms of employment and livelihood, even though its share in Gross Domestic Product has declined from over 50 percent in the initial years after Independence to around 20 percent in the recent years.

During the last one and a half decade Indian agriculture has been facing severe challenges, the most serious being the deceleration in its growth rate from about 3.3% during the period between 1980/81 and 1994/95 to around 2% between 1995/96 and 2004/05. This has serious implications for food security, farmers' income and poverty. There is widespread rural distress leading to a large number of suicides by the farmers in some parts of the country.

The growth rate of non- agriculture sector has accelerated during this period. ***And yet*** strong agriculture - non-agriculture as well as rural-urban divide is seen in the society. In view of the seriousness of this issue, the 11th Plan Approach paper placed a strong emphasis on restructuring policies for achieving accelerated, broad based and inclusive growth.

The core objectives of the 11th Plan for agriculture are (a) to achieve a 4% rate of growth; and (b) to ensure that growth and attendant benefits are distributed more widely across regions and classes of farmers. The targeted growth rate is considerably higher than the trend rate achieved over the past 5 decades and more than double the rate achieved during the last decade. This is a huge challenge in as much as the scope for expansion of cultivated area has long reached its limit, even as the degradation of land under cultivation continues unabated; the rate of expansion in area irrigated by surface water sources has slowed down with extreme inefficiencies in the use of available irrigation water; there is a failure to contain over-exploitation of groundwater; and there has been little or no improvement in the productivity of rain-fed lands. Also, the increasing feminization of agriculture and the predominance of small and marginal farmers pose challenges for restructuring the existing institutions with a view to ensuring easy access to inputs so that they are able to participate in the growth process more effectively.

In what follows **the Report of the Steering Committee attempts to highlight the major concerns; identify the causes underlying the present dismal state of agriculture**

in the country; and to suggest a road map for reviving agriculture with a view to placing it on a high, inclusive and sustainable growth path.

II
MAJOR CONCERNS

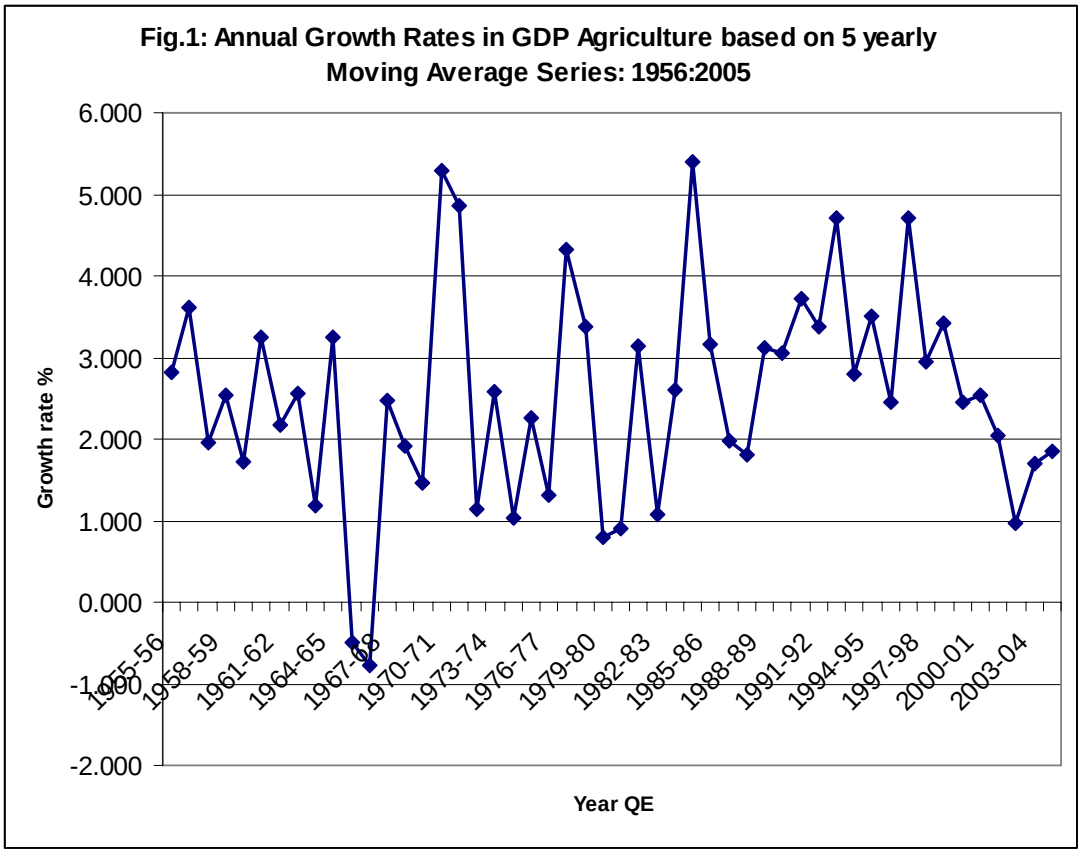
Recent trends in agriculture give cause for concern on several counts:

- **Slowdown in growth;**
- **Degradation of natural resource base;**
- **Uneven and slow development of technology;**
- **Inefficient use of available technology and inputs;**
- **Lack of adequate incentives and appropriate institutions;**
- **Adverse impact of trade liberalization on the agricultural economy of the regions growing crops (plantation, cotton and oil seeds) in which foreign trade is important;**
- **Widening economic disparities between irrigated and rain-fed areas; and between agriculture and the rest of the economy;**
- **Rapid and widespread decline in groundwater table threatening sustainability, with particularly adverse impact on small and marginal farmers;**
- **Aggravation in social distress as a cumulative impact of the above, the most worrisome being the farmers' suicides.**

The above concerns may be grouped under the following broad areas: Growth, Sustainability, Equity, Efficiency and Vulnerability. These are discussed below in this section. Technology issues are discussed in the next section.

Deceleration in Growth Rates in Agriculture

Indian agriculture depends heavily on vagaries of nature, particularly on the amount and distribution of rainfall, as more than 60 percent of the area under cultivation does not have access to irrigation. Due to this there are wide yearly fluctuations in total output. The estimated growth rates, based on five yearly moving averages of output, presented in Figure (1) and trend growth rates presented in Table (1) indicate that phases of growth coincided with different phases of agricultural policy.



In the pre-green revolution period the growth remained lowest even though considerable expansion in area took place. Adoption of high yielding varieties during the late 1960s led to substantial increases in productivity of two principal crops grown in India, namely, wheat and paddy, which raised output growth during the 15 years following green revolution. However, green revolution technology during this period remained concentrated in north-west plains and some areas in southern India, both of which had assured water supply for irrigation. Around 1980-81, improved technology spread to several other regions and agricultural economy diversified. This resulted in a further acceleration in the growth of agricultural output. This period also witnessed sharp acceleration in the growth rate of non-agriculture sector. After mid 1990s growth rate in agricultural output declined sharply. **Over the last 50 years, deceleration in the growth of agricultural output was not witnessed for such a long period as seen after 1994-95.** Thus decline in agriculture output growth has been a continuing phenomenon for more than a decade.

Table (1): Growth rate in GDP agriculture and non agriculture sectors in different periods, percent/year

Period	Total economy	Non-agriculture	Agriculture
I Pre green revolution			
1950/51 to 1964/65	3.95	5.59	2.66
II Green revolution period			
1965/66 to 1979/80	3.62	4.40	2.76
III Wider technology dissemination period			
1980/81 to 1994/95	5.37	6.56	3.33
IV Post reforms			
1995/96 to 2004/05	5.81	7.07	2.00

Another disquieting feature of agriculture growth after mid-1990s is that some of the sub-sectors of agriculture which were considered as sunrise sectors in the early 1990s, e.g. livestock and fisheries and horticulture also started showing deceleration. This can be seen from the growth rates of output of various sub-sectors of agriculture (Table-2). Fisheries and horticulture were the main source for acceleration in growth rate of agriculture output in the initial years of reforms. However, the situation for agriculture turned adverse with the beginning of the year 1997/8. The growth rates in the output of fruits and vegetables and fisheries decelerated. The deceleration is also seen in the case of livestock sector. Non-horticulture crops and cereal groups experienced negative growth after 1996/7. **These growth rates are lower than the growth rates in rural population and workforce employed in agriculture, clearly implying that per capita income in agriculture is declining.** This is one of the major factors explaining rising rural distress in the country.

Table (2): Growth rate in output of various sub sectors of agriculture at 1993-94 prices

Period	Crop sector	Live-stock	Fishery	Fruits and vegetables	Non–horticulture crops	Cereals
1980/81 to 1989-90	2.71	4.84	5.93	2.42	2.77	3.15
1990/91 to 1996/97	3.22	4.12	7.41	5.92	2.59	2.23
1996/97 to 2003/04	0.61	3.76	4.28	3.66	-0.31	-0.11

An indication of slowdown in farm incomes can be obtained by looking at the level and growth of agriculture GDP per agriculture worker (Table-3). During 1970s Value added per worker in agriculture increased annually by 0.7 percent. The growth rate accelerated to 1.18 percent during 1980s. During the last decade agriculture GDP per worker increased merely by 0.29 percent.

Table (3): Level and growth in per worker agriculture GDP at 1993-94 prices

Period	GDP agriculture per agriculture worker (Rs.)	Growth rate in previous 10 years (%/year)
1969/70 to 1973/74	9049	
1979/80 to 1983/84	9699	0.696
1989/90 to 1993/94	10902	1.176
1999/00 to 2003/04	11223	0.291

One of the most notable achievements of Independent India is that through green revolution technology the country could achieve self-sufficiency in food at the national level. It was in a position to address the problem of mass hunger, starvation and food shortages, although the achievements in this respect were far from satisfactory due to the failure to generate adequate employment and purchasing power for the poor. However, slowdown in the growth of agricultural output in the recent years is posing a serious threat to food security.

There are serious concerns relating to the adequacy of nutrition intake. While output of cereals increased at a much faster rate than population during the post-green revolution period till mid 1990s, output of pulses remained almost stagnant. Consequently, **per capita availability of pulses, which is a major source of protein in the country, showed a sharp decline (Table-4). Thus protein deficiency remains quite high in the country. Now, even cereal production has stagnated causing per capita availability to decline. This requires renewed emphasis on food security aspects of agriculture.**

Table (4): Per capita per day availability of foodgrains in India since 1971

(Unit: grams)

Period	Cereals	Pulses	Foodgrains
1971-1975	393	44	437
1981-1985	417	39	456
1991-1995	445	37	482
2001-2005	414	32	446

Sustainability of Natural Resources

While the need for accelerating agricultural growth is obvious, natural resource base in the country is shrinking. There are also signs of degradation of land and overexploitation of groundwater.

LAND:

Land resources are getting degraded through soil erosion, salinity and alkalinity, and chemicalisation. On the basis of the information provided by the Department of Land Resources in the Ministry of Rural Development, it appears that nearly 2/3rd of our agricultural land is degraded or sick to some extent and only about one third is in good health.

Productive capacity of land is declining due to nutrient mining, imbalance in the application of soil nutrients, neglect of micro nutrients and inadequate application of organic fertilizers and reduced green manuring. Organic carbon and microbial activities in our soils have declined which is reducing the productive capacity of our soils and fertilizer response. Incremental output per incremental unit of nutrients has been more or less constant and much below the responses achieved in farmers' field trials; given the water-seed-fertilizer synergy, one would have expected the response to increase.

WATER:

Rapid expansion of water exploitation for irrigation has been a key factor in the relatively high growth of agriculture achieved between the mid sixties and the late eighties. But the possibilities of further expansion in the volume of supplies are dwindling partly because the scope for expansion of surface irrigation is limited and more importantly because of over-exploitation of groundwater.

There is growing evidence of water table in several states getting depleted at a fast rate as water withdrawal is fast exceeding the recharge. Water table has fallen more than 4 meters since 1980 in 264 districts including groundwater rich Indo- Gangetic plains. The problem in the case of groundwater is to contain rather than increase the rate of extraction.

Farmers in agriculturally progressive states are now chasing water at deeper level. This is posing several problems. Large investments needed for pumping out water from deeper aquifers are reducing crop profitability and making it unviable for smaller sized holdings who are forced to abandon farming. Withdrawal of water from deeper aquifers increases the risk of water intrusion from other aquifers having brackish water. In hard rock area of peninsular India overexploitation of water has led to mining of water from deeper aquifers and ultimately to borewell failure. Even the deeper borewells did not last for long. These heavy investments made by incurring debt have not only depleted groundwater but also devastated farmers in the region.

Even as the prospect for increasing the volume of water for irrigation is diminishing,

the growth of demand for water both for irrigation and for other uses is unabated. This leads to increasing competition for limited supplies and attendant water conflicts between states, uses and users. Under these conditions, the prospects for increasing the growth of agricultural output at sustainable rates depends crucially on making more prudent and efficient use of water by reducing all avoidable waste and measures – institutional and economic – to get more per unit of water used.

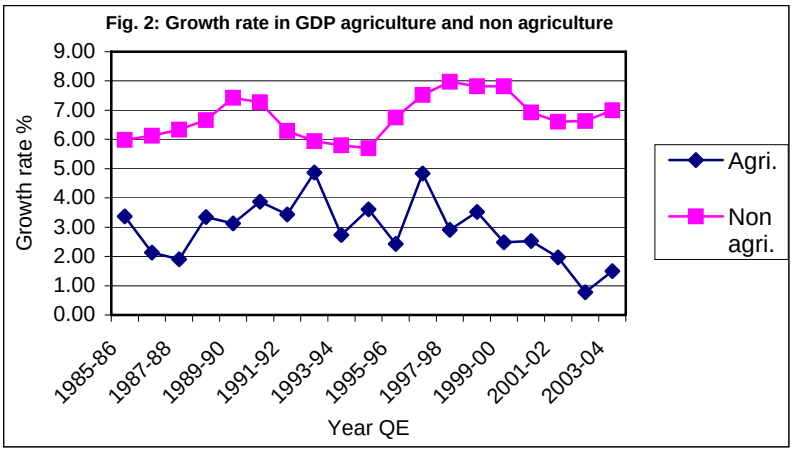
Soil, water, biodiversity and forests – which are the ecological foundations for sustained advances in productivity, are under severe anthropogenic pressures. In many parts of the country the carrying capacity of the ecosystem has been exceeded. Modern agricultural practices are contributing to genetic uniformity of crops with vast tracts of lands sown with the same genotype extending into even neighboring countries. This genetic uniformity makes agriculture highly vulnerable to unforeseen weather and pest/pathogen situations. Current problems of natural resource sustainability are being compounded by the possibility of adverse changes in precipitation, temperature and sea level due to global warming and climate change.

Equity

Another main concern is equity; inter-sectoral, regional (especially irrigated versus rain-fed areas), gender and size-class equity.

INTER-SECTORAL EQUITY:

Annual rates of growth in GDP agriculture and non- agriculture, based on five- yearly moving average series, beginning with QE 1984-85, are presented in Fig- 2. The two series of growth rates show that till early 1990s growth rate in agriculture sector was accelerating and the difference in growth rates between the two series narrowed down. After mid 1990s growth rate in agriculture decelerated very sharply whereas non- agriculture sector witnessed acceleration of growth to around 7 %. This created a large gap between the two sectors.



Faster growth in output of non-agriculture sector did not lead significantly to shifting of workforce from agriculture to non-agriculture sector. Between 1980-81 and 2000-01, the share of agriculture in GDP declined from 38.8% to 25.4 percent. The workforce engaged in agriculture in the same period witnessed a very small decline, from 60.5 percent to 58.4 percent (Table-5). **Slow growth in agriculture with no significant decline in labour force has created a serious disparity between agriculture and non agriculture as well as between rural and urban India.** This can be seen from the figures on value added per worker in agriculture and non-agriculture (Table-6): During the two decades after 1980/81 value added per worker in the non-agriculture sector has more than doubled whereas in agriculture the increase is less than 12 percent.

Table (5): Share of agriculture in economy's total output and employment

Year	Share in GDP at current price %	Share in Employment %
1980-81	38.8	60.5
1990-91	33.2	59.0
2000-01	25.5	58.4

Table (6): Value added per worker in agriculture and non- agriculture sectors at 1993/94 prices

Period:	Value Added per worker (Rs.)		Ratio of non-agri. to agri.	Growth in last decade (%/year)	
	Agri.	Non- agri.	Value Added	Agriculture	Non- agriculture
1978/9 to 1983/4	9961	28430	2.85		
1988/9 to 1993/4	11179	39355	3.52	1.16	3.31
1998/9 to 2003/4	11496	59961	5.22	0.28	4.30

REGIONAL EQUITY:

A major source of spatial inequality in agriculture is the growing disparity between rain-fed and irrigated agriculture. Productivity of rain fed lands are not only much lower than in irrigated areas but also more or less stagnant. Bulk of the growth has come from the expansion of irrigated area and increased productivity of irrigated land.

Covering 60% of the cultivated area, rain-fed farming continues to be critical for meeting the livelihood needs of a vast majority of small, marginal and tribal farmers. The greatest distress to farming and rural communities occurs in areas experiencing low and uncertain rainfall. Despite the development of new technologies in respect of crops, resource management, livestock and fisheries during the last 3-4 decades, the farm level adoption and impact on the farmers' income and livelihood in these disadvantaged areas has not been as significant as in irrigated areas.

This is mainly due to the low and highly fluctuating productivity and the low risk-bearing capacity of the rain-fed farmers, for whom risk aversion is more important than productivity enhancement. Low rainwater use efficiency and the constant threat of water scarcity and drought aggravate the situation. Land degradation and declining soil health, acute fodder shortage and poor livestock productivity are the other serious constraints. These challenges are compounded further by a large number of institutional, policy and infrastructural constraints like the lack of assured and remunerative prices and other marketing opportunities.

GENDER EQUITY:

For ages women in rural India, as in the rest of the society, have been denied rights to property, e.g. land and housing, access to other productive resources and power in decision-making. All the same, they are made to shoulder greater work burden at home and in the field. Their lack of control over household income and expenditure results in foods insecurity causing malnutrition for them and their children even when their household incomes rise above the poverty line.

The position has deteriorated in the post-form period, since the nineties, when there is a deceleration in the growth of agricultural output and employment and also a slow down in the growth of rural non-farm employment. **The out-migration of men, driven mainly by rural distress in this period, has added to the misery for rural women left behind who have had to share greater work burden in their fields without the necessary rights on**

land, access to resources, knowledge and skills.

The approach to gender equality in the Plans has remained piecemeal and fragmented both in terms of policy objectives and programmes. Moreover, the gender question has been approached largely in terms of welfare improvement, with little attention to its potential contribution to the efficiency of production, good governance, and the attainment of several objectives.

Without gender equality, other goals of development, namely, poverty alleviation, economic growth, environmental sustainability, social stability, and so on, will also be difficult to achieve. It is, therefore, time to place the achievement of gender equity as one of the central objectives and build it into the Plan's policies, programmes, strategies, and targets.

VIABILITY OF SMALLHOLDERS:

More than 80% of agricultural holdings in India are of the size less than 2 hectare and more than 60% of farmers operate less than 1 hectare area each. The size of holding is shrinking further as sub-division of holdings takes place consequent to the increase in population. **As attractive employment opportunities in the non-farm sectors are limited and are growing at a very small rate there is very slow shift of labour force from agriculture to non-agriculture.** Consequently, farm households are forced to make their living from income earned on smaller land holdings. **Improving the viability of smaller size holdings and imparting competitiveness to small farm production by providing access to new technology, inputs and credit through appropriate institutions continues to remain a big challenge**, as the performance in this respect has been far from satisfactory.

Income from two other supplementary sources for this section namely agricultural labour and their share in livestock income have also declined.

Efficiency

Efficiency may not have surfaced as a serious issue in Indian agriculture till recently. For one thing, as there was scarcity of food in the country the policies encouraged increase in production rather than reducing average cost of production. Two, the adoption of new technology, which resulted in an upward shift in production function, led to a reduction in average cost of production but without adequate emphasis in resource use efficiency. Three,

agriculture sector was, by and large, insulated from competition from abroad through strict regulations on imports.

With liberalization, however, the issue of efficiency has become highly relevant as domestic production has to compete with products of other countries. In the recent years domestic prices of several agricultural commodities have turned higher than international prices. India is not able to check import of a large number of commodities even at high tariff. This is true not only in the case of import from developed countries where agriculture is highly subsidized but also in the case of products from developing countries. India is facing severe import competition in the case of items like palm oil from Malaysia and Indonesia, spices from Vietnam, China and Indonesia, tea from Sri Lanka and rice from Thailand and Vietnam.

Under these circumstances, the role of domestic output pricing policy in assuring a reasonable return to farmers is likely to be limited. Cost reduction is imperative for increasing producers' profit margins, inducing larger investments in yield-augmenting technological improvements, containing the adverse environmental impact of misuse of water and agro chemicals, and for sustainability of growth.

Efficiency in trade involves efficiency at the level of production, marketing, processing, transport etc. Farmers in India are at a considerable disadvantage compared to developed countries in respect of storage, marketing, processing, transport and post-harvest infrastructure in general. For several commodities, transport cost from surplus to deficit states is much higher than freight from other countries to India. In the case of edible oil, high costs of oil seed processing and extraction, which in turn are related to low capacity utilization and lack of modern technology, are a major factor for poor competitiveness of India's oilseed sector. To compete in the global market, the country needs to reduce various post- harvest costs and undertake suitable reforms to improve efficiency of domestic markets and delivery systems.

International prices for most of the agricultural commodities are moving on a downward trend in real terms. This represents a secular trend attributable to the generally inelastic demand for agricultural products. This suggests that to compete in a liberalized environment, domestic prices must follow similar trend. This is not possible without technological breakthrough and reduction in cost of production, among other things, through crop shifts to efficient regions.

To be able to successfully compete in a liberalized trade regime, therefore, there

is need for a paradigm shift from merely maximizing growth to achieving efficient growth.

There are glaring inefficiencies in the use of water, fertilizer, and other resources. While technologies and practices to increase efficiency in the use of various inputs are available, their adoption is very low owing to the lack of necessary incentives and the institutional framework.

Vulnerability

Agriculture production and farm incomes in India are severally and frequently affected by natural calamities like droughts, floods, cyclones, storms, landslides and earthquakes. Susceptibility of agriculture to these disasters is compounded by the outbreak of epidemics and man-made disasters such as fire, sale of spurious seeds, fertilizers and pesticides, price crash etc. All these events affect farmers severely through loss in production and farm income, which are beyond the control of farmers. **With the rise in capital-intensity and increasing use of purchased inputs in agriculture, in the face of natural calamities and other man-made disasters, vulnerability of agriculture households has increased considerably.**

The increase in vulnerability in agriculture income at macro level is indicated by recent slow down in growth along with increased volatility of the growth rate. The standard deviation in agriculture GDP growth rate has increased by 50% between 1985/6 to 1995/6 and 1995/6 to 2004/5 (Table-7).

Table (7): Risk revealed by instability@ in GDP agriculture

Period	Instability %
1985/6 to 1995/6	4.16
1995/6 to 2004/5	6.58

@ Instability indices measured as : st.dev $[\ln(Y_{t+1}/Y_t)]$

Risk management in agriculture ranges from informal mechanisms like avoidance of risky crops, diversification across crops to formal mechanisms like Minimum Support Price, agriculture insurance and futures market. Advantage of MSP as a cover for price risk is available on a limited scale. CACP reports show that **farm harvest prices of various commodities often fall below MSP across space and crops in the markets where MSP is not effectively implemented through a system of state procurement** (Appendix Table-I). The primary crop insurance scheme of the country, namely, the National Agriculture Insurance Scheme, covered only 10-15% farmers, 9-16% crop area and 2.25 -3.56% of the

value of crop output in different years during the last five years of its implementation. **As the institutional arrangements for meeting income losses caused by natural disasters and other unfavourable events are either non- existent or very weak, farm households often turn to private sources which leads to indebtedness and ultimately to loss of productive assets.**

III
CAUSES UNDERLYING THE POOR STATE OF AGRICULTURE

Performance of agriculture is affected by a large number of factors, several of which interact among themselves. These factors comprise natural resource base including rainfall, infrastructure including irrigation, technology, inputs, price environment and institutions.

Public and private investment in infrastructure including irrigation, technological change and diversification are the three major sources of agriculture growth in India. But the progress on these fronts slowed down since the 1990s. While impact of rainfall continues to be strong, agriculture growth responds significantly to diversification (represented by the area under fruits and vegetables) and technology (represented by the yield potential of the varieties released since 1980s in respect of six major crops, viz., paddy, rapeseed/ mustard, groundnut, wheat, maize and cotton). Impact of public and private investments together is also quite strong (Table-8).

Table (8): Elasticity of GDP agr. with respect to selected variables and their growth rates

Factor	Elasticity	Growth rate in each factor		
		1981- 2004	1981 to 1991	1992 to 2004
Technology	0.308	2.69	2.93	1.81
Public investments	0.174	-1.40	-4.07	1.76
Private investments	0.128	3.93	4.05	2.83
Area under fruits/vegetables	0.458	2.75	3.06	2.30
Fertilizer	0.122	5.02	8.18	3.20
Rainfall	0.186			
GDPAgri		**3.04**	**3.29**	**2.55**

Source: An exercise done for the Steering Committee by Dr. Ramesh Chand, a member of the Committee.
Note: This model which takes overall GDP agriculture and overall investment was found satisfactory out of set of equations which included Value of crop output as dependent variables and irrigation as explanatory variables.

Since all the factors (except public investment which shows a marginal rise following a significant decline during the 1980s) show a deceleration after 1991, the net impact has been a deceleration in output growth.

A more simple but subtle explanation for deceleration in agricultural output in the recent years can be found by looking at growth rate in various factors that affect agricultural

output directly or indirectly. Table (9) shows that as compared to 1980s, there was a sharp increase in terms of trade for agriculture during the initial years of reforms. Agriculture prices relative to non- agriculture prices increased annually by 0.95 percent. There was also some improvement in the growth of irrigation during the early years of reforms. Public sector investments did not grow during these years and consequently growth in the stock of public sector capital formation declined from 3.86 to 1.92%. However, the growth of private sector investments in these years was about four times the growth during 1980-81 to 1990-91. This resulted in the same growth rate in total capital stock in agriculture during 1990-91 to 1996-97 as seen during the decade of 1980s. The pace of expansion in gross cropped area and the pace of diversification were also as strong as during 1980's. There was a sharp decline in the growth of fertilizer use and electricity used in agriculture but this seems to have been compensated by expansion in area, irrigation, diversification, and movement of terms of trade in favour of agriculture.

Table (9): Trend growth rate in area, input use, credit and capital stock in agriculture in different periods during 1980-81 to 2003-04: percent/year

Period	1980/81 to 1990-91	1990/91 to 1996/97	1996/97 to 2003/04
Gross irrigated area	2.280	2.620	0.510
NPK Use	8.170	2.450	1.330
Electricity consumed in agriculture	14.070	9.440	-0.860
Area under fruits and vegetables	5.600	5.600	4.800
Terms of trade	0.189	0.947	-1.693
Public sector net fixed capital stock	3.856	1.917	1.419
Private sector net fixed capital stock	0.562	2.179	1.165
Total net fixed capital stock	2.004	2.055	1.282
Credit supply	3.728	7.513	14.366
Total crop area	0.430	0.430	-0.480
Net sown area	-0.080	0.040	-0.550
Cropping Intensity	0.510	0.390	0.070

After 1996/7, almost all the factors turned unfavorable for growth of agriculture output. Net sown area witnessed a decline at the rate of 0.55% which was not compensated by increase in cropping intensity, so that gross cropped area also declined. The biggest set back to the output of crop sector came from a decline in the terms of trade for agriculture and slowdown in the expansion of irrigation. Terms of trade for agriculture after 1996/7 declined annually by 1.69. Liberalisation of trade has led to increased integration of domestic market with international market. Accordingly, the downward trend in international prices of agricultural commodities after 1997/8 has been transmitted to domestic prices resulting in deterioration in TOT for agriculture.

As compared to 2.62% annual growth in irrigated area during 1990/91 to 1996/7, the later period showed an annual expansion in irrigation by just 0.51%. The main causes of slowdown in irrigation are (a) deceleration in public and private sector capital formation after 1996/7, (b) decline in electric power to agriculture most of which is used for tubewells, and (c) stress on water resources.

The pace of diversification also slowed down in the recent years. Thus, the main factors which led to the slowdown in agriculture at the national level after 1996/7 are:

(a) deterioration in terms of trade for agriculture
(b) poor progress of irrigation and fertilizer,
(c) decline in supply of electricity to agriculture
(d) slowdown in diversification
(e) stagnant crop intensity
(f) decline in area under cultivation, which seems to be the result of expanding urbanization and industrialization.

Other factors which caused adverse impact on agriculture growth are: failure of irrigation to raise crop intensity, weakening production response to inputs, technology fatigue, missing links in seed production and distribution, and the near collapse of public extension system.

Deficiency in Rural Infrastructure

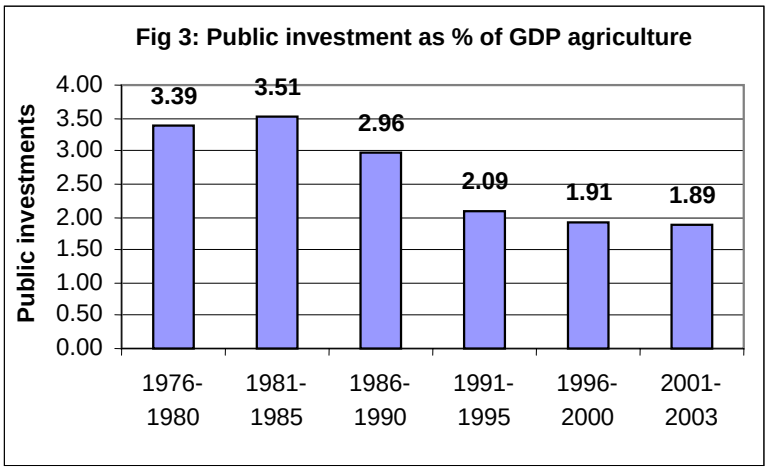
Since 1980-81, public sector capital formation in Indian agriculture has continuously shown a declining trend, with some short breaks. Of late, there is some improvement in rural road connectivity and communications, but progress in respect of irrigation, technology and in institutions bearing on producer incentives and efficiency of resource-use is far from satisfactory. There was an increase in private investment nonetheless the ratio of total investment to GDP agriculture declined.

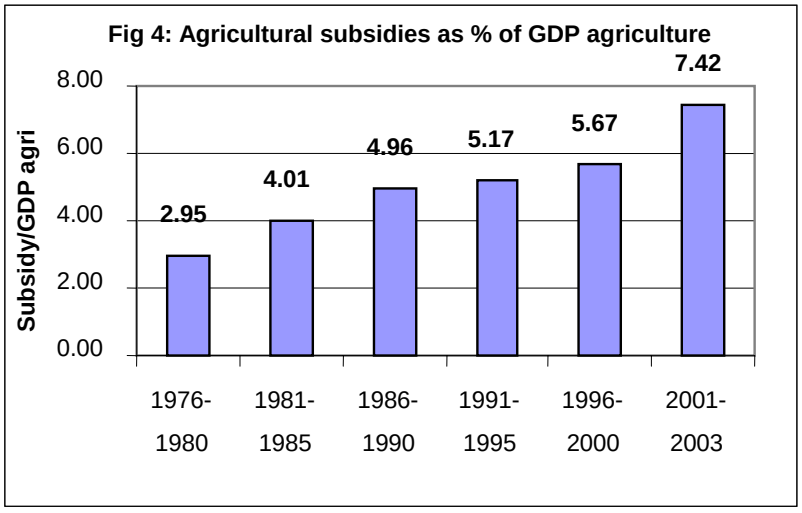
It is pertinent to observe that the decline in public sector investments in agriculture after 1981-85 coincided with the increase in subsidies on surface irrigation, power and fertilizers (Table-10; Figs. 3 and 4). During the five years from 1980-81 to 1984-85, the level of public investment was at 3.5% of GDP agriculture while subsidies were at 4.0%. Between 1985-86 and 1989-90, the magnitude of public investments declined to 2.96% of agriculture GDP whereas the level of subsidies rose to 4.96%. This trend is continuing since then. During 2001-2003, public investment declined to 1.89 % of agriculture GDP as against the rise in subsidies to 7.42% of this GDP.

Table (10): Trend in investments and subsidies in agriculture expressed as percent of GDP agriculture

Period	Total	Public	Private	Subsidy	Public investment and subsidy
1971-1975	4.99	2.04	2.95	1.21	3.25
1976-1980	7.07	3.39	3.68	2.95	6.34
1981-1985	7.28	3.51	3.77	4.01	7.52
1986-1990	7.05	2.96	4.09	4.96	7.92
1991-1995	6.69	2.09	4.60	5.17	7.26
1996-2000	6.36	1.91	4.45	5.67	7.58
2001-2003	6.69	1.89	4.80	7.42	9.31

Source: National Accounts Statistics.





Burgeoning subsidies are thus competing for scarce resources impinging upon the government's ability to invest in key areas. The above figures suggest that a reduction of farm subsidies even to the extent of one-fourth could enable the government to nearly double its investments in agriculture in crucial areas like irrigation and other infrastructure.

Some studies show that a rupee going into public investments is several times more productive in terms of output growth than when it is deployed as a subsidy. Diversion of resources from public investments to subsidies has other adverse consequences: **Subsidy schemes are more prone to misuse and leakages. In several cases they are doing more harm than good through the over-use of water resources, degradation of land, and imbalances in the use of plant nutrients resulting in wastage and inefficiency in resource use.**

Degradation of Natural Resource Base

The main reasons for degradation of natural resources are increasing pressure of human and animal population on natural resources, policies like free power for irrigation leading to the overexploitation of water resources and the lack of participatory management of natural resources. Various government programmes for natural resource management suffer from institutional weaknesses in their design, implementation and management. In the case of groundwater, for example, where the regulation has been entirely with the government, it has been marked by opaque and lax governance and in many respects contributed to degradation. Government policy on fertilizer subsidy has distorted prices in favour of nitrogenous fertilizer which has caused nutritional imbalances in large parts of the country, adversely affecting land productivity.

Conservation and Improvement of Rain-Fed Land

Degradation of land due to soil erosion, inadequate and unreliable rainfall and poor capacity of soils to absorb and retain moisture in rain fed-lands; and the deterioration of soil structure and quality due to excessive and imprudent use of water and agro-chemicals on irrigated lands are important factors dampening agricultural growth. Though numerous programmes for improvement of rain-fed lands have been taken up and substantial amount of money has been spent on them, they have had little effect because of poor design and even poorer implementation

Watershed development has been a major strategy to make sustainable use of natural resources in rain-fed areas. A serious problem with the approach on

watershed development is that projects are mostly planned and implemented by government departments in a piecemeal and fragmented manner without actively involving the beneficiary communities. Effective institutional arrangement for continued maintenance of the physical structure and regulation of access to their usufructs is conspicuously absent or dysfunctional. Several committees have pointed to this serious lacuna and argued for the necessity for participatory community level institutions in all stages of watershed development. Also, evaluation studies of Watershed Development programmes by various agencies indicate that in most cases large and medium farmers derive direct benefits while small farmers and labourers who constitute bulk of the watershed community are generally passive beneficiaries of employment provided during the execution stage.

Technology Development and Dissemination

The goal of 4% growth in agriculture can only be achieved by increasing productivity per unit of land. Considering the costs and constraints of resources such as water, nutrients and energy, the genetic enhancement of productivity should be coupled with input use efficiency. This can be made possible only by creation and utilization of new and improved technology. Since new technology creation and development is a slow process, for attaining the desired 4% growth during the XIth Plan period, we will have to rely more on known and proven technology. Agriculture research system claims to have a large number of promising technologies to achieve high growth and promote farming systems that improve natural resource base. However, these are not seen at farmers' fields at large.

Firstly, there is some confusion about technology and protocol. Majority of the technology claims are in fact protocols/techniques, which have not been adequately scaled up, or properly validated. Secondly, performance of a technology at the research farm and farm demonstration trials is shielded from constraints of resources and technical skills. On the other hand, technology in the hands of the farmer fails to reproduce faithfully due to the problems in arranging timely resources and inadequate knowledge and skills with the farmers. In fact, the claimed technologies in most cases are workable only under limited situations and are not robust enough to deliver under widely varying situations encountered at the farmers level.

Most of the agricultural research in India is adaptive wherein technologies developed elsewhere are re-tailored to fit to our needs and situations. International collaboration, interaction, training and general preparedness are, therefore, essential to utilize the emerging technologies. However, the system is too rigid and sluggish to reap quick benefits.

The system does not seem to be fully equipped to address the complex and challenging tasks before it. The reasons for this are several. **Agricultural research is underfunded.** Salaries are paid, but contingencies, so essential for research, are inadequate, particularly in state agricultural universities. A major part of the national agricultural research system consisting of **ICAR and its network has been frequently reviewed by eminent experts, but its highly centralized, hierarchical and bureaucratic set-up has not responded to the need for change. The available resources also have not been optimally utilized because of lack of clearly stated strategy and rational prioritization of research agenda.** For example, there is lack of consensus and clarity in the country on genetically modified crops. This frustrates scientific efforts on technologies that hold promise for future. The existing set-up has, of course, served important purpose in the past but using modern scientific developments to respond to future agricultural challenges through retaining scientific talent and ensuring quality output from them require some radical changes in the system.

There are multiple institutes focusing on the same aspects and considerable overlap is observed in the research mandates and work of SAUs and ICAR. This often leads to wastage of scientific manpower and resources. **Further, most of the wok on product development is carried out in research mode and hence is not clearly geared up to deliver products.** Similarly, although we claim to have a large number of trained scientific manpower, the level of skills and competence necessary for making great strides in technology development is sadly lacking. In fact, the limited number of well qualified scientists are burdened with too many tasks which affects even their output.

Frontline demonstrations of various departments provide clinching evidence of large gaps between what can be attained at farmers' fields with the adoption of improved technology and what is obtained with the existing practices followed by the farmers (Appendix Table II.1 to II.9). This is a clear pointer to the large potential for raising output through the effective dissemination of technology, especially in the eastern Gangetic Plains. But this is not happening because of the absence or weak Research-Extension-Farmer linkages. While better extension network can help in bridging the gap, to some extent, **realization of demonstration trials yields at farmers' field on a large scale would require technologies adaptable to wider regional variations.**

The Country has built an extensive network for research on all the aspects in the public sector but the performance has been uneven. Majority of the technology claims pertains to improved varieties. Although high genetic potential of the variety is the foundation of productive agriculture, there appears to be overemphasis on this aspect and

lack of attention to other down stream needs. Further, while improved varieties and technologies have increased the yield potential of, and returns to, irrigated rice and wheat but **the flow of improved varieties and production technology for rain-fed crops and regions with relatively low rainfall has been uneven in both pace and magnitude. The research system is geared, both in terms of priorities and for judging performance, mainly to breeding varieties of individual crops to the neglect of basic problems concerning cropping systems and cultivation practices for prudent, efficient and sustainable use of land, water and chemical inputs. Research has tended to focus mostly on increasing the yield potential by more intensive use of water and bio-chemical inputs. Far too little attention has been given to the long-term environmental impact or on methods and practices for the efficient use of these inputs for sustainable agriculture.** These features are widely known. But efforts to correct them have not been adequate, at any rate have not made much of a difference.

Slow Rate of Diversification

Livestock sector in India has been growing at a faster rate than crop sector which has raised its share in total output of agriculture sector from 17.3% during 1980-81 to 27.5% in the recent years. However, after mid 1990s, the growth rate of livestock output too decelerated, the major reason being the slowdown in the growth of crop sector, as there is a high complementarity between the two sectors.

India's livestock sector is quite large and the next food revolution could well be based on the growth of livestock output. As of now, productivity of livestock is awfully low. The reasons for this are many: huge unproductive stock, poor genetic resources, scarcity of feed and fodder, prevalence of crippling animal diseases, little attention to livestock health, unorganized and underdeveloped market for the sale of livestock products and very low public and private investment in the sector.

Like livestock, fishery also witnessed high growth, particularly following trade liberalization and export promotion during the early 1990s. However, its growth also declined after the mid-1990s, due to unscientific catch and over-extraction of marine fish, unplanned development of fish in coastal areas and neglect of inland fishery.

Market Infrastructure and Regulation

Assured marketing and prices provide the best incentives for farmers to invest in agriculture. Crops like pulses, oilseeds, maize, pearl millet and soybean etc. need market support as for wheat and rice. Agricultural markets are still underdeveloped and in **several**

cases farmers do not receive remunerative prices. This can be seen from the prices received by farmers as compared to the minimum support prices, which indicate the minimum level of price below which production is not remunerative. As mentioned before, in the case of a number of crops in many markets the actual price remained lower than MSP and in some cases the gap is very large (Appendix Table- I). This is because there are no arrangements for procurement at support prices for quite a few crops in several parts of the country. Thus, the MSP in such cases is only notional and not effective.

In Central and Eastern states having a large potential like Bihar, East Uttar Pradesh, Orissa, Assam, Chattisgarh and West Bengal, marketing infrastructure is very underdeveloped and private trade is exploitative. As such, the incentives for the adoption of new technology in such areas are very weak.

The disconnect between off-season market price and prices in the harvest season has widened in the recent years. Due to various market imperfections, there is strong asymmetry in transmission of price between retail and wholesale level and farm level. While increase in farm prices are quickly and wholly transmitted to retail level there is very slow and partial transmission of increase in retail prices and wholesale prices to farm level.

Market and post- harvest infrastructure has not kept pace with the growth of output over time. Agricultural markets are crowded, dominated by small scale operators who can hardly think of improving operational efficiency and scale advantage. The mere presence of a large number of market functionaries does not promote competition; rather it increases price spread. There are also reports of collusion among middlemen and malfunctioning of regulated markets in ensuring fair and proper grading, weighing and auction procedures.

Post-harvest infrastructure in handling, transport, processing and ports remained awfully poor. **The potential of private sector to contribute to agriculture growth and benefit farmers through participation in marketing and processing remained largely unrealized because of various types of restrictions and regulations. Reforms to improve and address this situation at state level are slow and reluctant.**

Status of Farm Women

Apart from women's lack of formal titles to the fields they cultivate, discussed in the previous section, **since women are not formally recognized as farmers but are seen merely as helpers on family farms, agricultural extension agents who provide information on new production-enhancing techniques and new farmer-support**

programmes seldom contact women. Second, existing farmer support institutions, including farmer's cooperatives, are structured with male farmers in mind, both in terms of location and forms of interaction. Given social norms and domestic responsibilities, women are far less mobile than men and less able to use these male dominated institutions effectively. Institutions catering to women farmers will need to have special features that help overcome these social constraints. It is notable, in this context, that one of the features of micro credit schemes is that women can avail of them within the village itself. There is gender bias in the functioning of institutions for information, credit, inputs and marketing.

Imperfections in Land Market and the Plight of Small Farmers

There is significant migration of resourceful farmers owning agricultural land from rural to urban areas. The land left behind by them either remains underutilized or even left fallow. Some of them do not want to sell their lands and some do not find the price attractive enough for selling land as **the small farmers genuinely interested in cultivation do not have resources to purchase land.** In several cases the land is purchased by the wealthy for speculative purposes. There is a lot of interest in cultivating such land through lease arrangements, but owners of land avoid such leases for fear of losing the ownership of their land due to the tenancy laws operating in various states. **Such of the land as is leased out, is on oral tenancy for a short period, which discourages productive investments in land by the tenants. This is harming equity as well as efficiency in resource-use.**

IV
THE WAY FORWARD

Accelerating Growth

Based on the recent experience on the factors underlying growth, livestock, fishery and forestry sectors can be expected to make higher contribution to output growth as compared to the crop sector including horticulture. On this basis, to achieve an overall agricultural growth of 4% during the 11th Plan, the target growth rate for four sub-sectors of agriculture suggested by the Working Group on "Crop Husbandry, Agricultural Inputs, Demand Supply Projections and Agricultural Statistics" are:

Table (11): Proposed growth rates from different sub-sectors of agriculture

Sub sector	Output share %	Proposed growth rate % per annum
Crops	46	2.7
Foodgrains	26	2.3
Oilseeds	6	4.0
Other crops	14	3.0
Horticulture	21	5.0
Livestock	25	6.0
Fisheries	4	6.0
Forestry/logging	4	0.0
Total		4.10

Though there are serious doubts about the credibility of estimates of output of sub sectors like horticulture and their contribution to agriculture growth, the Committee relied on the available data for exploring possibilities to achieve 4% growth in agricultural output during 11th Plan. Based on the estimated contribution of various factors, the possibilities of output growth during the 11th Plan period are explored (Table -12). Assuming that use of fertilizer during 11th plan increase annually by 3%; area under fruits and vegetables increase by 2%; and technology frontier increase by 1% per annum they can contribute 0.32%, 0.92% and 0.30% growth in output. These growth rates in fertilizer use, technology and diversification towards fruits and vegetables do not appear on the high side in the light of the recent as well as the long-term growth rates experienced in Indian agriculture. This leaves a gap of 2.46% growth in output to reach target of 4% growth rate and the options are growth in private and public investments.

Table (12): Growth in various factors needed to achieve 4% growth rate in agriculture

Source	Implicit factor growth	Output Elasticity*	Output growth
Fertilizer	3.0	0.106	0.318
Technology	1.0	0.308	0.308
Area under fruits and vegetables	2.0	0.458	0.916
Public Investments	11.9	0.174	2.067
Private investments	4.0	0.128	0.512
All sources			**4.121**

*The output elasticities used are from an exercise done for the Steering Committee by Dr. Ramesh Chand.

In the case of private investments, the assumption is that 4% of GDP Agr. would be ploughed back into agriculture, as was the case during the base year 2005-06. This would imply 4% annual growth in private investments which can provide 0.51% growth in output. Still it is half way the targeted growth rate of 4%. **The Committee believes that there is need for a major step-up in public investments in agriculture. Accordingly, the Committee recommends that the level of public investment be raised to 4% of GDP Agr. This would imply that public investments, at 1999-2000 prices, would be raised annually by 12% during 11th Plan.** This increase in public investment could result in output growth of 2.06 percentage points. Most of the public and private investments are expected in the area of irrigation with a view to adding around 3 million hectares per annum, watershed development and infrastructure for livestock and fisheries. **To ensure speedy completion of irrigation projects, the formula for central assistance, which is uniform across states regardless of their resource position, needs to be made flexible for providing liberal assistance to the poorer states where the potential for the development of irrigation is high.** Similarly, higher subsidy could be thought of for community-based projects.

The contributions of all the five factors, if they grow at the rates envisaged in Table 13, sums up to 4.1%. However, it is not as simple as the exercise done in above Table. For instance, favourable terms of trade, adequate credit supply, and increase in power supply to agriculture are some of the factors necessary for achieving stipulated growth in fertilizer and private investments. Similarly, progress in technology would require high performance of agricultural R&D system. Increase in public investment at 12% per annum at 1999-00 prices requires higher resource allocation for agriculture. There is enough potential to productively deploy public investments. Irrigation is one such area. The ultimate irrigation potential in the country has been estimated to be 139.89 mha (Major and medium 58.46 and minor 81.43), out of which 99.31 mha has been created by March 2005. If India fully exploits its irrigation

potential in next 15 years, it can attain 2.31% annual growth in area under irrigation.

Favourable institutional and regulatory environment, strong extension system, and improved rural infrastructure are some of the other conditions necessary for achieving 4% growth. In particular, there is a need for a continuous sector-wise monitoring of the potential for growth, the content and coherence of proposed programmes, the content and rationale of public sector plan expenditure especially for the loan/subsidy components, and greater clarity on the role of public and private sectors in terms of nature of physical investments and their financing, as well as policy environment.

The Accelerated Irrigation Benefits programme (AIBP) and watershed development already envisage a large step up over earlier plans. This is also true of minor irrigation but there are doubts about the desirability and/or effectiveness of proposed targets without major improvements in planning and implementation. There is a case for significant increase in outlays on rehabilitation and physical modernization of existing surface systems (both major and minor); rationalized and focused research programmes, and afforestation as well as more and better common service facilities that serve agriculture.

We need to focus not just on the volume of investment expenditure, but much more on their relevance for increasing production potential; reducing the proliferation and duplication of schemes and implementing agencies; tighter design and timely implementation of schemes; and reduction in waste and leakages. We also emphasize the importance of active involvement and participation of elected panchayats in planning and implementation of local works for agricultural and rural development for increasing the efficacy of public investment.

Output Growth and Demand Driven Diversification

We have seen in the previous section that diversification of agriculture is emerging as a major source of growth. As the experience of East and South-East Asian countries shows, the significance of this factor will increase as the consumption pattern gets diversified. Already, the data clearly shows that per capita direct demand for total cereals is on the decline in rural as well as urban India, while per capita demand for high value products like fruits, vegetables, milk and milk products, eggs, meat is increasing (Appendix Tables III-1 & III-2).

Table (13): Projected growth rate and demand for various food commodities towards 2011-12

Food item	Projected growth rate	Demand:

		Million tonnes
Food grains	2.21	251.7
Milk and milk products	3.18	100.39
Meat	4.65	5.36
Eggs: Billion	4.62	35.77
Fish	4.58	5.91
Oilseeds	2.94	49.2#
Vegetables	2.51	92.93
Fresh Fruits	3.46	29.43
Sugar and gur	1.88	22.49

 # Assume 40% dependence on import for edible oil

Source: NCAP-ICAR In House Estimates

Note: Projected demand includes export in the same ratio as in the base scenario 2003-4 for foodgrains and in 2004-5 for others.

It is projected that the direct demand for food grains as food would grow at a slow rate but food grain demand in other uses like feed, industrial use, export etc. would grow at a high rate. Based on these growth rates, the total demand for food grains is projected to be around 251 million tonnes at the end of XIth Five Year Plan by NCAP and around 245 million tonnes by the Working Group of the Planning Commission on this aspect. In contrast to 2.21% growth rate in food grains, the demand for fruits is projected to grow annually by 3 percent and for livestock products in the range of 2.7 to 3.85 percent. Therefore, the supply of horticultural and livestock products must grow at a much faster rate than food grains to match the growing demand.

It should be noted that NCAP's projected growth rates in demand for fruits and vegetables and livestock products are lower than the output growth rates envisioned by the Working Group (Table 11) to achieve 4% overall growth rates in agriculture. Besides potential errors in data, this suggests that even with high growth in per capita income, growth in demand may not support 4% growth rate in output. Therefore the projected growth rate in agriculture can only be indicative.

Nonetheless, the emerging scenario of increasing diversification offers an opportunity for raising farm incomes significantly as the employment elasticity for these activities is quite high. However, there are serious marketing constraints and scale disadvantages for diversified agriculture, especially for small farmers. **Private sector engaged in agro-processing and agro-business in general can play an important role in promoting diversification both by providing assured market for output and inputs through contract farming.** These can provide high quality seed and technology as well as training to farmers by collaborating with public research and extension agencies, although the transactions costs to reach small farmers is high and will require public support to group

efforts by such farmers.

Livestock and fishery development need major changes in policies and infrastructure support. There is need to massively scale up and expand the breeding infrastructure for cattle and buffalo. There is scope for livestock improvement through selective breeding using better quality indigenous stock and there exists a huge gap between the requirement and availability of feed and fodder in the country. India also needs a comprehensive control programme for important diseases of livestock.

There is further a need for focused plurality of institutions for marketing of milk along with consolidation of cooperatives. For example, NDDB has proposed a National Dairy Plan (NDP) focussing on accelerating dairy development in 325 districts with major dairying potential with expertise and funding from a consortium consisting of NDDB, NCDC and NABARD. This proposal requires that the consortium receive some Plan funds and would involve withdrawal of existing DAHD&F schemes from these districts so that unduly high subsidies do not impede rationalisation of the co-operative sector and its ability to compete with private players. Under this proposal, NDP will not be in operation in the remaining 275 districts that shall continue to receive assistance from the State and Central Governments. This is an idea worth considering, although with the caveat that State governments should have the option of deciding whether a particular district chosen for NDP should join or retain existing DAHD&F schemes.

In fishery, there is a need for establishing more hatcheries uniformly distributed throughout the country and to ensure availability of stockable size of seed for ponds and tanks and reservoir sites. Shrimp farming in coastal areas should be developed in a planned manner. Activities of fishing fleet and leasing of water should be consistent with sustainable harvest of fish.

Animal husbandry, fishery and horticulture are thus important sources of growth and proposed strategies and programmes for these sectors, in particular the role of the public sector, need to be properly articulated. However, in view of the data infirmities and the possible shortfall of demand noted earlier, it needs emphasizing that a large part of agricultural growth during Eleventh Plan has to come from higher productivity of traditional staple food grains, oilseeds and fibre crops. Overcoming constraints in these segments thus remains a major task of agricultural development strategy.

Input Provisioning

Growth of agriculture is critically determined by the use of modern inputs like fertilizers, seeds, plant propagation material, other agricultural chemicals and by the

availability of credit to purchase these and other inputs. There is a need to ensure adequate and timely supply of all these inputs. Out of these, **supply of seed needs urgent attention as quality of seed is the basic determinant of productivity.** Most of our farmers do not distinguish between grain and seed, either because of ignorance or due to lack of ready availability of seed. **Here is a need to revamp the seed production and distribution system by strengthening public sector seed agencies and by involving private trade in seed multiplication and distribution system. Quality checks on inputs are becoming more important as the unscrupulous trade fleecing farmers by selling spurious seed, fertilizer and chemicals has been on the rise.**

Land and Water

The country needs to have a clear land use policy so that the demands for industrialization and urbanization are met without compromising on agricultural use. About two third of our arable land remains without use for most part of the year. Increase in cropping intensity by various means is an effective way to cope with land constraint.

Since water is emerging as the main constraining factor, particular attention needs to be given to check wastage. Land and water need to be used efficiently and on a sustainable basis. Rain water going waste needs to be captured and conserved. **Major emphasis is needed on water conservation and recharging schemes, including restoration and renovation of traditional water bodies, as an integral part of watershed development with the involvement of local communities and NGOs.** These need to be planned at the agro-climatic zonal level. There is need for a paradigm shift in promoting agricultural productivity not only per unit of area but also per unit of water and time.

This calls for a substantial shift of emphasis in investment priorities away from expansion of capacity to physical modernization of existing systems. This is necessary (a) to reduce avoidable waste in the distribution and application of irrigation water so that a larger proportion of water diverted/extracted at source becomes effectively available for consumptive use by crops; and (b) undertake major repairs to the distribution networks and install more and better devices to facilitate flexible regulation of water deliveries to different segments of the command.

For these physical improvements to be effective, major institutional reforms are essential. Experience has shown that the present arrangements in which the government is directly responsible for developmental, regulatory and management functions relating to water are chaotic and ineffective. Rules are fuzzy, often inconsistent and also open to arbitrary change. Enforcement of rules and punishment of violations, which are rampant and

in which the government agencies are themselves culpable, is extremely lax. It is therefore essential (a) to review the existing laws and regulations regarding access to water for different uses and users to make them transparent, internally consistent and better serve the interests of socially optimal use of this resource; (b) to vigorously promote Participatory Irrigation Management (PIM) by entrusting responsibility for making and enforcing rules of allocation, appropriate to local conditions, to autonomous and self-reliant organizations managed by representatives of users with professional staff accountable to them; and (c) to ensure that the government gives strong support to these institutions to check and punish violations.

Water being a common pool resource serving a large number of users, it is impossible to monitor the behaviour of individuals to ensure that its use is efficient, equitable and sustainable from the social viewpoint. Strong governance is essential but not sufficient. Therefore, **institutional changes to improve overall water governance need to be reinforced by creating strong incentives for individual users to make prudent and economical use of water. Increasing the effective cost of water for individual users and aligning the relative costs for different uses to serve social priorities is essential. This process is difficult and calls for a great deal of effort to raise the awareness of public at large, including the elected representatives, about the consequences of defective pricing and poor cost recovery, and convince them that there is considerable scope for economizing the use of these inputs without adversely affecting their output and incomes.**

In this context, the Committee recommends that at least one model project in each state for surface system may be seriously implemented during the Eleventh Plan for physical modernization, especially distribution network and installation of control structures and volumetric supply gauges; and entrusting management of the systems to an autonomous organization of elected representatives at all levels, with power to decide and enforce rules of allocation and levy and collection of water charges.

Rainfed Areas

Improvement in agricultural productivity and livelihood concerns are more challenging in rain-fed areas. These areas require a holistic approach for land and water management that harness synergies in natural resource use, crop and livestock production, and various government, non- government and community-based institutions. **The emphasis in production should be on farming system approach that integrates crop, livestock, agro-forestry, and horticulture. Wherever possible, agriculture development programmes in rain-fed areas should converge on watershed.**

Attention to soil healthcare needs to be given high priority. **Soil health cards, giving regularly updated information on major and micronutrients should be issued to all the farmers. This would require strengthening of soil testing labs in all parts of the country.** This would be a catalytic intervention which will increase productivity immediately. The provision of micronutrients like zinc and boron and sulphur can help to increase yield by over 50% in dry land farming areas. At the same time, **production and sale of bio-fertilizers, e.g. compost, organic manure and micro nutrients should be encouraged on a large scale through informal as well as organized production systems by providing appropriate incentives.**

The nature of interventions and the techniques to be used are fairly well known in general terms. But there is not enough systematized and tested knowledge regarding the nature of treatments appropriate for different agro-climatic conditions. A concerted effort to collate and codify available knowledge on this aspect for rain-fed lands under different rainfall, topographic and physiographic conditions, based on the experience of projects undertaken by various organizations in different regions in the country and in similar regions in other parts of the world, is essential. Gaps will need to be identified and research organized to fill them.

Numerous institutional structures are already available to the Government like SFAC, NHB, NDDB, Agri-clinics, Agri-business Centres, Food Parks, Agro-export Zones, several Commodity Centered Technology Missions, Watershed and Wasteland Development Programmes etc. Instead of starting many new schemes, what is needed is the revitalization and restructuring of existing schemes and institutional structures and improving the efficiency of delivery through convergence and synergy among the numerous on-going vertically structured programmes.

The constitution of a National Rain-fed Area Authority (NRA) is not sufficient by

itself. It can perform a useful function by sponsoring research on technical aspects and on impact evaluation, and serve as the medium for interaction and exchange of knowledge and experience between different regions. It can demarcate regions which are chronically drought-prone and those with relatively high and assured rainfall where agricultural productivity is high. The private sector and banks could be assigned a greater role in watershed development in such better endowed areas in collaboration with local communities. NRAA could also introduce changes in law to restrict individual's right to extract unlimited amounts of water from under one's plot, and vesting the right to regulate access to and use of groundwater and its pricing with village communities.

While the creation of the NRAA is an important step, it is important to focus on decentralization of planning and implementation along with the necessary resources, through coordinated effort by the relevant departments, down to the grass roots level. The existing guidelines for Watershed Development need strengthening to ensure (a) proper social mobilization and institution-building in the initial stages of the programme so as to ensure community participation on a sustained basis;(b) adequate attention to equity and livelihood concerns of the poor; and (c) convergence of the programmes undertaken by different Ministries at the watershed level so as to raise agricultural productivity.

Technology

Agricultural research has not witnessed a big breakthrough for a long time. Despite tremendous scientific developments in biological sciences in recent years, agricultural scientists have not been able to convert them into useful products. Even when technologies become available (for example transgenics and genomics), we are slow to recognize and adapt them to our needs. Considering the fact that returns on investment in research are slow to come, sustained and liberal funding of agricultural research is essential to safeguard the future of our agriculture and food supply.

Part of the difficulty in addressing current crisis in agriculture is attributable to our weakness in planning of agricultural research. There is, for example, no clear document on research/technology and skill requirements and approaches to meet the projected food demands for 2010 or 2020. In view of the above, there is an urgent need to set up an expert group to keep tab on emerging technologies and to suggest plan for their adaptation. Similarly, priority setting for research and technology development needs to be greatly strengthened. Such priority setting should take into account regional demands, crop species and trait needs etc. to foster equitable and all-round development. For instance, **research priorities need to shift towards enhancing the yield potential in the rain-fed areas by**

evolving, through recourse to modern biotechnologies, varieties that are drought and pest resistant, and by evolving cropping systems suited to varying agro-climatic conditions.

Emphasis should be placed on strategic research. These strategic research projects should be based on identified priorities and should have high probability of delivery given adequate funding and logistic supports. In other words, a mission mode approach should be considered for strategic research. Considering the potential of such strategic research in meeting our agricultural goals, **the Committee recommends creation of a nationally funded strategic research programme to be planned, managed and monitored by high level expert scientific committee at Centre and in each state**.

Strategic research critically depends upon basic research. The current IPR regimes restrict the free availability of the findings of research conducted elsewhere for applications. Hence, in long-term interest, broad based basic research should be nursed with liberal funding.

Private sector is assuming greater role in agricultural research, however, the crucial role of public research in conservation and sustainable management of natural resources and major areas where private sector is reluctant to invest is very important. Moreover, spillover from CGIAR is on a decline which puts much larger responsibility on public research. The number of scientists working in NARS has sharply declined over last 15 years. In most of SAUs funds for research have been severely curtailed. Another trend witnessed in recent years is the mushrooming of institutes resulting in thin spread of limited resources and loss of research focus. Thus, there is a need for consolidation of institutes around critical areas and **outlay for the agricultural research and education should be raised to at least one per cent of the agricultural GDP.**

Close interactions, networks and collaborations are the hallmarks of modern day science. Therefore, to remain relevant and to make a difference, scientists and institutions should be able to respond quickly to changing situations. The biggest problem with NARS is that it is strictly governed by the same rules and regulations relating to expenditure and filling up of positions as operative in government departments of States and the Centre. This robs the system of flexibility and discretion which are essential for healthy functioning of scientific institutions. Unless the system is liberated from the present set up, there is little hope of desired progress. **Therefore, a complete restructuring of the system with involvement of SAUs is necessary to make research responsive to the needs of the farmers. This may involve complete functional and financial autonomy to ICAR and**

SAUs, with suggested measures to ensure greater accountability for performance both by research personnel and research institutes. Bold and urgent action is required for the implementation of such reforms, beginning at the central level. Further, in view of growing strengths of private sector research, strategic research programmes should be awarded on competitive basis allowing participation by both the public and private research organizations.

For technology to work, all components including resources, knowledge and skills need to be satisfied. However, in majority of cases, access is provided to only one or two components (e.g. seed and fertilizer), which leads to less than expected performance. Therefore, emphasis should be placed on providing a complete technology package. In this connection, the IT network of the country should be tapped. Similarly, service facilities should be set up with modern, high throughput equipments to advise farmers on such aspects as soil health, groundwater quality and product quality.

Agriculture Extension

It is widely accepted that linkages between the laboratory and the field have weakened and extension services have often little to extend information and advice that is specific to location, time and farming system. A disconnect is seen between what the farm families need by way of generic and dynamic information and what the conventional extension agencies are able to provide.

There is an immediate need for a vibrant, dynamic and innovative approach for agricultural extension. It is evident that public extension by itself can no longer respond to the multifarious demands of farming community. Therefore, Public-Private Partnership needs to be promoted for sharing of resources and convergence.

The three measures urgently required to revamp the extension system are: (a) allocation of more resources for extension; (b) closer and frequent interactions between research and extension; and (c) result oriented performance evaluation of extension staff.

The existing system of extension is highly crop centric. Extension services in activities like livestock and fishery are either missing or weak. As these sectors are showing high promise for accelerating growth, there is need for a strong extension system in these areas to motivate farmers to adopt improved practices.

Extension system has to employ a variety of approaches spanning Rural Knowledge Centres (RKCs), ICT based extension, farmer- to- farmer extension,

involvement of PRIs, NGOs and private sector. Women farmers' access to knowledge should be ensured through the women extension workers, especially in the remote hilly and tribal areas where women farmers predominate.

The biggest bottleneck in achieving results from agricultural development efforts is lack of coordination among various agencies. States should develop a system for effective delivery and provide feed back to the research system on regional problems on agro-climatic zonal basis. **A position of Development Commissioner of rank of Additional Chief Secretary should be created in each state to coordinate across all concerned departments, and this should be duly supported by Central Zonal Agricultural Production Commissioners to co-ordinate the Centre's efforts.**

The role of KVKs is to strengthen the knowledge base of the State extension functionaries, testing the research in local conditions in a limited way and providing feed back to the researchers. Loading on them the full fledged extension work would affect their efficiency. However, there is scope for improving structural and programmatic linkages. The KVKs while demonstrating research provide feed back to the Scientists on the local adaptability of the technology developed by the research system. There is need to address the structural issues through better linkages, coordination and clear division of responsibilities between the ICAR and the State Agricultural Universities.

There is a break down of the State extension efforts due to funding problems of the States. The number of extension workers is inadequate and those in position are not sufficiently equipped and with no update of knowledge base; leading to quackery. Hence, the issue of funding must be addressed by persuading the States to make adequate provision.

Another major weakness of the extension system is the lack of penetration to small and marginal farmers. The extension must reach the inaccessible, hilly and tribal areas in the country.

The Agricultural Technology Management Agency (ATMA) model of technology dissemination provides for integrating research and extension. It draws Strategic Research and Extension Plan (SREP) through line departments, SAU, KVK and other stakeholders whose ownership is weak. The up-scaled model is inadequately reflecting the results as compared to ones obtained through National Agricultural Technology Project (NATP) at pilot stage because of under funding, problem of monitoring, lack of accountability and non-facilitating administrative arrangements.

There are some good examples of extension in the private sector in commodities like Grapes, Sugarcane, Vegetables etc. but these are sporadic. Alternative channels of extension, delivery through input dealers, NGOs, farmer organizations, cooperatives, corporates and para-workers, etc. should be promoted with defined role space to share some of the technology dissemination responsibility of the state, particularly wherever they have comparative advantage.

The increasing feminization of agriculture should also be reflected in the extension programme through recruitment of women extension workers and addressing the special problems of women farmers through appropriate design.

The National Commission on Farmers has thrown up a number of innovative ideas for bridging the knowledge deficit, which need to be pursued.

It was further felt that the extension is primarily responsibility of the State Governments for which strong linkage between SAUs and the State Departments is critical. Some of the States have provided good examples of integration of research and extension from which the other States should also learn

As agriculture is becoming more and more knowledge intensive, due importance should be accorded to improving skill and human capital of farmers.

Agricultural Credit

Resource position of our farmers, especially the small and marginal farmers, being weak, they often depend upon private sources to meet their credit needs at very high rates of interest. **The requirement of such farmers is the adequate and timely availability of credit on reasonable terms. There is a need to increase the supply of institutional credit, through cooperatives, commercial banks and micro finance institutions on easy terms and conditions. The cost of credit delivery borne by farmers should be brought down and interest rate should be kept reasonably low. Though credit flow in the recent years has shown high increase, the flow to agriculturally underdeveloped areas and small and marginal farmers is far from satisfactory.**

The most potent means *for* ***widening and deepening access to institutional*** **credit to the innumerable small and marginal farmers are the Co-operative Credit Societies that are autonomous and democratic. It is, therefore, extremely important, that the restructuring of cooperative credit now in progress, on the lines of the recommendations of A. Vaidyanathan Committee are implemented speedily and**

rigorously.

The share of direct accounts with a credit limit of less than Rs.25,000 in total direct accounts declined from 97 per cent in 1990 to 67 percent in 2005, while their share in outstanding direct credit declined from 0.66 per cent to 0.23 per cent in the same period. Spatial distribution of credit across states and within states continues to remain unequal. The credit disbursal by commercial banks covers only 11.7 per cent of operational holdings in the country. The Steering Committee, therefore, recommends that:

The coverage of operational holdings needs to be increased significantly, with sub-targets for the less developed states and small and marginal farmers. The widespread practice of absentee landowners and non-landowners availing of agricultural credit needs to be curbed. The government is targeting an addition of 50 lakh agricultural accounts every year. **Strict norms need to be put in place to curb the practice of old accounts being closed and shown as new accounts.**

Emphasis should be on improving direct credit flow to agriculture and within direct credit, credit to small and marginal farmers.

At present direct finance to agriculture under priority sector lending includes credit for the purchase of trucks, mini-trucks, jeeps, pick- up vans, bullock carts and other transport equipment to assist the transport of agricultural inputs and farm produce. Direct finance also includes credit for the construction and running of cold storage facilities, warehouses and godowns. As alternate formal sources of finance are available for these, their inclusion under direct finance needs to be reconsidered.

As per the 1995-96 agricultural Census, the share of the area operated by small and marginal farmers is 36 per cent. Over the years, the area operated by small and marginal farmers has been increasing. **Considering that small and marginal farmers have no alternate sources of finance, the share of direct accounts with a credit limit of Rs. 25,000 in total direct finance may be targeted at a substantially higher level.**

Special credit packages with varying and flexible repayment periods may be thought of for the agriculture sector to take care of mismatches of income and expenditure flows of farmers and the seasonal nature of agricultural income. Doorstep banking with timings suitable to the farming community could be thought of.

Bulk of the RIDF funds are utilized by just five States. These targets are not met mostly in backward states. Ideally, the funds under RIDF should be ploughed back to states

in proportion to their respective shortfalls in priority sector lending. **Steps should be taken to improve the absorptive capacity of backward states in utilizing RIDF by relaxing norms for matching contribution.**

Subsidies on Irrigation and Fertilizers

There is a very strong case to reduce subsidies on power and irrigation not only to check overexploitation, indiscriminate use of water and degradation of soil, but also to make available large chunk of resources for improving rural infrastructure. **Water charges and levy on power used for irrigation must reflect the value of water to the society and future generations. The best way to accomplish this is to empower the local community institutions to collect economic rates linked to the volume of water consumed, determined by the local institutions, and use the revenues so collected for development at the local level. Metering devices can be installed at the lowest feasible level, at least at village level.**

While this will take concerted action over a period of time, a beginning can be made to ensure that water charges to individuals are assessed properly and that collection efficiency is improved. The scope for both is enormous.

Because nitrogenous fertilizers are subsidized more than potassic and phosphatic fertilizer, the subsidy tends to benefit more the crops and regions which require higher use of nitrogenous fertilizer as compared to the crops and regions which require higher application of P and K. In the case of fertilizer, the critical issue has been the imbalance in the use of NPK brought about by distortions in price ratio in favour of Nitrogenous fertilizer. It has already caused widespread soil degradation and reduced productivity which is becoming more acute with the passage of time.

Therefore, at present, **there is a need to promote balanced use of fertilizer which can be achieved either by redistributing the prevailing amount of fertilizer subsidy over NPK or by increasing subsidy on P and K in such a way that farmers are induced to use NPK in the right proportion.** This would not only check indiscriminate use of one kind of fertilizer to the detriment of the other but also reduce inter-regional and inter-crop disparities in fertilizer use (see Appendix Tables IV-1 & IV-2).

Farmers hardly pay any attention to emerging micronutrient deficiencies which are affecting productivity, quality and efficiency of fertilizer use. Massive efforts are needed for soil testing network to assess specific deficiencies at the regional and sub regional level. There is a need to take measures – including increasing the supply of such nutrients and even

subsidization – to correct them.

Ensuring Remunerative Prices

In the past government has ensured guaranteed prices to producers by procuring produce at MSP/ procurement price. This was done on a limited scale and only for a few crops. The demands for ensuring guaranteed prices to other crops through procurement mechanism are mounting.

In high potential regions like Bihar, East Uttar Pradesh, Orissa, Assam, Chattisgarh and West Bengal, MSP should be ensured through effective procurement. These states have poor marketing infrastructure and underdeveloped and exploitative private trade. The development of market infrastructure in such areas will greatly reduce price uncertainty faced by the farmers. Thus focus of procurement should gradually shift from traditional green revolution belt to the untapped regions. This would help in reversing deceleration in the growth of cereal output and in reaping technological gains. Agriculturally developed regions have relatively well developed marketing infrastructure and private trade is keen to undertake marketing of grains in such regions. If government restrictions on trade are relaxed, private trade would operate more effectively in agriculture marketing and reduce the need for government procurement.

The CACP recommends MSP for a number of important crops including those which have a high growth potential in the wake of diversification. However, since effective public procurement is limited now to only a few staples, that too only in a few states, **there is a clear case for expanding the coverage of crops and regions. To begin with, in each state, a few crops having a potential for growth may be selected and MSP made effective for them through public procurement by developing the necessary marketing infrastructure.**

System of MSP and procurement price was designed to serve different purposes. However, over time, the distinction between MSP and procurement price has been abandoned and now official agencies procure foodgrains at a price, which is invariably same as the minimum support price. This blurring between MSP and procurement price creates several problems. Sometime, government is forced to create conditions wherein prices are artificially forced down to the level of MSP and sometimes government is forced to buy whatever produce comes in the market irrespective of its requirements. Thus government has to carry excessive stock which is again sold back after some time for free sale in the market. There is a strong ground to create distinction between MSP and procurement price.

While the purpose of former should be to provide insurance against price falling below a floor level, procurement of quantity required by government should be done in a flexible manner in different markets and in different periods at open market prices.

Insurance Against Risks in Agriculture

Farming is a risky business involving natural hazards as much as market risks. Minimum support prices give some protection to the market induced risks. To cope with natural risks crop insurance is the most potent instrument.

Some two decades back crop insurance was introduced in the country. A new and revised version, viz., National Agricultural Insurance Scheme (NAIS) is available since 1999-2000. Despite state support the coverage of the NAIS has been tardy. NAIS is a useful device especially for the small and marginal farmers. All the countries having crop insurance have to subsidize the premium. We should also be prepared to accept an element of subsidy at least for the staple crops and for the small farmers. Currently NAIS is an ad-hoc scheme. It is important to impart a measure of permanency to the scheme.

There is a scope for improving the coverage of NAIS in terms of regions and crops, substitution of long term yield rate as a bench mark and ensuring prompt payment of the indemnities. Decision to devolve the area of damage assessment from blocks to smaller units may be done with care, as the costs of such decentralization and the moral hazards will be very high compared to the likely benefits. Other indicators, such as rainfall, could be used for assessing the damage due to natural factors. However, for the next few years they should not be treated as a substitute to NAIS.

An important lacuna, which many researchers have pointed out, is a rather indifferent attitude of the banks. **All commercial banks, RRBs and the Cooperative Banks should make crop insurance mandatory for all agricultural loanees, especially because such insurance can indirectly contribute to the viability of rural banking.** An equally important aspect is the need for much larger involvement of the states in the functioning of the scheme.

Government needs to take up agricultural reinsurance more extensively with appropriate insurance products. **Recently some of the successful insurance products like Rainfall Insurance have been developed by ICICI-Lombard General Insurance Company and by IFFCO-Tokyo General Insurance Company.** Under the scheme coverage for deviation in rainfall index is extended and compensations for economic losses due to the less or more than normal rainfall are paid. There is a lot of interest in private sector for insurance business. **Necessary incentives should be devised for insurance companies**

to design suitable products for agriculture sector.

Better Deal for Women Farmers

In the wake of feminization of agriculture, empowerment of women has become indispensable not only for gender equity but for realizing the targeted growth of agriculture.

Enhancing women's rights in land, providing infrastructure support to women farmers, and advancing legal support on existing laws, will get recognition for women as farmers and enable them to access credit, inputs, and marketing outlets. Second, women's names should be recorded as cultivators in revenue records, on family farms, where women operate the land having ownership in the name of male members. There needs to be a comprehensive directive across the country that in all government land transfers, women's claims are directly recognized, be they transfers for poverty alleviation, income generation (crop cultivation, fish cultivation), or resettlement.

The gender bias in the functioning of institutions for information, extension, credit, inputs and marketing needs correcting by gender-sensitizing the existing infrastructure providers. In addition, new institutions should be created that can cater especially to women farmers, taking into account their mobility and social constraints. **Women's cooperatives and other forms of group effort, where they do not already exist, should be promoted for the dissemination of agricultural technology and other inputs, as well as for marketing of produce.** These cooperatives could be set up by the government, but NGOs wanting to do so should also receive financial assistance from the government.

Land Markets and Prospects for Small Farmers

Active land market for sales and purchases and for lease can contribute to the productive use of land left behind by those who shift to non-farming occupations. However, small farmers are at a disadvantage as buyers of land because of resource constraints. As tenants they lack adequate incentives to invest because of the lack of security of tenure.

Moreover, land- lease laws in the country are such that the landowners either do not lease out land for fear of losing their ownership, or when they do lease out, the tenancy is concealed. Because of this, most of the small and marginal farmers are unable to enlarge their operational holdings by leasing-in land and when they do lease-in on a concealed basis, as is often the case, they can not make adequate investments both because of the

absence of entitlement for institutional credit and insecurity of tenure. Similarly, a large number of small and marginal farmers, who do not find farming viable and see non-farm vocations more attractive, avoid renting out land for fear of losing ownership.

Small farmers should be assisted to buy land through the provision of institutional credit, on a long-term basis, at a low rate of interest and by reducing stamp duty. At the same time, they should be enabled to enlarge their operational holdings by liberalizing the land-lease market. The two major elements of such a reform are: security of tenure for the tenants during the period of contract; and the right of the land owner to resume land after the period of contract is over. Small and marginal farmers stand to benefit from such a liberalization of the sale and lease market, apart from the social gain in terms of the more productive use of scarce land.

Special programmes need to be designed and implemented to enable small farmers to improve their capacity to go for high value commercial activities in crop production, dairy, poultry, fisheries etc. These farmers should be provided liberal assistance for meeting capital requirement to take up such activities.

Because of the increased pressure from small and marginal farmers on the limited land for their livelihood, there is no justification, at this stage, for encouraging corporate farming by relaxing the existing ceiling on land ownership.

The ultimate solution to the small farmer problem is the shift of labour force to non-farm occupations. For this the growth of rural non-farm sector through the development of agro-processing and other rural industries is essential. The development of rural infrastructure e.g. roads, communications and power holds the key. The on-going programme of Bharat Nirman offers a great promise in this context and needs, therefore, to be executed with highest priority.

Competitiveness of Agricultural Markets and Private Trade

The best way to get reasonable prices for producers is by ensuring that agricultural markets are competitive. Recent policy changes have paved the way for entry of private sector in agricultural markets and trade. **Private sector can play a major role not only in post harvest handling and distribution of produce but also by forging appropriate arrangements such as contract farming with farmers, particularly for high value crops. This is especially important for small holders who face serious marketing constraints.** Promotion of contract farming would create assured marketing outlets but this should be

governed by a well defined Code of Conduct that includes support to small producers in the areas of technology and input supply and fair price for the produce by organizing them into cooperatives wherever possible.

There are frequent reports of malfunctioning of regulated markets, and the ineffectiveness of regulatory mechanism to ensure fair trading practices in grading, weighing and auctioning even in the case of traditional crops. There is a need for more transparency and accountability in the functioning of these markets and for stringent action against malpractices.

There are apprehensions about organized retail trade in food, particularly relating to its impact on unorganized retail and employment. While this seems to be genuine in the case of big malls and super markets, it need not apply to small retail food stores or chains. **Recently, some corporate houses have ventured into opening up chains of retail food stores in urban centres which, apart from providing fresh and better quality products to consumers, have also benefited farmers through higher prices - in some cases assured by advance contracts. These small food stores seem to be providing more and better quality employment compared to the existing system.** This is borne out by a number of studies done recently. Such modernization of food chains by private trade needs to be promoted. However, there is a need for careful and objective monitoring of the impact on existing small traders in areas where the chains are prominent.

Agricultural Statistics

The agricultural statistics system has run down in many states. The conduct and supervision of crop cutting experiments has weakened, complete enumeration of land use and cropping and irrigation down to the plot level has become difficult.

The present status of implementation of various recommendations of the National Statistical Commission (NSC) clearly shows that these recommendations have not been taken seriously by the concerned organizations. Various recommendations by the NSC should be rigorously pursued and implemented at the earliest.

The database for agricultural sector needs to be thoroughly reviewed for its upgradation. **The formats of TRS Scheme as well as the ICS Scheme appear to have become a bit outdated and hence need to be thoroughly reviewed and changed for bringing about a lasting improvement in the basic system of Agriculture Statistics.**

The statistics relating to area and production of fruits and vegetables are seriously

doubted. **An alternative methodology for estimation of production of the horticultural crops as recommended by NSC needs to be followed. The economic contribution of several post-harvest activities such as trade, processing, packaging and the related activities in the periphery of agriculture need to be captured as GDP share of agriculture and allied activities.**

There is a need to computerize the land records. Fishery census needs to be conducted every five years and results of the agricultural census and the livestock census should be made available within two years after the surveys. For improving the collection and reporting of agricultural statistics in the North-Eastern Region, the office of North-Eastern Council (N.E.C.) may be made the coordinating agency for all the N.E. States.

Alternative ways – properly conducted sample surveys and remote sensing - to get the data need to be explored. Some efforts are being made to use remote sensing data to estimate area and yields of selected crops. A through review of these aspects as a prelude to reorganizing the system for collecting and publication of agriculture and related activities is desirable.

Agriculture in North East Region

Over the last 4 decades or so, many schemes and programmes have been implemented in the Jhum areas of the NE, with the aim of "weaning away the jhumias from the harmful practices of Jhum cultivation". Individually many of these schemes have succeeded but they have all failed to enthuse the farmers or failed to convince them to accept the solutions over large areas. What is needed is to understand that Jhum Cultivation is essentially a fairly sophisticated "AgroForestry" practice. In this domain, it is necessary to have a unified approach in the design of schemes which encompasses both trees (including bamboos) and annual crops. Jhum is a process which starts with a standing forest or jungle and ends with one or two annual crops. Both ends of Jhum need to be tackled.

There are externally aided projects, e.g. the Nagaland Environment Protection and Economic Development (NEPED) project, which are reported to be quite successful. Replication of successes is an issue the Planning Commission should focus in the XI plan, emphasizing "agroforestry", rather than agriculture and forestry separately.

V
FINANCING AND IMPLEMENTING THE ELEVENTH PLAN

A part of the terms of reference of this Steering Committee was to examine the reports of the Working Groups set up on agriculture for the Eleventh Plan, as well as reports of the National Farmers Commission and of six working groups constituted by the NDC sub-committee on Agriculture. This report is based on careful study of this entire material and on extensive discussion not only with most of the experts involved but also some important farmer organizations. However, the Steering Committee was unable to get into details of many individual schemes that currently operate or of new ones proposed by various Working Groups. The enormous work put in by these various Working Groups has led to broad consensus not only on problems afflicting Indian agriculture but also on most aspects of the way forward, with differences that remain being largely matters of detail that need to be resolved at the official level. This report, while reflecting the consensus, has highlighted the priorities that need to be emphasized when there are different views regarding design of existing schemes or choice between competing new proposals.

Financial Requirement

Financial requirements for agriculture sector for the 11th Plan as indicated by Central Ministries and States so far and estimated expenditure during 10th Plan are as follows:

(Rs Crore.)

	10th Plan	11th Plan
Centre	21,068	83,000
States	37,865	50,000
Total	58,933	133,000

Total requirement for 11th Plan comes to 2.25 times the outlay for 10th Plan. While this increase in overall outlay is not unreasonable, the proposals imply a reduction in State's share from 64.3% during 10th Plan to 37.6% during 11th Plan and a huge increase in dependence on Centre. It is important to note that the financial requirements stated above do not include financial requirements for irrigation and flood control nor do they include special fund for rainfed area development.

The Eleventh Plan Approach Paper aims at creating 11 million hectares of new irrigation potential, half through major and medium projects, and another 3-4 million hectares from modernisation of existing structures and restoration of tanks. The Ministry of Water Resources has estimated total financial requirement for irrigation, command area development and flood control for 11th Plan to be Rs. 2,08,000 crore. The details are as under:

Item	Amount Rs. crore
1. Major and medium irrigation	1,58,000
2. Minor irrigation, command area development and flood Control	51,000
3. Total	2,08,000

Investments in major and medium irrigation are estimated to add 9 million ha. (both continuing and new) and those in minor irrigation are estimated to cover 7 million ha (including tank restoration). These are huge amounts and a major issue relates to the Centre's role through its Accelerated Irrigation Benefits Programme (AIBP). While there is a case to expand AIBP, particularly on inter-state projects and in poorer regions, it is necessary to revisit its guidelines to achieve more timely results and also incentivise the reforms for water conservation.

A major problem with requirements put by various Ministries and States is that the entire thrust thus far is business as usual, with inadequate attention to longer term natural resources issues. NRM component is negligible in both Centre and State proposals. While bulk of public capital formation in this sector will continue to be on creating new irrigation potential, there should be a significant shift in focus towards efficient and sustainable use of resources, particularly land and water. It is important in this context to note that conservation schemes, i.e. afforestation in upper catchments at higher elevations of river basins, watershed development, soil amelioration and groundwater recharge will also require very large investment if taken up on requisite scale.

With technology fatigue clearly visible and with the looming threat of climate change, a vital Eleventh Plan priority is to strengthen Agricultural Research and Education while clearly demarcating responsibilities within the National Agricultural Research System (NARS) and reforming the way in which NARS relates to Extension. Further, India needs to develop its strength and capability in biotechnology, bio informatics, genomics, and transgenics research to harness huge potential in these areas and to avoid dependence on developed countries and their private sector for technologies in these areas. For this, the Committee has endorsed the long-standing view that resources for this area (both Centre and

States and including non-plan expenditure) should rise to 1% of agricultural GDP from around 0.65% currently. This implies a 14% real rate of growth, to justify which will require major changes including (a) a nationally funded strategic research programme to be planned, managed and monitored by high level expert scientific committee at Centre and in each state; (b) enhancing capacity of State Agricultural Universities on condition that they be given much greater functional and financial autonomy; and (c) much larger provision for direct training of farmers and to opening Knowledge Centres and impart demonstrations at the village level.

The Eleventh Plan outlay will also need to finance expanded farm support in other areas including credit, input provision, pest and disease control, risk management and post-harvest support, particularly produce marketing. These are the areas that currently account for most of the Plan expenditure of Agriculture and Animal Husbandry Departments both at the Centre and in the States and also for most non-Plan expenditure in these sectors. Much of this expenditure takes the form of subsidies to those who can access concerned support systems, although the main problem is that most farmers continue to lack such access and there are serious infrastructure and resource gaps which impede timely delivery and adversely affect the quality of goods and services delivered. Large resources, comparable to total public sector capital formation in agriculture proper, will be required to extend access and ensure timeliness and quality, especially since diversification and use of hybrids will require that more planting and breeding material be purchased and also since post-harvest operations would need modernisation to handle the perishable nature of output in sub-sectors likely to grow fastest. With farm profitability under pressure, some subsidies are unavoidable. But these should be scrutinised thoroughly towards eliminating distortions, particularly those that have deleterious effect on natural resources and those that impede growth either of the existing public support systems or of alternatives that the private sector may be in a position to otherwise provide. Also, since the domestic market will continue to account for the overwhelming bulk of demand, there is little merit in arguments that export-related activities need special subsidies because other countries subsidise their farmers. The public sector should concentrate on services that the private sector is unlikely to provide, e.g. quality seeds of open-pollinated varieties, pest and disease control, building essential infrastructure and on mechanisms to stabilise prices efficiently and minimise output risks without creating undue price distortion.

The priorities of sustainability and efficiency highlighted in this report require increasing the share in total plan resources of rain-fed areas and of high-potential low-income regions, particularly in Eastern and Central India. Financial requirement for development of rainfed area during 11^{th} Plan is estimated to be Rs. 38,000 crore. Such

investments would also enhance regional equity. Similarly, the demand projections made in this report require a shift in resources towards animal husbandry and horticulture, both of which have higher work participation of women than other crop sectors. This should enhance gender equity, although of course issues such as women's property rights and intra-household gender discrimination are even more important.

Public investment in agriculture is shared both by the Centre and the States. At present the plan expenditure on agriculture and allied sectors, of which a part goes to form public investment, is divided almost equally between the Centre and the States. Therefore, if the projected plan expenditure has to rise substantially during 11^{th} plan some incremental investment would have to come from the states. It is important not only because agriculture is a state subject but also because agriculture development in the states has to reflect the regional priorities keeping in view the national concerns, as well as because the programme implementation is at the local level.

Plan Implementation

There is a strong need to restructure agriculture planning at state level. States should commit a reasonable proportion of their plan resources for agriculture and irrigation; draw up a production plan and associated input plan taking account of agro-climatic conditions and fix annual target at the start of the fiscal year and ensure timely release of funds for relevant schemes. To facilitate the above each state should set up Agriculture Planning Committee with Agriculture Minister and Finance Minister as co-Chairs. The Committee should review implementation of the production plan every quarter.

Some mechanism will have to be put in place to ensure that the states, especially in the poorer regions with low capacity to invest, which show interest in enhancing plan expenditure in agriculture sector are rewarded. This can be achieved, for example through some central scheme with central Regional Production Commissioners (RPCs) at zonal level, coinciding with the ICAR zonal commissioners to receive technical input and working in close coordination with the State Production Commissioners in formulating agriculture development plans and in funding the central share of the state plans, with the guidelines of the centrally sponsored/ central sector schemes to be operated through these RPCs, providing adequate flexibility for change keeping in view the local conditions. RPCs should be helped by a Central Production Commissioner (CPC) at national level in formulating region specific programmes and to coordinate among states and regions. The CPC should also ensure speedy and direct flow of resources to RPCs/States. The regional priorities reflected in these agricultural plans, could take take into account the national concerns.

The Institutional Gap

In the context of plan expenditure funding and implementation it is important that the process of agricultural planning is consistent with the 11th Five Year Plan Approach which emphasizes bottom-up participation through districts plans, guidelines for which have already been issued to the states. This would require appropriate devolution of functions, funds and functionaries to the Panchayati Raj Institutions for their effective functioning in the area of agriculture and allied sectors, already constitutionally within the PRI domain. It should be, however, recognized that PRI capacity is currently very weak, while PRI involvement is now the norm in many government institutions including ATMA. There is need for an effective system of expert advice that farmers and PRIs should be able to access and which should be properly integrated with the state and national machineries of agricultural planning, research and administration. The setting up of expert bodies such as the National Rainfed Areas Authority (NRAA) and National Fisheries Development Board (NFDB) reflect this to some extent and the Committee's recommendations on research and extension visualize carrying this thrust forward.

The Planning Commission's guidelines on District Planning can be helped by Strategic Research and Extension Plan (SREP) to converge at district and lower levels. But these aspects do not yet find resonance in line departments. There is a specific role of the Centre both in research and in development to reach Central funds and priorities to lower levels consistent with Agro-economic requirements. This role can be achieved by decentralizing administration of CSS through Regional Production Commissioners acting alongside ICAR regional co-ordinations.

VI
CONCLUDING REMARKS

India has an impressive record of taking the country out of serious food crisis to self-sufficiency and self- reliance even when the population of the country doubled since 1971. This success was achieved through the favourable interplay of infrastructure, technology, extension and policy backed by strong political will. Therefore, **the Steering Committee is of the considered opinion that it should be possible to reverse the process of deceleration in agriculture growth and step it up significantly during the 11th Plan period.**

The basic causes for deceleration and the policy initiatives needed to reverse this process have been long known, as brought out by a number of scholars and knowledgeable persons on the subject. Recently, the National Commission on Farmers in its comprehensive Reports has highlighted the factors inhibiting the growth of Indian agriculture and undermining the welfare of the farmers. Thus, we have before us a clear road map for reviving Indian agriculture and placing it on a high growth path. **What is needed is requisite awareness of the relevant issues on the part of the decision-makers at the state and central level and, above all, the political will to act decisively and accord high priority to agriculture by implementing the major recommendations. The institutional mechanisms to initiate and monitor purposive action need to be put in place at the highest level both at the Centre and the States.**

STRATEGIC ACTION POINTS

1. **Public sector outlay for agriculture should be increased to 4% of GDP agriculture towards the end of eleventh plan.**

2. **Outlay for agriculture R&D should be raised to 1% of GDP agriculture at the earliest.**

3. **Research priorities need to shift towards enhancing the yield potential in the rain-fed areas by evolving, through recourse to modern biotechnologies, varieties that are drought and pest resistant, and by evolving cropping systems suited to varying agro-climatic conditions.**

4. **A complete restructuring of the agricultural research system with involvement of SAUs is necessary to make research responsive to the needs of the farmers. This may involve complete functional and financial autonomy to ICAR and SAUs, with measures to ensure greater accountability for performance. National fund should be created for strategic research which should be planned, managed and monitored by high level expert scientific committees at Centre and in each state. Research agenda setting and management should be decentralized at the agro-climatic region level.**

5. **The on-going major and medium irrigation schemes should be speedily completed. A major programme for physical modernization of existing systems is needed to improve distribution network and to increase productivity by reducing losses.**

6. **Rainwater harvesting and aquifer recharge should be provided strong policy support. All existing wells and ponds should be renovated to augment water supply.**

7. **Incentives should be provided to improve soil health through balanced use of fertilizers and application of micro nutrients and improvement in the organic matter for soils. Soil health cards, giving regularly updated information on major and micronutrients should be issued to all the farmers by strengthening of soil testing labs in all parts of the country. production and sale of bio-fertilizers, e.g. compost, organic manure and micro nutrients should be encouraged on a large scale.**

8. **Balanced use of fertilizers(NPK) should be promoted either by redistributing the prevailing amount of fertilizer subsidy over NPK or by increasing subsidy on P and K.**

9. **Policies like free power and irrigation must be stopped through a major nation-wide initiative for creating awareness among the elected representatives and public at large about the harmful consequences and by empowering the local community institutions to charge the economic rates and use the amounts so collected for development at the local level.**

10. **Supply of power to agriculture should be metered at individual user level or at the level of groups of contiguous farms with the involvement of local institutions, where necessary, so that users pay on the basis of actual consumption. Government may subsidize the rate for small and marginal farmers but should not allow a flat rate or a totally free supply.**

11. **The existing guidelines for Watershed Development need strengthening to ensure (a) proper social mobilization and institution-building in the initial stages of the programme so as to ensure community participation on a sustained basis;(b) adequate attention to equity and livelihood concerns of the poor; and (c) convergence of the programmes undertaken by different Ministries at the watershed level with a view to raising agricultural productivity. There has to be effective coordination between the concerned departments from the stage of planning to implementation and from the top to the grass roots level.**

12. **Quality control and regulation should be made stringent to check supply of spurious pesticides, seed and fertilizer.**

13. **SAU, ICAR, State farms and other public agencies should expand their seed production activities. Special effort should be made to distribute seed of improved varieties in the less developed states. Cooperative and Private sectors should be encouraged in seed production.**

14. **MSP must be honoured for major crops in all the regions/ states, at least in markets up to the Mandal level. At least one major crop in kharif and one major crop in rabi season in each agro ecological region in a state should be guaranteed MSP. There should be clear distinction between MSP and procurement price.**

15. **The effect of volatility in international prices on domestic agriculture should be checked by aligning tariffs with the changing price situation.**

16. **Direct marketing by farmers to consumers on the pattern of *Apni Mandi* model in Punjab, *Uzhavahar Shandies* in Tamil Nadu and *Rythu Bazar* in Andhra Pradesh should be encouraged on a large scale. The character of these models**

should not be diluted by allowing non- farmers to sell their produce in such markets.

17. **Post harvest infrastructure should be modernized and food laws should be simplified and unified to attract private investments in food processing.**

18. **Extension machinery should be revamped and oriented to meet the information needs of diversified agriculture by employing a variety of approaches spanning Rural Knowledge Centres (RKCs), ICT based extension, farmer- to- farmer extension, involvement of PRIs, NGOs and private sector. Add by 5.2.4.**

19. **Women farmers' access to knowledge should be ensured through the women extension workers, especially in the remote hilly and tribal areas where women farmers predominate.**

20. **The restructuring of cooperative credit now in progress, on the lines of the recommendations of A. Vaidyanathan Committee should be implemented speedily and rigorously.**

21. **Credit supply should be on liberal terms and involve minimum paper work and cost. The coverage of operational holdings should be increased significantly, with sub-targets for the less developed states and small and marginal farmers. The share of direct accounts with a credit limit of Rs. 25,000 in total direct finance should be targeted at a substantially higher level.**

22. **Agriculture insurance should be expanded by strengthening NAIS and by involving banks and private insurance companies. There should be 50% subsidy on the premia for insurance.**

23. **Enhancing women's rights in land, providing infrastructure support to women farmers, and advancing legal support on existing laws, will enable them to access credit, inputs, and marketing outlets.**

24. **The gender bias in the functioning of institutions for information, extension, credit, inputs and marketing should be corrected by gender-sensitizing the existing infrastructure providers. Women's cooperatives should be promoted for the dissemination of agricultural technology and other inputs, as well as for marketing of produce.**

25. **Appropriate legislation should be brought immediately to liberalize land lease market.**

26. **Agriculture and forestry in the North East region needs to be treated as integrated activity emphasizing "agroforestry", rather than agriculture and forestry separately.**

27. **Special programmes need to be designed and implemented to enable small farmers to improve their capacity to go for high value commercial activities in crop production, dairy, poultry, fisheries etc.. These farmers should be provided liberal assistance for meeting capital requirement to take up such activities.**

Appendix Table I

Incidence of market price going below minimum support price during 2004-05 marketing season

State	Market Centre	Crop	MSP	Market price (Rs./ Quintal)			
			Rs./qtl	October	November	December	January
Andhra Pradesh	Jammikunta	Paddy	560	530	550		
Bihar	Sasaram	Paddy	560	550	550		
Chhattisgarh	Raipur	Paddy	560	480			
Karnataka	Mysore	Paddy	560				498
Karnataka	Raichur	Paddy	560	526			
Madhya Pradesh	Balaghat	Paddy	560	505	507		
Madhya Pradesh	Katni	Paddy	560	400	400		
Madhya Pradesh	Sehore	Paddy	560	271	250		
Maharashtra	Kolhapur	Paddy	560	500			
Uttar Pradesh	Attara	Paddy	560	525	530	545	
Uttar Pradesh	Bareilly	Paddy	560	535	540	540	
Uttar Pradesh	Mainpuri	Paddy	560	530	531	525	535
West Bengal	Bankura	Paddy	560		550	525	540
West Bengal	Sainthia	Paddy	560		480	510	515
Gujarat	Karjan	Jowar	515	450	420	500	
Karnataka	Bellary	Jowar	515	400	400		
Karnataka	Gokak	Jowar	515	400			
Karnataka	Harapanahlli	Jowar	515	400	400		
Madhya Pradesh	Chindwara	Jowar	515	375	450		
Madhya Pradesh	Khargaon	Jowar	515	356	422		
Madhya Pradesh	Ujjain	Jowar	515	350	381		
Rajasthan	Jaipur	Jowar	515	491			
Rajasthan	Kota	Jowar	515	490			
Uttar Pradesh	Bahraich	Jowar	515	430	425	395	415
Uttar Pradesh	Kanpur	Jowar	515			465	430
Uttar Pradesh	Kanpur	Jowar	515	435	455	460	
Haryana	Hissar	Bajra	515	475	490		
Madhva Pradesh	Morena	Bajra	515	400	450	460	460
Maharashtra	Pathaordi	Bajra	515		490	500	
Rajasthan	Jaipur	Bajra	515	530	503		
Uttar Pradesh	Agra	Bajra	515	460	450	465	475
Uttar Pradesh	Agra	Bajra	515	460	440	435	
Uttar Pradesh	Hathras	Bajra	515	385	425	455	475
Andhra Pradesh	Jammikunta	Maize	525	508	504	508	500
Andhra Pradesh	Karimnaaar	Maize	525			505	490
Andhra Pradesh	Nizamabad	Maize	525	498	495	490	500
Andhra Pradesh	Warangal	Maize	525	493	495	505	500
Bihar	Muzaffarpur	Maize	525	470	485	510	
Gujarat	Himatnagar	Maize	525	510			
Himachal Pradesh	Mandi	Maize	525	500	520		520
Karnataka	Davanagere	Maize	525	350	415		
Karnataka	Gokak	Maize	525	470	445	490	490
Karnataka	Gokak	Maize	525	430			
Karnataka	Shikaripura	Maize	525	450	450		
Madhya Pradesh	Bhopal	Maize	525	400	452		
Madhya Pradesh	Chindwara	Maize	525	425	440		
Madhya Pradesh	Khargaon	Maize	525	389	350		

Madhya Pradesh	Mandla	Maize	525	400	500		
Puniab	Hoshiarpur	Maize	525	480			
Punjab	Kapurthala	Maize	525	500	520		
Uttar Pradesh	Bahraich	Maize	525	435	470	450	450
Andhra Pradesh	Kurnool	Groundnut	1500			1459	
Andhra Pradesh	Mahboobnagar	Groundnut	1500		1263		
Andhra Pradesh	Suryapet	Groundnut	1500			1369	1300
Guiarat	Jamnaaar	Groundnut	1500			1106	1420
Karnataka	Dharwar	Groundnut	1500		1290		
Madhya Pradesh	Chhindwara	Groundnut	1500		1010		
Madhya Pradesh	Ganjbasoda	Groundnut	1500		1481		
Madhya Pradesh	Indore	Groundnut	1500		1300		
Maharashtra	Nasik	Groundnut	1500		1200		
Uttaranchal	Dehradun	Groundnut	1500		1140	1336	
Uttaranchal	Vikas Nagar	Groundnut	1500		1255	970	
Andhra Pradesh	Warangal	Moong	1410			1360	1400
Gujarat	Mehasana	Moong	1410			1350	
Gujarat	Patan	Moong	1410				1310
Karnataka	Bangalore	Ragi	515		500	440	
Karnataka	Channagiri	Ragi	515	470	450		
Karnataka	Harapanahalli	Ragi	515	420	400		
Karnataka	Hosadurga	Ragi	515	450	450		
Madhya Pradesh	Bhopal	Soybean	1000		555		
Madhya Pradesh	Ujjain	Soybean	1000		700		
Kamataka	Jamkhandi	Sunflower	1340		1300	1300	1300
Maharashtra	Jalna	Sunflower	1340				1300
Andhra Pradesh	Suryapet	Tur	1390			1371	
Delhi	Najafgarh	Tur	1390			1300	
Gujarat	Junagarh	Tur	1390	1350	1266	1315	
Madhya Pradesh	Bhopal	Tur	1390		1100		
Madhya Pradesh	Sagar	Tur	1390		1300		
Madhya Pradesh	Satna	Tur	1390		1200		
Andhra Pradesh	Nizamabad	Urad	1410	1170		1150	1300
Gujarat	Dahod	Urad	1410	1345	1325		
Gujarat	Himatnagar	Urad	1410		1370	1350	
Gujarat	Patan	Urad	1410		1360	1325	1355
Madhya Pradesh	Bewara	Urad	1410		1190		
Madhya Pradesh	Susnair	Urad	1410			1330	
Rajasthan	Hindaun	Urad	1410	1000	1100	1200	
Uttar Pradesh	Bareilly	Urad	1410	1360	1360	1360	
Uttar Pradesh	Hapur	Urad	1410	1400		1400	
Uttar Pradesh	Marua-Sumerpur	Urad	1410		1150	1260	
Uttaranchal	Kasipur	Urad	1410	1370	1375	1376	

Appendix table II.1

State-wise performance and potential of wheat as revealed by actual yield and yield with improved practice and farmers practice

Yield: Kg/ha 2002-03 to 2004-05

State	Improved Practice	Farmer practice	Actual 2003-04	Yield gap % between	
				I and F	I and A
Uttar Pradesh	4206	3324	2794	26.5	50.5
Bihar	3651	2905	1783	25.7	104.8
Punjab	4463	4035	4207	10.6	6.1
Haryana	4751	4520	3966	5.1	19.8
Rajasthan	3948	3724	2794	6.0	41.3
Gujarat	4034	3491	2681	15.6	50.5
Madhya Pradesh	3297	2472	1789	33.4	84.3
Maharashtra	3411	2907	1335	17.3	155.5
Himachal Pradesh	2616	2126	1380	23.0	89.6
West Bengal	2766	2081	2316	32.9	19.4
Uttaranchal	3388	2444	1877	38.6	80.5
Karnataka	3608	2761	480	30.7	651.7

II.2

State-wise performance and potential of barley as revealed by actual yield and yield with improved practice and farmers practice

Yield: Kg/ha 2002-03 to 2004-05

State	Improved Practice	Farmer practice	Actual 2003-04	Gap % between	
				I and F	I and A
Uttar Pradesh	3232	2627	2198	23.1	47.1
Punjab	4363	3871	3348	12.7	30.3
Haryana	3965	3471	2800	14.2	41.6
Rajasthan	4311	3273	2249	31.7	91.7
Gujarat	2867	2125		35.0	
Madhya Pradesh	3759	2912	1507	29.1	149.4
Himachal Pradesh	2391	1943	1292	23.1	85.1

II.3

State-wise performance and potential of rice as revealed by actual yield and yield with improved practice and farmers practice

Yield: Kg/ha 2003-04 to 2004-05

State	Improved Practice	Farmer practice	Actual 2003-04	Gap % between I and F	Gap % between I and A
Rainfed (upland) 2003-04					
Chhattisgarh	3740	3138	1455	19.2	157.0
Jharkhand	2292	1380	1695	66.1	35.2
Manipur	4277	1830		133.7	
Uttar Pradesh	3620	2480	1942	46.0	86.4
Rainfed (shallow lowland)/ Boro; 2003/04, 2004/05					
Assam	4520	2550	1534	77.3	194.7
Chhattisgarh	3554	2784	1455	27.7	144.2
Jharkhand	3480	2300	1695	51.3	105.3
Manipur	6350	5095		24.6	
Tripura	1360	1520		-10.5	
UP	3656	3432	2187	6.5	67.2
Irrigated					
Chhattisgarh	3919	3137	1455	24.9	169.4
Bihar	4883	4158	1516	17.4	222.1
Gujarat	5585	4890	1891	14.2	195.3
J&K	7488	4705	1941	59.1	285.8
UP	7050	5200	2187	35.6	222.4
Uttaranchal	3850	3200	1942	20.3	98.2

II.4

State-wise performance and potential of maize as revealed by actual yield and yield with improved practice and farmers practice

Yield: Kg/ha 2003-04 to 2004-05

State	Improved Practice	Farmer practice	Actual 2003-04	Gap % between I and F	Gap % between I and A
Assam	2899		719		303.2
Bihar	3719		2374		56.6
Chhattisgarh	4023		1384		190.7
Gujarat	1834		1717		6.8
Himachal Pradesh	3546		2444		45.1
Jharkhand	2600		1604		62.1
J&K	3690		1658		122.5
Karnataka	3317		2013		64.8
Madhya Pradesh	4575		2056		122.5
Orissa	3389		1417		139.1
Punjab	3503		2980		17.5
Rajsthan	2550		1863		36.8
TN	4881		1567		211.5
Uttar Pradesh	3736		1392		168.4
Uttaranchal	2090		1478		41.4

II.5

State-wise performance and potential of sorghum as revealed by actual yield and yield with improved practice and farmers practice

Yield: Kg/ha 2002-03 to 2003-04

State	Improved practice	Farmer practice	Actual 2003-04	Gap % between I and F	Gap % between I and A
Andhra Pradesh	2402	1513	1145	58.8	109.8
Gujarat	2134	1414	1006	50.9	112.1
Karnataka	1503	1219	471	23.3	219.0
Madhya Pradesh*	1510	984	1332	53.5	13.3
Maharashtra	1832	1242	727	47.5	151.9
Rajasthan*	1911	611	714	212.7	167.6
Tamil nadu	1837	1356	612	35.5	200.2
Uttar Pradesh*	1755	1122	1004	56.5	74.8

* Relates for kharif season only

II.6

State-wise performance and potential of sugarcane as revealed by actual yield and yield with improved practice and farmers practice

Yield: Kg/ha 2000-01 to 2004-05

State	Improved practice	Farmer practice	Actual 2003-04	Gap % between I and F	Gap % between I and A
Uttar Pradesh	90950	70350	55541	29.3	63.8
Bihar	74420	49440	40990	50.5	81.6
Punjab	76230	68970	53821	10.5	41.6
Haryana	82670	72610	58012	13.9	42.5
Rajasthan	79210	61480	53345	28.8	48.5
Gujarat	102950	83030	71820	24.0	43.3
Madhya Pradesh	112550	84660	42089	32.9	167.4
Maharashtra	127440	99520	51297	28.1	148.4
Tamil Nadu	127660	109780	91924	16.3	38.9
Uttaranchal	83350	75590	59773	10.3	39.4
Karnataka	147390	128000	66667	15.1	121.1
Assam	85470	60590	38638	41.1	121.2
Orissa	113180	90360	58774	25.3	92.6
AP	83960	58960	72105	42.4	16.4
Kerala	101650	80190	84265	26.8	20.6
India	99270	79580	58988	24.7	68.3

II.7

State-wise performance and potential of cotton as revealed by actual yield and yield with improved practice and farmers practice

Yield: Kg/ha 2002-03 to 2003-04

State	Improved practice	Farmer practice	Actual 20003-04	Gap % between I and F	Gap % between I and A
Punjab	1820	1467	556	24.0	227.2
Haryana	1845	1597	454	15.5	306.4
Rajasthan	1753	1532	351	14.5	399.5
Gujarat	905	688	417	31.6	116.9
Orissa	701	553	409	26.7	71.3
Madhya Pradesh	1166	903	190	29.2	513.7
Maharashtra	1002	861	189	16.4	430.2
Karnataka	1498	1240	174	20.8	760.6
AP	1711	1543	384	10.9	345.6
Tamil Nadu	1765	1442	213	22.4	728.6

II.8

State-wise performance and potential of mustard as revealed by actual yield and yield with improved practice and farmers practice

Yield: Kg/ha 2002-03 to 2004-05

State	Improved practice	Farmer practice	Actual 2004-05	Gap % between I and F	Gap % between I and A
Bihar	1385	942	830	47.0	66.9
Chhattisgarh	1101	772	432	42.6	154.9
Haryana	1640	1410	1559	16.3	5.2
Himachal Pradesh	na	na			
a) Mustard	1320	790	556	67.1	137.4
b) Karan Rai	883	287	556	207.7	58.8
Jharkhand	802	440		82.3	
Madhya Pradesh	1966	1675	1007	17.4	95.2
Rajasthan	1667	1413	1306	18.0	27.6
Tamil Nadu	232	155		49.7	
Uttar Pradesh	1545	1130	1008	36.7	53.3
Uttaranchal	1319	1054	846	25.1	55.9
Punjab	1561	1420	1196	9.9	30.5

II.9

State-wise performance and potential of soyabean as revealed by actual yield and yield with improved practice and farmers practice

Yield: Kg/ha 2002-03 to 2004-05

State	Improved practice	Farmer practice	Actual 2003-04	Gap % between I and F	Gap % between I and A
Himachal Pradesh	1440	1154	1000	24.9	44.0
Uttaranchal	1973	1496	1294	31.9	52.5
Madhya Pradesh	1442	1134	1130	27.2	27.6
Chhattisgarh	2208	1669	845	32.3	161.2
Maharashra	1907	1514	1396	25.9	36.6
Rajasthan	1503	1159	1400	29.7	7.3
Karnataka	1517	1303	532	16.4	185.1
Tamil Nadu	1456	1140		27.8	

Appendix Table III.1

Trend in direct consumption of cereals and pulses as food

Kg/person/year

	1973-74	1983	1993-94	2004-05
A. Rural				
Rice	83.95	80.67	85.41	79.68
Wheat	42.83	54.26	53.53	52.23
Fine cereals	126.78	134.93	138.94	131.91
Jowar			10.22	5.23
Bajra			5.84	4.73
Maize			4.62	3.74
Other cereals			3.41	1.84
Course Cereals	56.82	45.14	24.09	15.52
Total cereals	183.60	180.07	163.03	147.44
Pulses			9.25	8.20
Foodgrain			172.28	155.64
B. Urban				
Rice	65.46	64.73	64.36	59.04
Wheat	52.56	58.64	57.43	56.53
Fine cereals	118.02	123.37	121.79	115.57
Jowar			4.75	2.74
Bajra			1.58	1.37
Maize			0.37	0.30
Other cereals			0.85	0.97
Course Cereals	19.71	14.11	7.55	5.39
Total cereals	137.73	137.48	129.33	120.96
Pulses			10.46	9.53
Foodgrain			139.80	130.49

Rice includes rice products like chira, khoi, lawa, muri, rice powder etc.

Appendix Table III.2

Per capita consumption of food items other than foodgrain

Unit: Kg/year, Eggs in number

Item	1987-88	1993-94	1999-00
Rural			
Milk and milk products	49.4	54.7	63.3
Meat	2.1	2.1	2.4
Egg	6.3	7.8	13.3
Fish	2.7	2.8	3.4
Edible oil	4.3	4.6	6.5
Vegetables	50.8	59.8	71.9
Fresh Fruits	9.7	15.7	17.3
Sugar and gur	10.0	9.5	13.1
Urban			
Milk and milk products	64.6	65.2	74.2
Meat	3.2	3.0	4.2
Egg	17.4	18.0	25.1
Fish	2.9	3.2	3.6
Edible oil	6.8	6.3	9.4
Vegetables	56.9	64.5	73.5
Fresh Fruits	15.7	25.4	26.9
Sugar and gur	11.8	11.7	16.1

Appendix Table IV.1

Prices of different types of fertilizer

Year	Urea (46% N)	Single Super Phosphate (16% w.s. P2O5)	Muriate of Potash (60% K2O)
1980-81	4.35	5.27	1.83
1985-86	5.11	5.94	2.17
1990-91	5.11	5.94	2.17
1991-92	6.91	8.07	2.93
1992-93	6.00	16.25	7.50
1993-94	6.00	14.25	6.34
1994-95	6.81	14.13	6.26
1995-96	7.22	16.60	7.15
1996-97	7.46	17.36	6.73
1997-98	7.96	17.19	6.17
1998-99	8.33	17.19	6.17
1999-00	9.35	17.19	6.63
2000-01	10.00	18.75	7.09
2001-02	10.50	18.75	7.43
2002-03	10.76	19.06	7.59
2003-04	10.50	20.09	7.43
2004-05	10.50	19.81	7.43
2005-06(P)	10.50	21.56	7.13

IV.2

State-wise share in fertilizer subsidies, area, and agricultural output

State	State's share in subsidy 2002-03 to 2005-06			State Share in		State share in crop output	Subsidy as % of NSDP ag.
	N	P and K	NPK	GCA	NSA		
	2005-06	2005-06	2005-06	2002-03	2002-03	2002-03	2003-04
A.P.	10.50	12.45	11.10	6.53	6.91	8.06	3.24
Assam	0.76	1.49	0.98	2.19	2.07	2.21	1.16
Bihar	5.56	2.12	4.52	4.33	4.22	4.70	2.24
Chhattisgarh	1.69	1.74	1.71	3.04	3.29		
Gujarat	6.02	5.61	5.89	6.00	6.52	5.43	2.68
Haryana	6.74	4.03	5.91	3.41	3.00	3.37	4.44
Himachal	0.26	0.25	0.25	0.52	0.46	0.74	0.90
J. K.	0.47	0.38	0.44	0.61	0.57	1.00	1.14
Jharkhand	0.64	0.73	0.67	1.17	1.25		
Karnatka	5.43	8.99	6.53	6.32	6.78	3.62	3.51
Kerala	0.75	1.81	1.07	1.63	1.61	2.47	1.05
Madhya Pradesh	4.67	6.08	5.09	10.33	10.66	6.80	2.03
Maharashtra	8.33	11.56	9.32	12.19	12.46	6.65	3.03
Orissa	1.87	1.97	1.90	4.50	4.46	3.07	1.51
Punjab	10.32	5.87	8.96	4.30	3.67	5.53	4.09
Rajasthan	4.60	3.28	4.20	11.15	11.66	5.19	2.18
Tamil Nadu	3.99	6.43	4.74	2.87	3.12	3.18	3.09
U.P.	20.91	14.71	19.01	13.96	13.01	13.90	3.44
Uttaranchal	0.78	0.54	0.71	0.69	0.63		
W.B.	5.21	9.44	6.49	5.23	4.56	7.94	1.93

F.No. M-12043/5/2006-Agri.
Government of India
Planning Commission
(Agriculture Division)
....

Yojana Bhavan
Sansad Marg, New Delhi
Dated: 25.10.2006

OFFICE MEMORANDUM

It has been decided to constitute, with the approval of Deputy Chairman, Planning Commission, a Steering Committee on Agriculture and Allied Sectors for formulation of the Eleventh Five-Year Plan (2007-12). The composition of the Steering Committee will be as follows:-

1. Dr. C.H. Hanumantha Rao ..... Chairman
   240-B, Jubilee Hills, Road No. 18
   Hyderabad – 500033
   Tele : 040 236 8656 (R)
   Fax : 040 2354 3166

2. Prof. V.S. Vyas ..... Member
   Institute of Development Studies
   8-B, Jhalana Institutional Area
   Jaipur – 302 004
   Tele : 09829065032 (M)
   Fax : 0141 2705601 (R)
   e-mail:- vsvyas@mac.com

3. Dr. A. Vaidyanathan ..... Member
   B-1, Sonali Apartment, Old No. 11
   Beach Road, Kalakshetra Colony
   Chennai – 600 090
   Tele : 09444909607 (M)
   044 24919607 (R)
   e-mail : avnathanster@gmail.com

4. Dr. G.S. Kalkat, Chairman ..... Member
   Punjab State Farmers' Commission
   House No. 706, Sector 11-B
   Chandigarh
   Tele : 09872881706 (M)
   0172 2746076 (R)
   e-mail:- farmercomm@punjabmailgov.in

5. Prof. Abhijit Sen, Member, Planning Commission ..... Member
   e-mail:- abhijit.sen@nic.in

6. Prof. V.L. Chopra, Member, Planning Commission..... Member
   e-mail:- vlchopra@nic.in

7. Dr. V.V. Sadamate, Adviser (Agri.) ..... Convener
Planning Commission
e-mail:- sadamate@yahoo.com

2. Specific Terms of reference assigned to this Steering Committee are:

2.1 To interact with the various Working Groups set up by the Planning Commission relating to agriculture and allied sectors for the Eleventh Five Year Plan (2007-12) and review their recommendations,

2.2 To consider the reports of the National Commission on Farmers (NCF) and the NDC Sub-Committee on Agriculture and related issues and its six Working Groups and;

2.3 Based on 2.1 and 2.2 above; suggest plans and schemes for Eleventh Plan including modification, up scaling or discontinuation of ongoing programmes.

3. The Steering Committee may co-opt/invite any other official/non-official expert/representative of any organization as member(s)/special invitee, if required and may devise its own procedures for conducting its business including meetings.

4. The Steering Committee may examine and address issues which are important but are not specifically spelt out in the ToR.

5. The expenditure of the Members on TA/DA in connection with the meetings of the Steering Committee will be borne by the Ministry/Department/State Government to which they belong. In case of non-officials, the TA/DA will be borne by the Planning Commission as admissible to the class –I officers of the Government of India.

6. The Steering Committee will submit its Interim Report by Mid December, 2006

(Surinder Singh)
Director (Agriculture)

Chairman and all Members of the Steering Committee.

Copy forwarded to :-

1. Principal Secretary to the Prime Minister.
2. Pr.Advisers/Advisers/JS (SP&Admn.). Planning Commission.
3. PS to Deputy Chairman, Planning Commission.
4. PS to MOS.
5. PS to all Members, Planning Commission.
6. PS to Member-Secretary, Planning Commission.
7. Director (PC).
8. Accounts-I Branch, Planning Commission.
9. Information Officer, Planning Commission.

F.No. M-12043/5/2006-Agri.
Government of India
Planning Commission
(Agriculture Division)
....

Yojana Bhavan
Sansad Marg, New Delhi
Dated: 19th March, 2007

OFFICE MEMORANDUM

In continuation to the Planning Commission's Office Memorandum of even no dated 25th October 2006, it has been decided, with approval of the Deputy Chairman, Planning Commission, to include the following member in the Steering Committee on Agriculture and Allied Sectors for formulation of the Eleventh Five-Year Plan (2007-12):-

1. Dr. Ramesh Chand, ... Member
   National Professor (ICAR),
   National Centre for Agricultural Economics and Policy Research (NCAP),
   Library Avenue,
   Pusa,
   New Delhi - 110012
   P.B.No. 11305
   Telefax No. 011- 25842665

2. Other terms and conditions of the Steering Committee remain unchanged.

(Surinder Singh)
Director (Agriculture)

To,

1. **The Chairman of the Steering Committee,**
2. **Dr. Ramesh Chand and**
3. **All other Members of the Steering Committee.**

Copy forwarded to:-

1. Principal Secretary to the Prime Minister.
2. Pr.Advisers/Sr. Advisers/Advisers.
3. PS to Deputy Chairman, Planning Commission.
4. PS to MOS.
5. PS to all Members, Planning Commission.
6. PS to Member-Secretary, Planning Commission.
7. Director (PC).
8. Accounts-I Branch, Planning Commission.
9. Information Officer, Planning Commission.

Annexure

Summary of 11th Plan proposal of the Ministry of Agriculture for Consideration of the Steering Committee

*****

A meeting chaired by Member in-charge Agriculture was held with Secretary, Department of Agriculture & Cooperation (DAC) and Secretary, Department of Animal Husbandry, Dairying and Fisheries (DAHDF) on 5th April 2007 in order to discuss the nature of schemes and the allocation of funds during the 11th Plan. Prior to the meeting, the concerned Departments of the Ministry of Agriculture were furnished with the recommendations of the respective Working Group.

DAHDF

On Animal Husbandry, Dairying and Fisheries, the Department has proposed an outlay of Rs.16678 crore (659.21 percent increase over 10th Plan). The Working Group on the other hand had recommended an outlay of Rs.41783 crore excluding NFDB for Rs.2070 crore.

A few salient features that are brought about during the 11th Plan are briefly indicated below:

i A large number of schemes which are implemented by the Department presently involving small allocations are being clubbed and brought under 7 Heads including Dairy Development. Similarly, fisheries sector is also brought under 7 Heads including NFDB. This will ensure proper monitoring and evaluation of the schemes.

ii Significantly, the Department had not made any provision for Extension and technology transfer during the 10th Plan, nor made any proposal during the 11th Plan also. However, in view of the importance of Extension for transfer of technology and animal health, the Working Group has recommended Rs.250 crore for the 11th Plan.

iii The nature of schemes that could be taken up by NFDB shall have to be clearly defined. This in turn would take out a substantial volume of development work from the Deptt. of Fisheries which shall have to shift its role during the 11th Plan.

DAC

The Department of Agriculture and Cooperation (DAC) has proposed an outlay of Rs.51,052 crore (286 percent increase over 10th Plan outlay of Rs.13200 crore) as against which the total outlay recommended by the 9 Working Groups is Rs.1,81,871 crore.

A few salient features are as follows:

i Under food security, a provision of Rs.1500 crore has been made. At present, DAC is proposing to take up a special programme on Wheat. A similar programme may be extended to Rice also during the course of the Plan period.

ii During 11th Plan, fraction and small allocation for rainfed areas shall be amalgamated and brought under a larger heading to be known as 'Natural Resource Management'. Operation of funds under this heading shall be largely guided by NRAA. For 11th Plan an outlay of around Rs.5720 crore was proposed by the Department and Rs.29898 crore has been recommended by the Working Group.

iii DAC has made a substantial allocation for Horticulture.

iv There shall be a substantial increase in the allocation for Extension which brings under its ambit different approaches and strategies.

v The component of Macro Management of Agriculture (MNA) shall be substantially increased. The operation of MMA shall be largely guided by the Regional Planning Authorities proposed to be established co-terminus with the agro-climatic zones.

vi Allocation under Micro-Irrigation shall be augmented during the 11th Plan so as to cover not only Horticulture crops but other crops as well.

vii On soil health DAC has proposed a mega-project which shall cover all aspects from identifying deficiencies of the soil to treating them.

DARE

Nature of schemes/ programmes to be taken up during 11th Plan

1. The 10th Plan outlay for Department of Agriculture Research and Education was Rs.5368 crore for various programmes and activities related to Crop Science, Horticulture, NRM, Animal Science, Fisheries, Extension, NATP, Agricultural Education, etc.

2. Agricultural research system needs to be thoroughly revamped and restructured in the light of the advice rendered by High powered Committees chaired respectively by Dr. M.S. Swaminathan and Dr. R.A. Mashelkar. Bold action is required for their implementation. Similar to the 'knowledge deficit' at the farmer's level, there is 'action deficit' in the research system.

3. The Indian Council of Agricultural Research (ICAR) has experience of past several decades of block budgeting wherein the budget allocation is made irrespective of the performance of different projects. Of late, the weakness of this pattern of budgeting has become evident and a need has been felt to have the budgeting with monitorable indicators to the project. ICAR was asked about a year back to shift to project based funding in preparation for the 11th Five Year Plan. This kind of budgeting/ research would enhance overall efficiency of the research institutions by inculcating a healthy competition amongst scientists and encouraging them to make more focused efforts to achieve the targets.

4. With regard to utilization of National Fund for Basic and Strategic Research in Agriculture, there is need to adopt a clearly stated strategy/ roadmap for addressing high priority selected challenges facing Indian agriculture, for pegging programmatic intervention of requisite type.

5. Apart from increasing public investment to a level of 1% of Agriculture GDP, there is a need of improving the efficiency of agriculture research system. The number of Institutes is ever expanding with overlapping mandates. The mushrooming of Institutes thinly spreads the scarce resources as well as loses the focus required in research. There is strong case for rationalizing the number and consolidating the Institutes around critical thrust area so as to avoid duplicity in research effort and transit from commodity approach to deploying quality disciplinary science to systems efficiencies.

6. The priority setting in the past and present agriculture system has been on informal approach and individual perceptions which is not helpful in resetting agricultural research agenda. There is need for institutional system of setting priorities for research for the sake of continuity and efficiency.

7. There is need to define responsibility between the national and the State level institutes. The ICAR should partner and mentor State Agricultural Universities tackling regional and local research priorities.

8. There is a need to streamline operating procedures for conducting research. More autonomy to the scientists, clearly defined pathways and milestones are required to tackle these problems.

9. With regard to new initiatives/ institutes, the need is to meet the requirements of revised and prioritized research agenda reorient and revised mandate of new institutional patterning need-based research priorities.

10 It would be necessary that all agricultural development and research programmes are evaluated using productivity and farm income as the performance indicators. This would also provide a quantitative measure for assessing the success of the programme at the end of the Plan period.

11. As against the proposal of the Department of agricultural research and education at 12176.40 crore (226.83 percent increase over 10^{th} Plan) the Working Group has recommended Rs. 31672 crore. The Division recommends change in the approach of ICAR into a project mode. Proliferation of research institutes will be restricted. Innovative quick result oriented research by SAUs/ ICAR and other research institutes which are State-specific shall be encouraged.

11TH PLAN OUTLAY

DAC	**Rs. in Crores**
Proposed by DAC	Rs. 51052
Recommended by Working Group	Rs. 181871

DAHDF

Proposed by DAHDF	Rs. 16678
Recommended by Working Group	Rs. 41783

DARE

Proposed by DARE	Rs. 12176
Recommended by Working Group	Rs. 31672

Total

Proposed by Department	Rs. 79906
Recommended by Working Group	Rs. 255326