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MINISTRY OF AGRICULTURE
(DEPARTMENT OF AGRICULTURE AND COOPERATION)

(CROP DIVERSIFICATION)

COMMITTEE ON ESTIMATES
(2012-2013)

TWENTY THIRD REPORT

FIFTEENTH LOK SABHA

LOK SABHA SECRETARIAT
NEW DELHI

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Presented to Lok Sabha on 30.04.2013

LOK SABHA SECRETARIAT
NEW DELHI

April, 2013/ Vaisakha , 1935(S)

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3.	Dr. Yumnam Arun Kumar	-	Deputy Secretary

[1] Expired on 24.01.2013

INTRODUCTION

I, the Chairman of Committee on Estimates (2012-2013) having been authorized by the Committee to submit the Report on their behalf, present this Twenty Third Report on 'Crop Diversification' pertaining to Ministry of Agriculture (Department of Agriculture and Cooperation).

2. The representatives of the Ministry of Agriculture (Department of Agriculture and Cooperation) briefed the Committee on 14.06.2012 on the subject. The Committee took their oral evidence on 29.08.2012.

3. The Report on the subject was considered & adopted by the Committee at their sitting held on 26.04.2013.

4. The Committee wish to express their thanks to the representatives of the Ministry of Agriculture (Department of Agriculture and Cooperation), who appeared before them and placed their considered views on the subject. The Committee also wish to thank them for furnishing the information required in connection with examination of the subject.

NEW DELHI;
29 April, 2013
Vaisakha 9 ,1935(S)

FRANCISCO SARDINHA,
CHAIRMAN,
COMMITTEE ON ESTIMATES

REPORT ON

"CROP DIVERSIFICATION"

PART – I

BACKGROUND ANALYSIS

CHAPTER - I

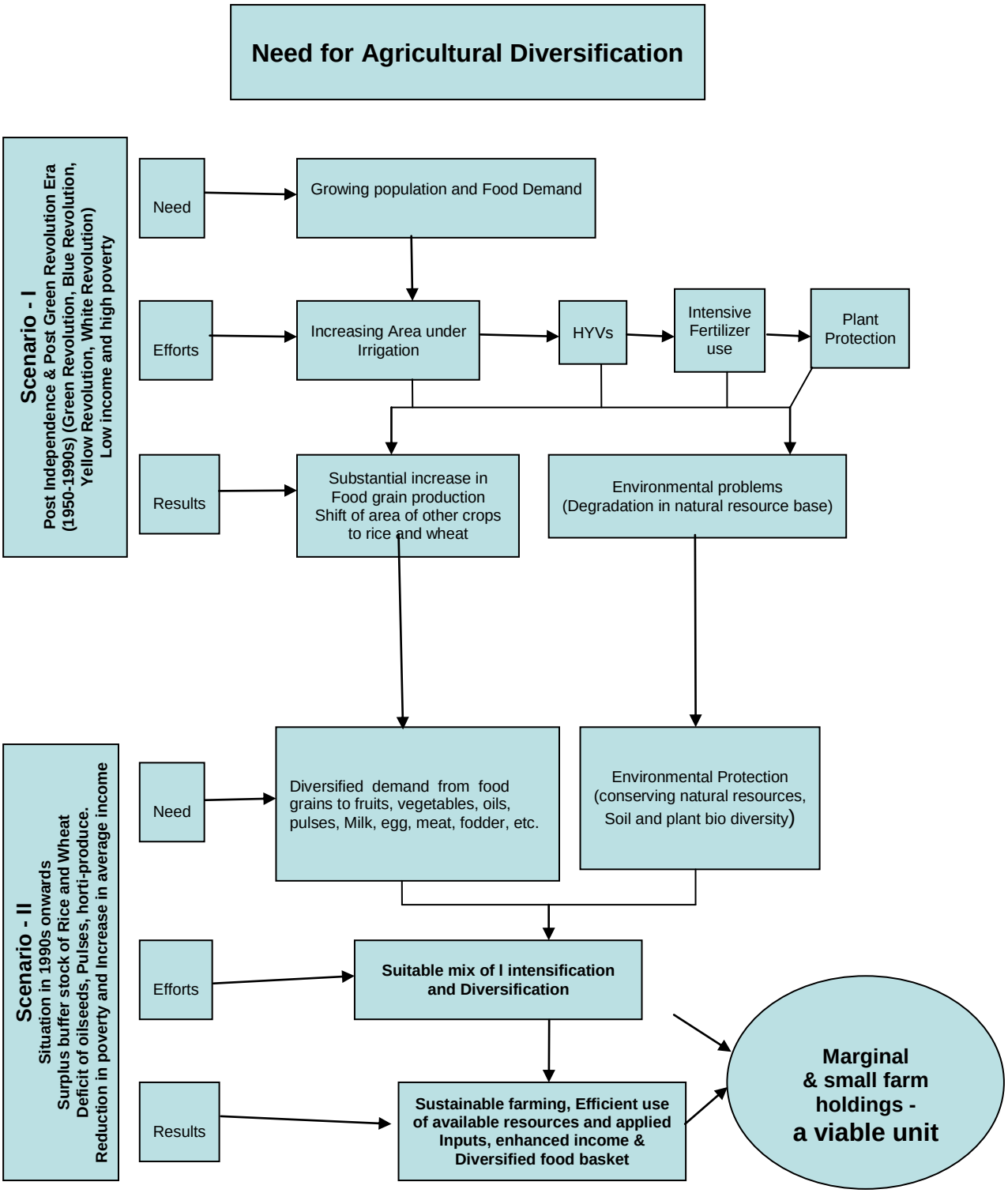
INTRODUCTORY

In India, agriculture is considered as the single most important livelihood of the masses. Over the years, the various policy initiatives of the Government have been focusing to attain self-sufficiency and self-reliance in foodgrains production in the country. However, a sustained economic growth, rising per capita income and growing urbanization since 1990s are ostensibly causing a shift in the consumption patterns in favour of high value food commodities like fruits, vegetables, dairy, poultry, meat and fish products from staple foodgrains such as rice, wheat, other cereals and pulses. The demand for and supply of these high value food commodities has grown much faster than those of foodgrains leading towards crop diversification in the country. According to the Department of Agriculture and Cooperation (DAC), some of the compulsive factors that lead to introduction of crop diversification in Indian agriculture *inter-alia* include conservation of natural resources (soil, water, etc.); improvement in soil fertility and productivity; better water and nutrient use efficiency; increasing income on small farm holdings; withstanding price fluctuation; mitigating ill-effects of aberrant weather; balancing food demand; improving fodder for livestock animals; minimizing environmental pollution; reducing dependence on off-farm inputs; ensuring food security and mitigating the climate change effects.

1.2 According to the DAC, crop diversification is intended to diversify the production system providing a variety of choice in the production of a variety of crops in a given area and time so as to expand agricultural activities and also to minimize risk. Crop diversification in our country is generally viewed as a shift from traditionally grown less

remunerative crops to more remunerative crops, like oilseeds, pulses, fodder crops, horticulture, medicinal and aromatic plants. Crop shift (diversification) also takes place due to Government's policies and thrust on these crops over a given period of time. Various support mechanisms on production, marketing, etc. induce crop shifts.

1.3 The need for crop diversification in different scenarios of agricultural development in the country is depicted in following flow chart:


Need for Agricultural Diversification
Scenario - I
Post Independence & Post Green Revolution Era
(1950-1990s) (Green Revolution, Blue Revolution,
Yellow Revolution, White Revolution)
Low income and high poverty
Need
Growing population and Food Demand
Efforts
Increasing Area under Irrigation
HYVs
Intensive Fertilizer use
Plant Protection
Results
Substantial increase in Food grain production
Shift of area of other crops to rice and wheat
Environmental problems
(Degradation in natural resource base)
Scenario - II
Situation in 1990s onwards
Surplus buffer stock of Rice and Wheat
Deficit of oilseeds, Pulses, horti-produce.
Reduction in poverty and Increase in average income
Need
Diversified demand from food grains to fruits, vegetables, oils, pulses, Milk, egg, meat, fodder, etc.
Environmental Protection
(conserving natural resources, Soil and plant bio diversity)
Efforts
Suitable mix of I intensification and Diversification
Results
Sustainable farming, Efficient use of available resources and applied Inputs, enhanced income & Diversified food basket
Marginal & small farm holdings - a viable unit

1.4 As per the information furnished by the DAC, continuous cultivation of a group of crops in the Indo-Gangetic Plain of the country has created many agro-ecological problems like deterioration in inherent soil fertility, physical conditions of soil, etc. Excessive exploitation of underground water has led to fall in water table while excessive use of water in canal network area has brought about soil salinity and alkalinity. Depletion of organic carbon content of soil (from 0.8 to 0.2 percent or even low) as evident from experimental results of Punjab Agricultural University, Ludhiana indicates poor soil support for crop growth. The study has revealed a fall of almost half a meter per year in water table in Punjab. Continuous and heavy use of pesticides in rice, wheat and cotton has led to environmental hazards including the depletion of ozone layer. The intensive use of fertilizers has increased the nitrate concentration in water. Use of industrial effluents for agriculture especially near cities has created problem of heavy metals in the food chain. Emission of Methane from low lying rice areas also causes environmental hazards. According to the DAC, these problems can be reduced to minimum by incorporating horticultural/plantation crops, oilseeds and pulses in the system based on the suitability of land resources.

1.5 Although the nation has surplus foodgrain stocks, yet the food and nutritional security at household level continue to be an area of concern. The per capita availability of foodgrains is 438.6 grams/day against the recommended level of 500 grams/day. The availability of pulses, a rich source of protein to the huge vegetarian population of the country, is less than 31.6 grams/day/capita against the recommended intake of 55 grams/day/capita. The per capita availability of vegetables is below the recommended Dietary Allowance of 295 grams/day by about 40 grams/day. The availability of oils and fats is about 20.2 grams/day against the requirement of 40 grams/day. With increasing standards of living, the need for edible oils, pulses and horticultural produce will further increase, this would inevitably calls for increasing oilseed, pulses, horticultural crops production. Therefore, there is need for diversification from cereal dominated production system to horticulture, oilseeds, and pulses to increase the area under these crops to enhance the production to meet the increasing demand of diversified food basket in the country.

1.6 According to the DAC, monoculture and continuous cropping of rice–wheat system have resulted in deteriorating soil fertility. The soil has deteriorated leading to build up of diseases and pests. The decline in factor productivity in the most productive regions in the country has become a major concern. All these developments have endangered the basic fabric of sustainability in some of the most productive zones of the country. Pulses, when included in cropping system, offer a unique opportunity in building up soil fertility by virtue of converting atmospheric nitrogen into assimilable form of ammonia (Biological Nitrogen Fixation). The inclusion of pulses in cereal-cereal system economizes nitrogen use to the tune of 30-40 kg/ha for succeeding cereal crops.

1.7 Under mono-cropping situation, the labour requirement is limited to peak crop season, leaving the remaining period dry for employment. Moreover, the attraction towards conventional agriculture is reducing in educated rural youth. According to the DAC, technology driven interventions in crops as well as horticulture sector (floriculture, poly house farming etc.) will provide intellectual satisfaction and attract the rural youth. Diversified agriculture may help in creating additional employment opportunities.

1.8 According to the DAC, the substantial growth in the area of rice and wheat coupled with productivity gain by virtue of improved varieties and input intensive cropping has resulted into huge foodgrain stocks, storage and the disposal of which have become a problem. Contrary to this, the nation has to depend increasingly on import of edible oils and pulses to meet the domestic needs. This again needs consideration for agricultural diversification from rice–wheat system.

1.9 As per the information furnished by the DAC, milk, meat and egg production has to be increased substantially to meet the growing demands. This would be possible only through improved cattle breeds, better feed and fodder quality leading to an immense need to bring additional area under fodder cultivation through diversification or by utilizing culturable waste and fallow lands.

1.10 The Indian agriculture is characterized by small and marginal farm holdings. The average farm size is only 1.23 hectares (ha). Around 94 percent of farmers have land holdings smaller than 4 ha and they cultivate nearly 65 percent of the arable land. On the other hand, only 1 percent of the farmers have operational land holdings above 10 ha and they utilize only 11.8 percent of the total cultivated land.

1.11 As per the information furnished by the DAC, inspite of the fragmented land holdings and limited utilisation of cultivable land, India is bestowed with diverse agro-climatic conditions favourable for cultivation of diverse crops. Broadly, these crops are classified into two groups – foodgrain crops and commercial crops. Due to the challenge of feeding our vast population and the experience of food shortages in the pre-independence era, 'self reliance' in foodgrains has been the cornerstone of our policies in the last 60 years. Around 65 percent of the total cultivated area is under food grain crops (cereals and pulses). The cultivation of commercial crops especially cotton, sugarcane, spices, etc. continues to be promoted to meet the growing demand of the increasing population. However, as per the estimates released by the Central Statistics Office (CSO), the share of GDP in Agriculture and Allied Sectors to GDP of the total economy of the country at 2004-05 prices has declined from 35.7 percent in 1980-81 to 14 percent in 2011-12.

1.12 As per the information furnished by the DAC, there was renewed focus on foodgrains in the Eleventh Five Year Plan in view of their stagnating production and increasing demand. A number of initiatives such as 'National Food Security Mission' and 'Rashtriya Krishi Vikas Yojana' were taken up to improve crop production. As a result of increased attention to agriculture in recent times, there is marked improvement in production of foodgrains, fruits and vegetables. Under Oilseeds also there is jump in the production to about 32.5 million tonnes. However, inspite of the encouraging increase in the production, a large quantity of these commodities are still being imported to bridge the demand–supply gap.

1.13 According to the DAC, shift of large area of less remunerative coarse cereals like maize, jowar, bajra and small millets to rice and wheat made country self sufficient to a large extent. However, due to adequate cereal stocks, priority was given to pulses and oilseeds following a regionally differentiated strategy, i.e. promotion of crops and commodities in the agro-climatic regions that suited them the most. Over the years i.e. 1950-51 to 2010-11 these initiatives have resulted in increase in area by 16.49 million ha in oilseeds; 7.32 million ha under pulses, 1.65 million ha in potato, 7 million ha in vegetables, fruits and others, 5.36 million ha in cotton and 3.17 million ha in sugarcane. Though the area of total coarse cereals has reduced by 9.24 m ha during the same period, the area under maize which is relatively more productive and remunerative amongst the coarse cereals due to its better yield potential and diversified uses, has increased by 4.11 m ha. Similarly, large increase in area of oilseeds was triggered due to introduction of more remunerative crop of soybean during the 70s in rainfed areas of Central India. The area of soybean has increased from 0.03 million ha in 1970-71 to 9.95 million ha in 2011-12.

1.14 The total production of rice, wheat, pulses and oilseeds in the country has grown from 207.6 million tonnes to 245.4 million tonnes during the period pertaining to 2006-07 to 2011-12 (4^{th} advance estimates). During the afore-mentioned period, the production of wheat and rice has grown from 169.2 million tonnes to 198.2 million tonnes whereas the production of pulses and oilseeds has grown from 38.5 million tonnes to 47.2 million tonnes

1.15 According to the DAC, some of the horticultural crops like potato and banana also registered significant increase. Similarly, efforts under National Horticulture Mission and Technology Mission on Horticulture for North Eastern and Hill States have resulted in impressive gains during the Eleventh Five Year Plan.

1.16 Inspite of the impressive achievements, the Indian agricultural sector continues to face poor infrastructure conditions. About 60 percent of the gross cropped area of the country is rainfed/dryland which are predominantly mono-cropped and are mostly

dependent on rainfall, which is also greatly characterized by large variations in terms of precipitation both spatially and in time. Besides, majority of farmers in the country are yet to gain the positive impact of advancement and application of science and technology in agriculture. As a result, the productivity levels of many major crops in India do not compare very favourably with the yields obtained in other countries such as China, Brazil, Japan, Egypt, Korea, France, Germany, etc. Besides, the illiteracy of the farmers is one of the constraints to shift to more remunerative cropping patterns in response to market signals.

1.17 Details of area production and yield of principal crops in various countries in 2009 is given at Appendix - I.

1.18 As per the information furnished by the DAC, about 60 percent of the gross cropped area of the country is rainfed/dryland which are predominantly mono-cropped. The risk of crop failure due to failure of rains is very high in these production systems. Diversified agriculture through inter-cropping, agro-forestry, horticulture and plantation crops may help in minimizing the risk of complete crop loss and thereby ensuring income to the farmers. According to the DAC, the oilseeds and pulses are the preferred crops in the regions and the Government is implementing 'Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize' (ISOPOM) and 'National Food Security Mission' (NFSM) to promote these crops with sustainable use of inputs.

1.19 According to the DAC, the large population of farming in the country comes under small and marginal land holding. Crop diversification through multiple cropping with off-farm activities offers great scope for making these farm holdings viable. Accordingly, the Government is promoting custom hiring hubs of the machineries to facilitate mechanization of small and marginal farm holding. To make smaller farms more productive and remunerative micro-irrigation and hi-tech horticulture are being promoted. To augment the impact of improved technologies, cluster approach for promotion of different interventions under NFSM, 'Accelerated Pulses Production Programme (A3P)' and 'Bringing Green Revolution to Eastern India' (BGREI) has been adopted. Besides, Farmers Producers Organizations are being created for

mainstreaming the small and marginal farmers and providing them the market linkages for contract farming.

1.20 From the above it is clear that crop diversification in the country needs to be given special focus. Though Government is taking measures to diversify agriculture, sustained efforts are required to popularize the same amongst the farming community.

1.21 As per the information furnished by the DAC, some of the major problems and constraints in introducing crop diversification in the country are primarily due to the following reasons with varied degrees of influence:

(i) A large part of the cropped area in the country is completely dependent on rainfall.

(ii) Sub-optimal and over-use of resources like land and water resources, causing a negative impact on the environment and sustainability of agriculture.

(iii) Inadequate supply of seeds and planting materials of improved cultivars.

(iv) Fragmentation of land holding less favouring modernization and mechanization of agriculture.

(v) Poor basic infrastructure like rural roads, power, transport, communications, marketing, processing, storage, etc.

(vi) Weak research - extension - farmer linkages.

(vii) Inadequately trained human resources, together with persistent and large scale illiteracy amongst farmers.

(viii) Poor database for horticultural crops.

(ix) Decreased investments in the agricultural sector over the years.

(x) Slow pace of pricing reforms in agriculture marketing.

1.22 In this backdrop, the Committee deemed it fit to take this subject for detailed examination and Report to Lok Sabha. The Committee examined the subject in detail and identified certain critical issues as enumerated in the succeeding Chapters of this Report.

CHAPTER II

SCHEMES FOR CROP DIVERSIFICATION

According to the Ministry of Agriculture, the DAC is implementing several schemes, which facilitate diversification towards more remunerative and productive crops/cropping systems. These include (i) National Food Security Mission (NFSM), (ii) Technology Mission on Oilseeds and Pulses (TMOP), (iii) National Horticulture Mission for North-East and Himalayan States (HMNEH), (iv) National Horticulture Mission (NHM) and (v) Rastriya Krishi Vikas Yojana (RKVY). The details of the schemes are given below:

(a) National Food Security Mission (NFSM)

2.2 According to the DAC, the National Development Council (NDC) in its 53rd meeting held on 29th May, 2007 adopted a resolution to launch Food Security Mission comprising rice, wheat and pulses to increase the production of rice by 10 million tonnes, wheat by 8 million tonnes and pulses by 2 million tonnes by the end of Eleventh Five Year Plan. Accordingly, a Centrally Sponsored Scheme 'National Food Security Mission (NFSM)' was launched from Rabi 2007-08 to operationalise the above mentioned resolution. The National Food Security Mission has three components viz. National Food Security Mission- Rice (NFSM-Rice), National Food Security Mission-Wheat (NFSM-Wheat) and National Food Security Mission- Pulses (NFSM-Pulses).

2.3 The main objective of NFSM is to increase production of rice, wheat and pulses through area expansion and productivity enhancement in sustainable manner in identified districts of the country; restoring soil fertility and productivity at individual farm level; creation of employment opportunities; and enhancing farm level economy (i.e. farm profits) to restore confidence among farmers.

2.4 NFSM is being implemented in 482 districts of 19 States viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Jammu & Kashmir,

Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. About 20 million hectares of rice area and 13 million hectares of wheat area is included in these districts that roughly constitute about 50 percent of cropped area for wheat and rice. For pulses, additional 4.5 million ha (20 percent cropped area) would be created.

2.5 The interventions under NFSM include demonstration of improved production technology; distribution of quality seeds of High Yielding Varieties and hybrids; popularization of newly released varieties; support for micro nutrients; gypsum; zero tillage; Rotavators; Conoweeders; seed drills; multi- Crop Planters; Power Weeders and other farm implements; Integrated Pest Management (IPM), Integrated Nutrient Management (INM), extension; water lifting and moisture saving devices; mass media campaign; local initiatives; awards for best performing districts; interventional exposures for technical knowledge enrichment; and project management team.

2.6 As per the DAC, support under this scheme for two more DAC – ICARDA – ICAR (Department of Agriculture & Cooperation – International Centre for Agricultural Research in Dryland Areas – Indian Council of Agricultural Research) collaborative projects on pulses have been launched. They are (i) Enhancing Lentil Production for enhanced livelihood in Rice Fallow Areas of Eastern India; and (ii) Pre-Breeding research project for breaking yield barriers in Lentil and Kabuli chickpea in India. ICARDA, Syria will be the nodal institute for implementation of these two projects.

2.7 According to the DAC, in addition to the above, Accelerated Pulses Production Programme (A3P) has been launched under NFSM-Pulses from Kharif 2010 for Demonstrations of Production and Protection Technologies on Village Level Compact Blocks for enhanced production of pulses as well as motivating Farmers. A3P has been conceptualized for active propagation of key technologies such as Integrated Nutrient Management (INM) and Integrated Pest Management (IPM) in a manner that creates catalyzing impact by assuring farmers of higher returns from the identified crops of pulses in the country under NFSM-Pulses during Eleventh Five Year Plan.

Budgetary Analysis of the Scheme

Financial Outlay and Expenditure of National Food Security Mission

(₹ in crore)

	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Proposed Outlay	0.00	1316	1100	1350	1350	5516
BE	0.00	1100	1350	1350	1350	5150
Actuals	396	878	1017	1279	1286	4857

2.8 It may be observed from the above Table that the actual expenditure was less than the budgetary provision by ₹ 222 crore (20 percent) in 2008-09, by ₹ 333 crore (25 percent) in 2009-10, by ₹ 71 crore (5 percent) in 2010-11 and by ₹ 64 crore (5 percent) in 2011-12. It is observed from the Outcome Budget 2013-14 that certain physical outputs like Distribution of HYV seeds, distribution of Hybrid seeds and Farmers Field School are far below from the desired targets set for the years 2011-12 and 2012-13. For instance, during 2011-12, the total distribution of HYV seeds was 303,786 Qtls. less than its stipulated target of 4,686,656 Qtls. Similarly, during 2012-13 as on December, 2012, there were 2,380,045 Qtls. of HYV seeds still left to be distributed vis-à-vis the stipulated target of 42,00,432 Qtls. of HYV seeds. Similar trend is also observed in case of distribution of Hybrid seeds. During 2011-12, only 44.41 percent of the set target could be achieved and as on December, 2012, the physical achievement made was only 48.04 percent of the set target. In case of the component of Farmers Field School, the achievement made was about 8 percent less than its stipulated target during the year 2011-12. For the year 2012-13 as on December 2012, the achievement made in terms of percentage was only 44.69 percent of the stipulated set target.

2.9 As per the Outcome Budget (2013-14), an outlay of ₹ 1850 crore was provided at the BE stage for the year 2012-13. As on December, 2012 ₹ 1502.37 crore have been spent out of the provided outlay. For the year 2013-14, an outlay of ₹ 2250 crore has been provided under the plan budget for ensuring foodgrain security by increasing

productivity in low productive areas by bridging the yield gaps in a cropping system approach that includes promotion of selected commercial crops like cotton, jute and sugarcane and enhancing soil fertility.

(b) Rashtriya Krishi Vikas Yojana (RKVY)

2.10 According to the DAC, Rashtriya Krishi Vikas Yojana (RKVY) was launched in 2007-08 with an outlay of ₹ 25,000 crore to incentivize States to enhance public investment to achieve 4 percent growth rate in agriculture and allied sectors during the Eleventh Five Year Plan. The scheme requires States to prepare District and State Agriculture Plans for creation of such infrastructure, which are essential to catalyse the existing production scenario for achieving higher production. Additional Central Assistance (ACA) is made available to States as 100 percent grant.

2.11 According to the DAC, the States have been provided flexibility and autonomy in the process of selection, planning, approval and execution of schemes to make investments in interventions as per their priorities and agro-climatic requirements so that the outcomes are as envisaged in the RKVY objectives. The projects of the State Governments are approved by the State Level Sanctioning Committees (SLSCs) under the Chairmanship of Chief Secretary of the respective States.

2.12 As per the information furnished by the DAC, funds are routed through State Agriculture Department, which is the nodal Department for the scheme. Over the years, outlay of RKVY has been stepped up. States have been released ₹ 14598.31 crore during 2007-08 to 2010-11. States have been reasonably prompt in approving projects and incurring expenditure under RKVY.

2.13 According to the DAC, RKVY is projectised and States have taken up over 5300 projects in the last five years across all segments of agriculture and allied sectors both for increasing production and productivity and creating infrastructure. RKVY format has also enabled taking up national priorities as sub-schemes, while keeping States' flexibility of project selection and implementation intact. All nine special

programmes/schemes with focused objectives are being implemented as sub-schemes of RKVY. These sub-schemes are:

(i) Bringing Green Revolution to Eastern India (BGREI)

2.14 Programme of bringing Green Revolution to Eastern India (BGREI) has been introduced covering the States of Assam, Bihar, Chhattisgarh, Jharkhand, Odisha, part of Eastern Uttar Pradesh and West Bengal, with objective of improvement in the rice based cropping system by intensive cultivation through promotion of recommended agricultural technologies and package of practices.

2.15 On being asked whether the negative impacts of Green Revolution such as degradation of fertility of soil, impact of pesticides and artificial fertilizers on the crops and environment as a whole have also been studied and measures taken so that Green Revolution in Eastern India can avoid/reduce the negative impact of Green Revolution in North Western India, the DAC in a note stated as under:

> "All the negative impacts of Green Revolution such as soil fertility degradation and excessive use of pesticides and chemical fertilizers are being addressed holistically under various programmes. Balanced use of fertilizers on the basis of soil test crop response is recommended by National Agricultural Research Systems for different crops and cropping systems so as to avoid excessive use of chemical fertilizers. Integrated Nutrient Management involving bio-fertilizers, organic manures and residue management through zero tillage is being promoted in rice, wheat and pulses under National Food Security Mission (NFSM) and Bringing Green Revolution in Eastern-India (BGREI). Besides, concerted efforts are being made to introduce pulses in rice–wheat and rice–rice system to economize the nitrogen use. Integrated Pest Management (IPM) with need based use of chemical pesticides is also promoted in rice, wheat and pulses under National Food Security Mission and BGREI. Emphasis has been given on judicious use of ground water to meet irrigation requirements".

2.16 The Committee have also been informed that the majority of the districts identified for the implementation of BGREI are high rainfall districts (>1200mm) and neither the surface water nor ground water availability is a constraint in Eastern Region. In fact, safe disposal of surface water during rainy season is a priority to avoid water logging/inundation.

(ii) Integrated Development of 60,000 Pulses Villages in Rainfed Areas Scheme

2.17 Integrated Development of 60,000 Pulses Villages in Rainfed Areas Scheme is in operation for attaining self-sufficiency in production of pulses within next three years in 60,000 pulses villages in rainfed areas for increasing crop productivity and strengthening market linkages.

(iii) Special Programme on Oil Palm Area Expansion (OPAE)

2.18 Special Programme on Oil Palm Area Expansion (OPAE) aims to bring 60,000 ha under oil palm plantation and integrating the farmers with the markets.

2.19 When asked about the steps taken to promote oil palm cultivation all over the country so as to be self sufficient and reduce import from countries like Indonesia and Malaysia, the DAC in a note stated as under:

> "The oil palm cultivation is being promoted through the Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM) which provides financial support for planting material, cultivation cost, installation of drip irrigation systems, diesel pump sets, training, development of waste land and technology transfer through demonstrations and publicity. Presently, the programme is being implemented in the States of Andhra Pradesh, Karnataka, Tamil Nadu, Gujarat, Goa, Odisha, Kerala and Maharashtra. Besides ISOPOM, a Mission on Oilseeds and Oil Palm has been announced in the budget of 2012-13. During 12th Plan period, the Department of Agriculture & Cooperation, Ministry of Agriculture envisages augmenting production of vegetable oils. In order to encourage investment in oil palm sector and to encourage farmers to grow oil palm, Government of India has launched a special scheme on Oil Palm Area Expansion (OPAE) under RKVY 2011-12. OPAE provides enhanced assistance for planting material, cost of cultivation, supply of drip systems, supply of pump sets, inter-cropping, INM/PM etc, vermi-compost etc, water harvesting/bore well, processing units and Research & Development (R&D) on Oil Palm. OPAE include a strategy indicating State specific targets for area expansion, interventions for oil palm development, research and development on oil palm, institutional linkages, and initiatives for creating processing facilities in needy states. OPAE is being implemented with an allocation of ₹ 100.00 crore under RKVY during 2012-13".

(iv) Vegetable Initiative for Urban Clusters

2.20 Vegetable Initiative for Urban Clusters aiming to meet the growing demand for vegetables by a robust increase in the productivity and market linkages. As per Annual Report (2011-12), an efficient supply chain will be established to provide quality vegetables at competitive prices. For this purpose, an amount of ₹ 300 crore has been provided.

(v) Initiative for Nutritional Security through Intensive Millets Promotion (INSIMP)

2.21 The sub-scheme aims to promote higher production of bajra, jowar, ragi and other millets in 1000 compact blocks covering about 25,000 villages and to provide market linked production support to ten lakh millet farmers in the arid and semi-arid regions of the country, upgrade millet processing technologies and create awareness regarding their health benefits to promote balanced nutrition.

2.22 When the Committee enquired about the steps which have been taken to resolve the declining trend of farming for pearl millets and corns in States like Bihar, Uttar Pradesh and Rajasthan, the DAC, stated as under:

> "Integrated Cereal Development Programmes for Coarse Cereals based cropping systems (ICDP-Coarse cereals) is being implemented in Bihar, Uttar Pradesh and Rajasthan under Macro Management to promote pearl millet and other millets. To promote corn in these states, Accelerated Maize Development Programme (AMDP) was implemented during IX Plan which was subsumed under Integrated Scheme on Oilseeds, Pulses, Oilpalm and Maize (ISOPOM) since 2002-03. It is true that the millets and corn require less water than rice and suit the low rainfall regions of the country. For promotion of millets, a dedicated programme on 'Initiative on Nutritional Security through Intensive Millet Programme (INSIMP) is being operated since 2010-11 in the country. Under this programme three dedicated Centres of Excellence, one each for sorghum at Directorate of Sorghum Reserach, Hyderabad, pearl millet at Chaudhary Charan Singh Haryana Agriculture University, Hisar and Small millets at University of Agriculture Sciences, Bangalore have been established to facilitate the production, processing and value addition of millets including ragi and other small millets".

vi) National Mission for Protein Supplements (NMPS)

2.23 National Mission for Protein Supplements aiming to take up activities to promote animal based protein production through livestock development, dairy farming, piggery, goat rearing and fisheries in selected blocks.

(vii) Accelerated Fodder Development Programme (AFDP)

2.24 Accelerated Fodder Development Programme aims to accelerate production of fodder through intensive promotion of technologies to ensure its availability throughout the year to benefit farmers in 25,000 villages.

(viii) Rainfed Area Development Programme (RADP)

2.25 Rainfed Area Development Programme aims to improve quality of life of farmers, especially small and marginal farmers by offering a complete package of activities to maximize farm returns for enhancing food and livelihood security of farmers.

(ix) Saffron Mission:

2.26 The sub-scheme of Saffron Mission aims at economic revival of saffron cultivation in Jammu and Kashmir.

2.27 As per the DAC, RKVY links 50 percent of Central Assistance to States by stepping up percentage of State Plan expenditure on agriculture & allied sectors. States have indeed increased allocation to agriculture and allied sector from ₹ 8770.16 crore (4.88 percent) in 2006-07 to ₹ 29413.12 crore (6.82 percent) in 2011-12 (RE).

2.28 According to the DAC, RKVY has emerged as the principal instrument in financing development of agriculture and allied sectors in the country. Its convergence with other Central Government Schemes i.e. National Rural Employment Guarantee Scheme (NREGS) has also helped to bolster development of the agrarian economy. RKVY is proposed to be continued in the XII Plan as a State Plan Scheme with some modifications. The proposed scheme will have three channels/streams – RKVY (Production Growth), RKVY (Infrastructure and assets) and RKVY (Special Schemes).

The scheme will be applicable to all States and UTs subject to the fulfillment of eligibility criteria. From the Financial Year 2013-14 onwards, 20 percent of Annual Outlay is proposed to be earmarked for focused intervention schemes to be decided by the Central Government from year to year and the balance of outlay will be split equally (40 percent each) between remaining two streams of Production Growth and Infrastructure/ Assets development.

Budgetary Analysis of the Scheme

Financial outlay and Expenditure of Rashtriya Krishi Vikas Yojana

						₹ in crore
	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Proposed Outlay	0.00	5875	5500	5000	8000	25864.70
BE	0.00	3165	4067	6722	7810	22253.70
Actuals	1246	2886	3758	6719	7794	22403.00

2.29 According to the DAC, the pace of utilization of funds under RKVY was not satisfactory in its first year of implementation (i.e 2007-08), however it has improved considerably since 2008-09. State Governments are now showing more interest in implementation of the scheme and most of the States have finalized detailed District Agricultural Plans (DAPs) and State Agricultural Plans (SAPs) and identified intervention needed.

2.30 As per the Outcome Budget (2013-14) of the DAC, an amount of ₹ 7794.09 crore was released to the States, during 2011-12 and has been utilized completely by the States. Similarly, during 2012-13 Rs 6244.07 crore was released to the States of which an amount of Rs 1705.40 crore has been reported utilized by the States as on 31st December, 2012.

2.31 As per the Outcome Budget (2013-14) an outlay of ₹ 9217 crore was provided for the year 2012-13. Out of which ₹ 6349.23 crore have been spent as on December,

2012. An outlay of ₹ 9954 crore has been proposed for the year 2013-14 with considerable focus on agriculture infrastructure and special initiatives. 20 percent of annual outlay is proposed to be reserved/earmarked for special schemes to be decided by the Central Government from year to year and 40 percent each for Production Growth and Infrastructure Development respectively.

(c) National Horticulture Mission (NHM)

2.32 According to the DAC, the National Horticulture Mission was launched in 2005-06 for holistic development of horticulture sector duly ensuring horizontal and vertical linkages, with active participation of all stake-holders. All States and three Union Territories of Andaman Nicobar Islands, Lakshadweep and Puducherry are covered under the Mission except the eight North East States including Sikkim, and the States of Jammu & Kashmir, Himachal Pradesh and Uttarakhand, which are covered under Horticulture Mission for North East and Himalayan States (HMNEH). At present, 372 districts in 18 States and 3 Union Territories have been covered under NHM. All horticulture crops such as fruits, spices, flowers, medicinal and aromatic plants, plantation crops of Cashew and Cocoa are included for area expansion, whereas vegetables are covered through seed production, protected cultivation, Integrated Nutrient Management (INM)/Integrated Pest Management (IPM) and organic farming.

2.33 When enquired about major steps that have been taken to encourage organic farming in the process of crop diversification in the country, the DAC in a note stated as under:

> "Crop diversification is not contingent upon Organic Farming. However, the Government is promtiong organic farming in the country under National Project on Organic Farming (NPOF). The steps taken to encourage organic farming are: (i) Fruits & Vegetables Waste/ Agro-waste Compost Production Units (100 TPD capacities) - For establishment of large mechanized compost plants by APMCs/ Municipalities/ other public sector enterprises/ fertilizer companies/ private industries/ private entrepreneurs etc for fruits and vegetable market waste/ agro waste compost units under PPP or other mode. There is a provision of financial assistance in the form of capital investment subsidy @ 33 percent of TFO (Total Financial Outlay) or ₹ 60 lakh whichever is less through NABARD. (ii) Biofertilizer and/ or Bio-pesticide production Units - For establishment of state of the art sterile liquid/ carrier based 200 tonne Per Annum biofertilizers and microbial bio-

pesticides production units under public or private sector. Assistance up to 25 percent of TFO (Total Financial Outlay) or ₹ 40 lakh whichever is less, will be available as credit linked back ended subsidy through NABARD. During Eleventh Plan, 196 service providers were appointed. For promotion of organic inputs production, 17 Fruit and Vegetable Waste Compost Units, 30 Biofertilizer Production Units and 680 vermiculture hatcheries were sanctioned. Under Human Resource Development, 3476 trainings on various aspects of organic farming were organized. For market development and awareness creation programmes/seminars/New Initiative, 70 such programmes were organized. 3201 field demonstrations on farmers fields were also organized during the 11th plan period. 221 Model Organic Farms were sanctioned to various departments. 20 issues of quarterly publication, Organic Farming Newsletter and 10 issues of bi-annual Biofertilzer Newsletter were published. A low cost, farmers group centric certification system "Participatory Guarantee System (PGS-India) was launched and 20 Regional Councils were appointed under the programme. 7897 samples of Biofertilisers and 1995 samples of organic fertilisers were tested under FCO by National Centre of Organic Farming (NCOF) and its six Regional Centres of Organic Farming (RCOFs). 5496 strains of microbial inoculants were supplied to various biofertilizer production units".

Budgetary Analysis of the scheme

2.34 As per the Annual Plan 2012-13 of the DAC, the total Budget Estimates of NHM Scheme for the Eleventh Five Year Plan was Rs 8809 crore, out of which, Rs 1100 crore was earmarked for 2011-12.

2.35 According to the DAC, proposal for the Twelfth Five Year Plan for NHM is ₹ 11000 crore and for Annual Plan 2012-13 is ₹ 2000 crore. The financial performance of the scheme during Eleventh Five Year Plan as on 24th February, 2012 as under:

Financial Outlay and Expenditure of National Horticulture Mission

(₹ in crore)

	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Proposed Outlay	1100	1150	1400	1100	1200	5950
BE	1150	1100	1100	1061	1200	5611
Actual	919	1010	800	970	1049	4750

2.36 It is observed from the Outcome Budget (2013-14) of the DAC that during the years 2011-12 and 2012-13, targets under quantifiable physical output like area coverage, rejuvenation, nurseries, organic farming, IPM, water harvest structures, post-harvest management, markets, have generally been met in this period.

2.37 The Outcome Budget (2013-14) an outlay of ₹ 1350 crore have been provided for the year 2012-13. Out of which ₹ 834.68 crore have been spent as on December, 2012. For the year 2013-14 an outlay of ₹ 1600 crore has been provided for the holistic growth of Horticulture sector covering fruits, flowers, vegetables, mushroom, spices, aromatic plants, cashew and cocoa, etc.

2.38 As per the DAC, NHM has achieved good progress under production related programmes through area expansion, rejuvenation, protected cultivation etc. However, off take under PHM and marketing components has been rather slow during the initial phase of the scheme. With the revision of cost norms and pattern of assistance, there has been some improvement during 2010-11 and these efforts need to be continued during the Twelfth Five Year Plan.

(d) Horticulture Mission for the North East and Himalayan States (HMNEH)

2.39 According to DAC, the Scheme, earlier known as 'Technology Mission for Integrated Development of Horticulture in North East States including Sikkim' (TMNE), was launched in 2001-02 in all the eight North East States including Sikkim and in the States of Jammu & Kashmir, Himachal Pradesh and Uttarakhand and is being implemented in mission mode. The mission covers entire spectrum of horticulture right from production to consumption through backward and forward linkages.

2.40 As per the information furnished by the DAC, the implementation of the Mission since its inception upto 2010-11 has helped in bringing in an additional area of 5,79,910 ha under various horticulture crops in these States. Out of this, fruits contributed 3,15,346 ha, vegetables 1,16,125 ha, spices 82,316 ha, saffron 168 ha, plantation crops (cashew) 14,111 ha, medicinal plants 6464 ha, aromatic plants 10,412 ha, flowers

33,649 ha, root and tubers crops 1319 ha. In addition, 56,593 ha of senile and unproductive orchards have been rejuvenated to increase productivity. Infrastructure facilities such as model nurseries (1129), community tanks (11,191), tube wells (16,549), greenhouses (94,92,717 sqm.), model floriculture centres (27), herbal gardens (57), tissue culture units (27), disease forecasting units (33) and 39 mushroom units have been set up. Besides, wholesale markets (48), rural primary markets (306), apni mandis (70), State grading laboratories (18) and 86 processing units and 34 cold storages have been established. So far, 3,55,523 farmers including women farmers have been trained on various aspects of horticulture.

2.41 According to the DAC, during the Financial Year (2011-12), additional area of about 25091 ha has been brought under cultivation of various horticulture crops. Of this, fruits contributed 10438 ha, vegetables 8486 ha, spices 5155 ha, aromatic plants 13 ha, and flowers 999 ha. In addition, 4137 ha of senile and unproductive orchards have been rejuvenated to increase productivity. Infrastructure facilities such as model nurseries (88), community tanks (9), tube wells/dug wells/water harvesting systems (575), protected cultivation/greenhouses (486447 sqm.), horticulture mechanization/agri. equipments (2486), vermi-compost units (3076), disease forecasting units (7) and 10 mushroom units have been set up. In addition, during the year 2012-13, 2 Processing units were also set up in the Himalayan States. Under the training component, so far 53417 farmers have been trained on various aspects of Horticulture.

Budgetary Analysis of the scheme

Financial Outlay and Expenditure of Technology Mission on Horticulture for North Eastern States

(₹ in crore)

	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Proposed Outlay	382	350	360	400	500	1992
BE	293	299	349	400	500	1841
Actuals	321	291	325	399	493	1831

2.42 It may be seen from above table that during 2007-08, there was excess expenditure vis-a-vis Budget Estimate whereas in the remaining years of Eleventh Plan, there had been underutililzation of budgetary targets. The Table also indicates that less than the proposed outlays during the year 2007-08, 2008-09 and 2009-10.

2.43 It is observed from the State-wise data furnished by DAC for the year 2011-12 that there was shortfall in utilization of released amount under HMNEH as indicated below:

States	**Percentage of Utilization of released amount in 2011-12**
Arunachal Pradesh	97.18
Nagaland	86.50
Sikkim	92.24
Tripura	87.46
Jammu and Kashmir	86.37
Himachal Pradesh	48.06
Uttarakhand	49.50

2.44 It is observed from the DAC's Outcome Budget 2013-14 that most of the components of the scheme have performed poorly during 2011-12 and 2012-13 (upto December, 2012). For instance, the area expansion for horticultural purpose was 1,679 ha less when compared to the target during 2011-12. Another important component of the scheme i.e. training of farmers/trainers including women also performed badly. The achievement made during 2011-12 was only 77.35 percent of target.

2.45 As per the Outcome Budget 2013-14, an outlay of ₹ 500 crore for the year 2012-13 has been provided at BE stage. Out of which ₹ 360.44 crore have been spent as on December, 2012. An outlay of ₹ 550 crore has been provided for the year 2013-14 wherein the major components of the scheme, will remain the same and new components like establishment of seed infrastructure, import of planting material, high

density plantation, cost-intensive horticulture crops, canopy management in horticulture etc. are being introduced.

(e) Integrated Scheme of Oilseeds, Pulses, Oil-palm and Maize (ISOPOM):

2.46 According to the DAC, in order to provide flexibility to States in implementation, based on a regionally differentiated approach in promoting crop diversification, and to provide focused approach to programmes, Centrally Sponsored Scheme of Integrated Scheme of Oilseeds, Pulses, Oil-palm and Maize (ISOPOM) is being implemented since 1.4.2004.

2.47 The scheme is being implemented in 14 major States for Oilseeds and Pulses, 15 States for Maize and 9 States for Oil Palm. ISOPOM is being implemented by State Governments through their Departments of Agriculture, Indian Council of Agricultural Research (ICAR), National Seeds Corporation (NSC), State Farms Corporation of India (SFCI), Krishak Bharti Cooperative (KRIBHCO), National Agricultural Cooperative Marketing Federation of India (NAFED) and Indian Farmers Fertilizers Cooperative (IFFCO). Under the scheme, assistance is provided for purchase of breeder seed, production of foundation seed, production and distribution of certified seed, distribution of seed minikits, distribution of plant protection equipments, weedicides, supply of rhizobium culture/phosphate solubilising bacteria, supply of improved farm implements, micro-nutrients, distribution of gypsum/pyrite/liming/dolomite, distribution of sprinkler sets and water carrying pipes, publicity etc. to encourage farmers to grow oilseeds, pulses and maize on a large scale. In order to disseminate information on improved production technologies among the farmers, block demonstrations and Integrated Pest Management (IPM) demonstrations are organized through State Department of Agriculture and Frontline demonstrations through ICAR.

2.48 According to the DAC, based on the experience gained in the implementation of ISOPOM, the scheme has been modified with regard to norms and pattern of assistance, inclusion of new components of improved farm implements and supply of micronutrients in deficient area, so as to make it more effective and result-oriented.

Besides this, new agencies like NAFED, KRIBHCO, IFFCO and private sector (through State Department) have been involved in distribution of certified seeds and subsidy on supply of gypsum, rhizobium culture, pipes for carrying water, sprinkler sets, etc. has been enhanced/rationalized.

Budgetary Analysis of the scheme

Financial Outlays and Expenditure of Integrated Oilseeds, Oil Palm, Pulses and Maize Development

(₹ in crore)

	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Proposed Outlay	400	450	610	500	550	2510
BE	300	320	320	500	550	1990
Actuals	343	399	451	708	616	2519

2.49 As is observed from the Outcome Budget (2013-14) of the DAC for the year 2011-12 and 2012-13, the achievement of quantifiable physical outputs of oil palm and oilseeds did not achieve the targets.

	Quantifiable Physical Outputs	**2011-12**		**2012-13**	
		Target	**Achievement**	**Target**	**Achievement**
Oilseeds	Production (in lakh tonnes)	336	300.12 (89%) (4th Advance Estimates)	335	187.83 (1st Advance Estimates for Kharif only)
Maize	Production (in lakh tonnes)	215	215.72 (4th Advance Estimates)	225	148.90 (1st Advance Estimates for Kharif only)
Oil Palm	Area Expansion in Ha	270	65.91 (24.4%) (4th Advance Estimates)	250	25.74 (1st Advance Estimates for Kharif only)

2.50 As per Outcome Budget (2013-14), an outlay of ₹ 575 crore at BE stage have been provided for the year 2012-13. Out of which ₹ 394.96 crore have been spent as on December, 2012. An outlay of ₹ 500 crore has been provided for the year 2013-14 to increase the production, productivity and also self-sufficiency in oilseeds and maize.

(f) Investment through Private Participation

2.51 As crop diversification calls for higher investment, the Committee enquired about the steps taken to induce private participation to accelerate the pace of crop diversification in the country. In response, the DAC stated as under:

> "National Policy for Farmers (NPF), 2007 contains the following points relating to private sector participation in agriculture:-
>
> - Non-governmental organisations (NGO) and private sector research and development (R&D) institutions would also be included under the National Agricultural Research System (NARS) umbrella.
>
> - Bio-technology research in the area of vaccine development would be stepped up, encouraging public private partnerships.
>
> - Cooperatives require an entrepreneurial approach, competitive edge through suitable enterprise focus and strategic alliances with private and public sector units.
>
> - The common service centres of the Department of Information Technology, Government of India and those set up by the State Governments and private initiative programmes will be evolved for inclusive and broad-based development.
>
> - Terminal markets for agriculture would be developed in public-private-partnership mode to provide better market access to farmers with better price realization in a transparent trading environment with suitable backward linkages to give technical backstopping services needed for quality and demand driven production.
>
> - Small farmers and the SHGs would be associated in Private Limited Companies as stakeholders and not just as shareholders.
>
> - In order to attract youths to the agriculture sector, a number of vocational training courses in different aspects of agricultural and allied activities including value addition and processing of agro-products shall be introduced and recognized. The KVKs, institutions of state

governments/ICAR and competent private institutions may also provide such recognized vocational training to the youth.

- Subsequently, an Inter-Ministerial Committee finalized a Plan of Action for Operationalisation of the NPF, 2007 in which the following further steps have been identified:-

(i) Multi subject awareness/training oriented to substantially improve skill base of farmers would be desirable. ICAR/SAUs/KVKs may be assisted to prepare training modules for such skill development training. As far as possible, accreditation as applicable for vocational training/education may be ensured for such training programmes. Guidelines for effectively associating private sector in this effort may be developed by DAC (Extension Division) in consultation with DARE/ICAR.

(ii) NARS, Seed protection/production agencies and private sector may be brought together in consortia for development of new varieties and for production of newly developed varieties.

(iii) The strategy for Eleventh Plan emphasizes the need to ensure adequate and timely supply of quality seeds. The seed production and distribution system must be revamped by strengthening public sector seed agencies and by involving private trade in seed multiplication and distribution system.

(iv) NABARD may consider direct lending to PRIs, NGOs and selected private sector units and popularize model schemes like agri clinics, enterprises and contract farming. RIDF can be used for this purpose. NABARD should promote sector wise pro-active plans to improve productivity in agriculture and rural development activities.

(v) Model guidelines should be issued for agricultural cooperatives/ federations of SHGs to enter into strategic alliances with private and public sector organizations for marketing, value addition and other forward linkage activities.

(vi) Framework for linking extension machinery with common service centres or other IT infrastructure including PCO booths available at village level should be developed, so that these can function as Gyan Chaupals at village level providing quality information and advice to the farmers.

(vii) There is an urgent need for modernization of cold storage and processing facilities in the country to minimize post-harvest losses in perishable agricultural produce. Creation of these infrastructures by federations of farmers' SHGs with appropriate linkages with the private sector be encouraged and supported under ongoing schemes of DAC. Appropriate guidelines for this purpose may be issued.

(viii) SFAC should be energized to cater to the needs of the farmer entrepreneurs and to promote public and private investment in agri business.

(ix) DARE/ICAR may implement the provision relating to vocational training course through SAUs/KVKs and private institutions through district level network of such institutions/polytechnics in order to bring in need based and vocation specific training of rural youth. KVKs/SAUs may provide training of trainers and resource persons in other vocational institutions. Similarly training for women should also be undertaken".

CHAPTER - III

CROP DIVERSIFICATION SCENARIO

The nation is bestowed with diverse agro-climatic conditions ranging from temperate to tropical conditions which offer attractive scope for cultivation of diverse crops and thereby promotion of diversified agriculture. According to the DAC, appropriate technology suiting local agro-climatic conditions as well as the local needs of the people has been put in place to promote agricultural diversification in the country.

3.2 As per the information furnished by the DAC, it has been stated that it may not be practical to adopt a uniform strategy for crop diversification for the whole country having varied ecological zones and production systems. This has led to adoption of different diversification strategies for different zones and areas based on the geographical and agro-ecological considerations as suggested below:-

Zone - I

According to the DAC, the major thrust in the region, i.e. Northern plains embracing Punjab, Haryana and Western Uttar Pradesh, would be to promote diversification towards less water demanding crops such as oilseeds, pulses, horticulture and vegetables from rice–wheat system.

Zone - II

Western arid zone embracing Rajasthan and Gujarat where more emphasis is required to promote oilseeds, pulses and perennial plants preferably medicinal and aromatic plants and quality millets etc. in place of rice, wheat, sugarcane and cotton.

Zone - III

In Central Plateau region embracing Madhya Pradesh, Chhattisgarh and Maharashtra there is a need to promote oilseeds and pulses in place of rice and

sugarcane. Also the rice fallows need to be exploited through oilseeds and pulses. Floriculture and horticulture and quality millets should also get priority.

Zone - IV

Southern peninsula region embracing Tamil Nadu, Karnataka, Andhra Pradesh and Kerala require emphasis on diversifying the rice–rice system and also sugarcane based cropping system towards pulses, oilseeds, horticulture, plantation crops, spices and floriculture.

Zone - V

In Eastern region embracing Bihar, Jharkhand, Odisha and West Bengal crop diversification/intensification in rice fallows should get top priority.

Zone - VI

In hilly areas including North East States, diversification of non-remunerative rice and rice fallows through organic pulses and perennial fruits, floriculture and plantation crops on hilly slopes needs to be promoted. In Sub-Himalayan northern States like Uttarakhand, Himachal Pradesh and Jammu and Kashmir, promotion of horticultural/plantation crops and floriculture on hill slopes and off-season vegetables in valleys is required to be promoted.

3.3 In this regard, the Committee have been informed that the Central Government has been advising States to promote agricultural diversification keeping in view the availability of natural resources, domestic demand and potential of exports. The issue has been discussed and deliberated upon with the State Governments on various occasions. Based on such interactions with the State Governments, State-specific strategy for agricultural diversification, as furnished by the DAC, is given in the following Table.

Traditional crops and proposed crops to be grown in some states

Sl. No.	State	Traditional crops grown	Proposed crops to be undertaken
1.	Madhya Pradesh	Upland Paddy, Kodon Kutki, Low-lying Paddy, Paddy bunds.	Tur, Til, Niger, Castor, Barley, Soyabean, Maize, Urad, Moong, fruits and vegetables.
2.	Jharkhand	Marua, Niger, Wheat, Upland Paddy.	Til, Tur, Durum Wheat, Vegetables, gram, lentil.
3.	Chhattisgarh	Upland and mid-land Paddy, Kodo-Kutki.	Niger, Soybean, Maize, Tur, Horticulture crops.
4.	Bihar	Paddy, Low land Paddy, Wheat, Kharif Tur.	Fine and scented Paddy, Pulses, Oilseeds, Banana, Lichi, Rabi Tur, Floriculture.
5.	Uttar Pradesh	Paddy, Wheat, Sugarcane	Scented Paddy, Rabi Maize, Pulses, Groundnut, Cotton, Soybean and vegetable crops, inter-cropping with sugarcane
6.	Gujarat	Upland Paddy, Coarse cereals.	Maize, Sesame, Castor, Date palm, Medicinal plants, Spices and Fodder crops.
7.	Andhra Pradesh	Cotton, Paddy, Groundnut, Jowar, Rabi Paddy.	Castor, Redgram, Soybean, Maize, Sunflower Sesame, Pulses and Vegetables, Coriander, Horticultural crops.
8.	Karnataka	Groundnut, Cotton, Millets, Castor, Soybean.	Horticulture crops, Castor, Inter-cropping with sugarcane, coconut and others.
9.	West Bengal	Boro Rice, Upland crops, Kharif Rice.	Wheat, Summer Groundnut, Til, Maize, Soybean, Vegetables, Fruits, Flowers and Spices.
10.	Haryana	Rice, Wheat	Arhar, Gram. Moong, Maize, Cotton, Sugarcane, Fruits & vegetables.
11.	Punjab	Rice, Wheat	Basmati Rice, Organic Basmati, Maize,

			Sunflower, Pulses, Barley, Hayola, Winter Maize.
12.	Odisha	Rice, Minor Millet.	Pulses, Groundnut, Cowpea, Kharif Vegetables, Horticultural crops.
13.	Tamil Nadu	Rice, Pulses	Banana, Onion, Sugarcane.
14.	Maharashtra	Paddy, Coarse cereals, Cotton	Oilseeds, Soybean, Horticultural crops, Medicinal plants and floriculture
15.	Rajasthan	Bajra, Cotton, Pulses	Inter-mixed cropping of Bajra, Pulses, Oilseeds, Green Fodder crops, Guar, Moth, Spices and Horticulture crops.

POTENTIAL AREAS FOR CROP DIVERSIFICATION

3.4 As per the information furnished by the DAC, the following are the potential areas of crop diversification:

Rice–Wheat Cropping System of Indo-Gangatic Plains

3.5 As per the DAC, about 10.5 million ha area in the Indo-Gangetic Plains is under rice–wheat system where continuous cropping of the same species of plants has led to several problems related to soil fertility, factor productivity, alkalinity/salinity and build up of specific diseases and several environmental hazards. The system offers unique opportunity for diversification through short season oilseeds and spring summer pulses like urdbean and mungbean, and summer vegetables in sequential cropping.

3.6 The Committee have been informed that during Kharif season, the pulses and oilseeds, if grown in place of upland rice, will not only increase the soil fertility but also avoid excessive exploitation of ground water. The DAC added that concerted efforts are required for rational crop planning according to land suitability, need of locality and marketing avenues.

Rice–Rice System of Peninsular States

3.7 According to the DAC, rice monoculture is prevalent in a vast area in peninsular region of the country, i.e., Andhra Pradesh and Tamil Nadu. The system in long run has created anaerobic conditions thereby leading to reduced zone in the rhizosphere which often restricts the root and plant growth. Therefore, the incorporation of pulses/oilseeds in the cropping system needs to be promoted to overcome these problems.

Upland Rice of Eastern States

3.8 According to the DAC, over a large area in the Eastern India, rice is grown under upland rainfed conditions. Productivity of upland rice is low as the crop generally suffers from moisture stress conditions. Complete failure of upland rice crop is not uncommon. Because of high risk involved, the input use in upland rice is also low which further affects the productivity of the crop. These upland paddy areas, if diversified, could be more productive with cultivation of maize, oilseeds, pulses, millets, vegetables, horticultural and floriculture crops.

Rice Fallows

3.9 As per the information furnished by the DAC, of the total 44 million ha area under rice, about 15 million ha is under rainfed conditions. Majority of this area is left fallow after the harvest of the rice crop. The rice fallows offer an attractive opportunity of crop intensification and diversification by virtue of their potential to grow short duration pulses viz. urdbean, mungbean, pea, lentil and oilseeds like rapeseed, linseed, groundnut, vegetables, floriculture, etc. on residual moisture.

3.10 According to the DAC, in the country, rice fallows exists under three distinct agro-climatic conditions.

(i) Coastal ecosystem: In coastal ecosystem, there is sufficient moisture in soil profile at the time of harvesting allowing sowing of Rabi season crop. The winters are mild providing most congenial conditions for the growth of winter season oilseeds, pulses, vegetables, floriculture, etc. The soils of this region are

acidic and acid tolerant crops may be included in the cropping system. The most suitable crops are blackgram, greengram in pulses; rapeseed and mustard and linseed in oilseeds and vegetables.

(ii) **Semi-arid rainfed ecosystem:** The ecosystem spreads over Chhattisgarh, part of Madhya Pradesh and Maharashtra and is characterized by moisture stress at the time of harvesting of rice. Winters are relatively cool with occurrence of frost. Under these conditions, broadcasting of small seed oilseeds and pulses in standing crop of rice before 4-7 days of its harvest is the ideal practice. The crops invariably suffer due to moisture stress especially during their terminal growth stages which calls for suitable moisture/water conservation measures to be adopted for obtaining optimum yields and introducing floriculture and oilseed crops.

(iii) **Humid ecosystem:** This ecosystem consists of rice fallows of Bihar, West Bengal, Odisha and North East Hill States and is characterized by heavy rainfall and sufficient moisture in the soil profile at the time of the harvest of the rice. About 8-10 lakh ha of saturated soils remain unexploited in the rainfed low land areas of eastern India. In many cases, the soils remain saturated throughout the year, particularly in inter-hill valleys. Winters are cool and provide opportunity for the introduction of a range of oilseeds, pulses and vegetable crops. Under saturated conditions winter season rice is also a possible option for crop intensification.

Sugarcane-based Cropping System

3.11 As per the information furnished by the DAC, sugarcane is grown under two distinct bio- physical conditions existing in Central and Peninsular India and Northern part of the country. Mostly long duration (18 months) crop is grown in Central and Southern part of the country while in Northern India, the crop duration is only 12 months or even less. Sugarcane, initially a slow growing crop and widely planted, offers an attractive opportunity for the introduction of early maturing pulses like mungbean,

urdbean, cowpea (spring/summer planted crop), chickpea and oilseeds like rapeseed and mustard and sunflower (autumn planted crop) and vegetables as inter-crop. The system provides a bonus yield of inter crops besides the optimum yield of main crop, i.e. sugarcane. Pulses when incorporated in the system also enrich the soil through biological nitrogen fixation and add to soil fertility.

Agro-forestry Systems

3.12 According to the DAC, alley cropping of arable crops with widely planted fodder/shrubs offer an opportunity to grow short duration less water demanding oilseeds and pulses in the fragile rainfed eco-system. These systems, besides providing additional output in terms of foodgrain, also enrich the soil and help as a natural soil cover against water and wind erosion. The Committee have also been informed that important agro-forestry systems may be casurina/subabool+green gram/black gram/cowpea/sunflower.

Area and production of horticultural crops

A – Area (million ha); P – Production (million tonnes)

Crops	**1991-92**		**1996-97**		**2001-02**		**2010-11 (provisional)**	
	A	**P**	**A**	**P**	**A**	**P**	**A**	**P**
Fruit	2.87	28.63	3.58	40.46	3.89	45.37	6.63	75.83
Vegetables	5.14	58.56	5.51	75.10	6.25	93.92	8.22	137.69
Spices	2.05	1.90	2.38	2.80	2.50	3.02	2.46	4.02
Coconut	1.53	6.93	1.89	8.98	1.84	8.67	1.90	10.82
Cashew	0.53	0.30	0.66	0.43	0.72	0.45	0.95	0.65
Others	0.21	0.24	0.26	0.30	0.51	1.07	1.14	2.13
Total	**12.33**	**96.56**	**14.28**	**128.07**	**15.71**	**152.5**	**21.30**	**231.14**

3.13 According to the DAC, development of market infrastructure also helps in introduction of alternate crops, e.g., introduction of soybean in Madhya Pradesh and Maharashtra. Often low volume high-value crops like spices also aid in crop diversification. Higher profitability and stability in production also induce crop diversification, for example sugarcane replacing rice and wheat. Diversified cropping systems are adopted in rainfed areas primarily to reduce the risk of crop failures owing to drought or inadequate rains. There has been a significant growth in the area of rice, wheat, oilseeds and sugarcane during the period 1984-94 whereas the pace of growth reduced considerably during last decade. A negative growth in area of coarse cereals has been noticed during 1984-2004. However, renewed efforts through various crop development programmes created enabling environment for increase in growth of production of all the crops during Eleventh Five Year Plan.

Macro-perspective of Crop Diversification

3.14 According to the DAC, the following are the macro-perspective of crop diversification:-

(i) Crop diversification has got attractive opportunity in the changing scenario of trade, economy and price regime as well as the support infrastructures for storage, value addition and post-harvest management. However, diversification is most location/region-specific and largely triggered by the price regime of a commodity vis-à-vis the alternate commodity.

(ii) Another specific factor which essentially call for crop diversification (both horizontal and vertical) is dwindling natural resources in some of the most productive regions of the country like Punjab, Haryana & Western Uttar Pradesh. Rice–wheat cropping pattern is the most stable and productive system in these states and the most important for National Food Security, as these states largely contribute towards the Public distribution System. It may not be prudent to diversify the entire area of rice–wheat rather the diversification of practices will create an enabling environment for restoration of soil health and conserve natural resources. The Government is promoting such practices to conserve land and water without compromising with the production and productivity.

(iii) Pulses, oilseeds, vegetable and fruits are the most important ingredients of Indian agriculture, largely focused for diversification. The Government is committed to enhance the acreage under these crops in potential regions by diversifying the less productive crops and systems. The record production of pulses during 2010-11 of 18.24 million tonnes could happen due to sizeable increase in area under pulses. Besides, new niches like enhancing area of summer pulses (in between rice & wheat) in irrigated areas, intercropping with sugarcane, soybean, cotton, jowar, bajra and maize is also emphasized to promote these crops and bring in sustainability in the production system besides enhancing the production of pulses. It is noteworthy to mention that pulses once included in the cropping systems fix sizeable quantity of atmospheric Nitrogen into soil. Similarly, enhancing area/productivity of oilseeds through production and higher price structure is being focused. Value addition and cold chain storage facility is likely to enhance the area and production of vegetables & fruits in the country.

SHIFT IN ACREAGE OF CROP DIVERSIFICATION

3.15 Quantitative Analysis of crop diversification in some of the States i.e. Punjab, Haryana, Uttar Pradesh, West Bengal, Bihar and Jharkhand, Andhra Pradesh, Karnataka, Maharashtra and Rajasthan by the DAC for the period 1983-84 to 2009-10 reveals the following:

Rice–Wheat rotation States – Punjab, Haryana and Uttar Pradesh

The rice**–**wheat is a predominant cropping pattern in Punjab, Haryana and Uttar Pradesh.

Punjab: Significant shift towards fine cereals (rice and wheat) took place in Punjab from coarse cereals, pulses and oilseeds and commercial crops. Positive procurement, assured return and stability in production and marketing were considered major factors responsible for this significant shift towards rice and wheat.

Haryana: The diversification of coarse cereals and pulses took place toward rice/wheat and oilseeds during 1983-84 to 2009-10. The share of fine cereals to total cropped area increased from 40.77 to 58.21 percent while that of coarse cereals declined from 19.87 to 11.20 percent and pulses from 12.54 to 2.11 percent.

Uttar Pradesh: The area under fine cereals i.e. wheat and rice showed marginal increase in the period 1983-84 to 2009-10. The area under coarse cereals and oilseeds reduced substantially during the same period. The acreage under pulses is almost stagnant. The area under commercial crops and fruits and vegetables showed marginal increase over the period.

(ii) Rice dominant States – West Bengal, Bihar and Jharkhand

West Bengal: The percentage share of gross cropped area under fine cereals, coarse cereals and pulses declined during the period 1983-84 to 2009-10 while increase in oilseeds and fruits &vegetables which indicated diversification from fine cereals, coarse cereals and pulses to oilseeds and vegetables and fruits.

Bihar and Jharkhand: The area from pulses, oilseeds and coarse cereals has diverted towards fine cereals during the period 1983-84 to 2009-10. However, area under commercial crops is almost stagnant in the same period. There is marginal increase in area under fruits and vegetables during the period 1993-94 to 2009-10.

Other States – Andhra Pradesh, Karnataka, Maharashtra and Rajasthan

Andhra Pradesh: The area under pulses, oilseeds, commercial crops and fruits and vegetables increased during the period 1983-84 to 2009-10. However, the acreage under fine cereals and coarse cereals decreased during the same period, which indicates that diversification from the fine cereals and coarse cereals to oilseeds, pulses and commercial crops. The area under fruits and vegetables increased more than twice during the same period.

Karnataka: The acreage under fine cereals is almost stagnant. The area under coarse cereals and commercial crops showed decreasing trend during the period 1983-84 to 2009-10. The area under fruits and vegetables increased from 2.19 to 6.15 percent in the period 1993-94 to 2009-10. The acreage under oilseeds and pulses increased during the same period which indicates diversification towards oilseeds and pulses.

Maharashtra: The area reported under fine cereals and coarse cereals showed negative trend during the period 1983-84 to 2009-10. The area under oilseeds and pulses showed an increase upto 1993-94 but after that there is slight decline in the acreage in year 2003-04. However, the acreage under oilseeds again increased in the year 2009-10. The area under fruits and vegetables also increased over three times during the period 1993-94 to 2009-10.

Rajasthan: The area under fine cereals reduced marginally during the period 1983-84 to 2009-10. The area under pulses remained almost constant over the period. The area under oilseeds increased approximately two and half times in the same period. Area under commercial crops increased upto 1993-94 and declined thereafter marginally. The acreage under fruits and vegetables showed positive sign in the period 1993-94 to 2009-10.

ALL INDIA SCENARIO OF CROP DIVERSIFICATION

3.16 According to the DAC, the area under fine cereals is almost stagnant in the period 1983-84 to 2009-10. The States which registered a decline in percentage area under fine cereals are Andhra Pradesh, Kerala, Tamil Nadu, Assam, Arunachal Pradesh, Sikkim, West Bengal and Madhya Pradesh. The States which exhibited increase in area under fine cereals are Bihar, Jharkhand, Odisha, Haryana and Punjab. The percent area under coarse cereals has declined significantly except in Bihar, Himachal Pradesh, Rajasthan and Jammu and Kashmir. The coarse cereals are good fodder crop and well suited to the traditional mixed farming system. Coarse cereals are an integral part of food consumption basket in Rajasthan. The acreage under commercial crops did not show increase in the same period. The percent area under

commercial crops increased in Andhra Pradesh but decreased in Assam, Karnataka, Odisha, Rajasthan and Punjab.

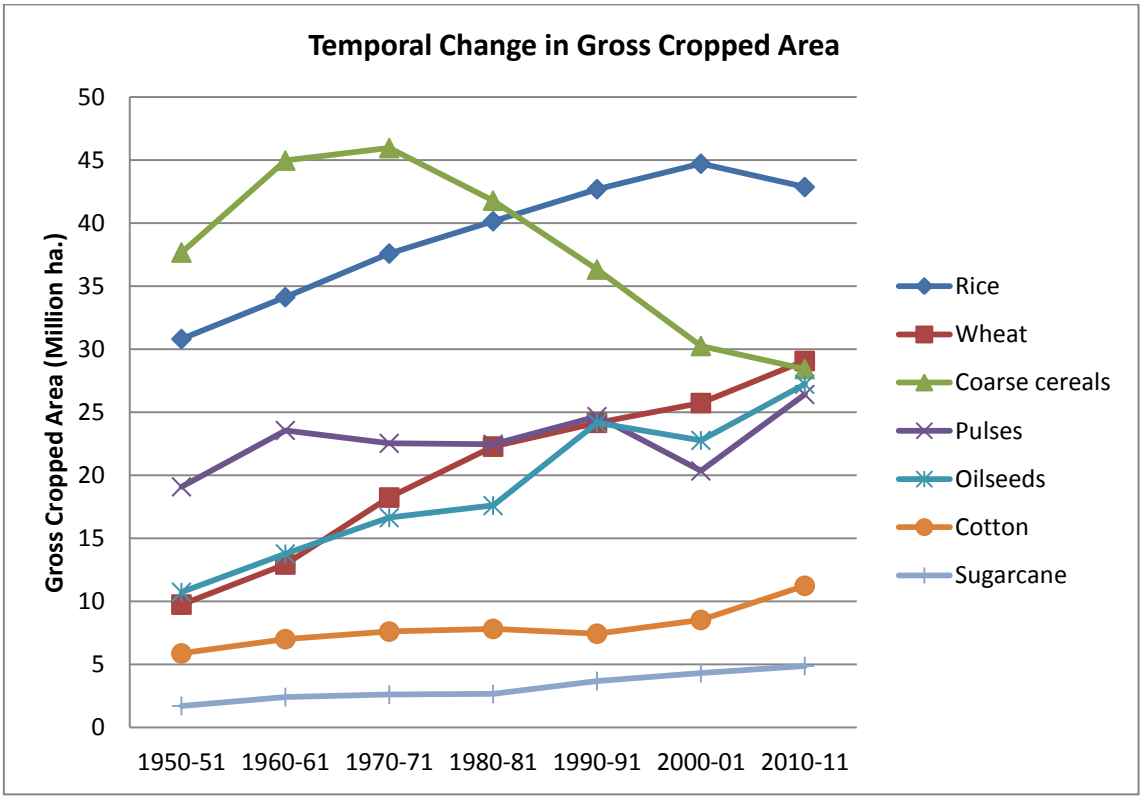
3.17 As per the information furnished by the DAC, the area under fruit and vegetables in the country as whole exhibited increase from 3.59 to 7.00 percent of total cropped area in the time period 1993-94 to 2009-10. A substantial increase in area under fruits and vegetables was reported in North Eastern States, Sikkim, Tripura and Arunachal Pradesh as well as West Bengal, Tamil Nadu and Andhra Pradesh.

CURRENT PRODUCTION SCENARIO

3.18 According to the DAC, the present foodgrain production is 252.56 million tonnes. There is significant increase in pulses production due to renewed focus during the Eleventh Five Year Plan. From a stagnating production level of 14 million tonnes during last two decades, production of more than 18 million tonnes was achieved during 2010-11. Under Oilseeds also there is jump in production to about 32.5 million tonnes. Increased pulses and oilseeds production is encouraging, however a large quantity of these commodities are still being imported to bridge the demand supply gap.

3.19 According to the DAC, the area under foodgrains has increased by 30.2 percent and production by 397 percent signifying the quantum jump in productivity over a period of 60 odd years. This breakthrough was achieved through increase in the irrigated area, intensive fertilizer use and adoption of High Yielding Variety (HYV). Some of the horticultural crops like potato and banana also registered significant increase. Similarly, efforts under National Horticulture Mission and Technology Mission on Horticulture for North East and Hill States have resulted in impressive gains during the Eleventh Five Year plan with the production of horticultural crops reaching a level of about 231.14 million tonnes during 2010-11. According to the DAC, more and sustained efforts are required to popularize the horticultural/plantation crops in view of changing dietary pattern and ever growing fruit/vegetable demand.

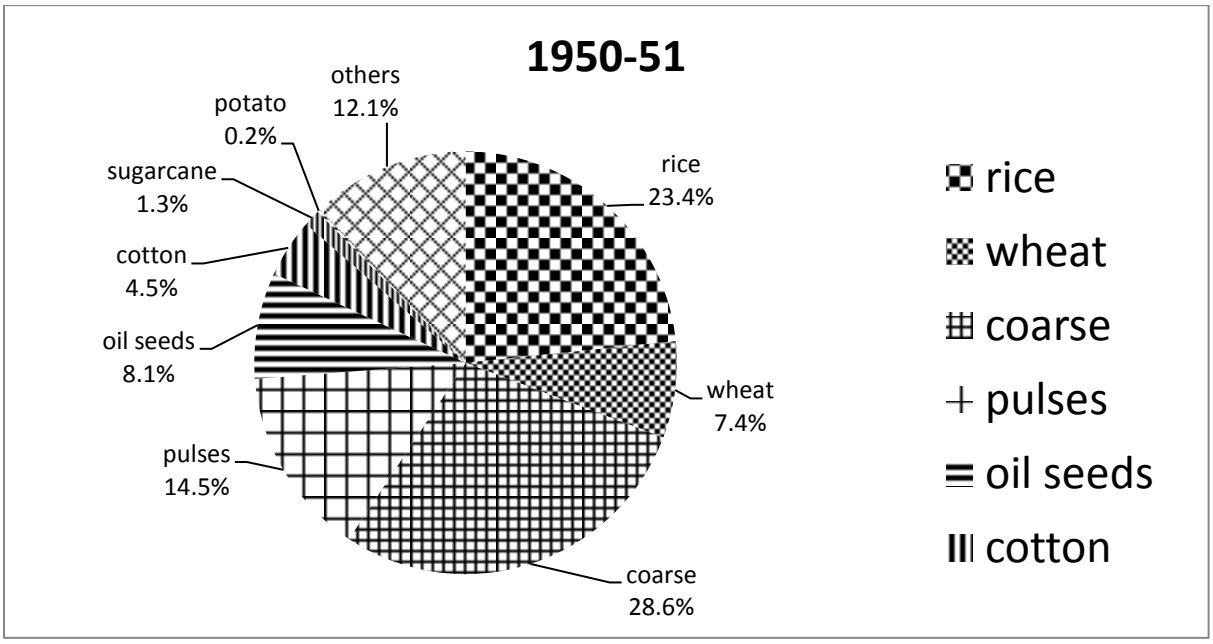
3.20 According to the DAC, the gross cropped area has increased by about 63.21 million ha over a period of about 60 years. The temporal change in the gross crop area in the country is given at Appendix - II of this Report. Of the total increase, rice and wheat together account for 33.33 million ha, oilseeds account for 15.75 million ha, pulses account for 7.13 million ha while area of coarse cereals has reduced by 9.24 million ha. The trend in area coverage under various crops since 1950-51 is given in the following chart:



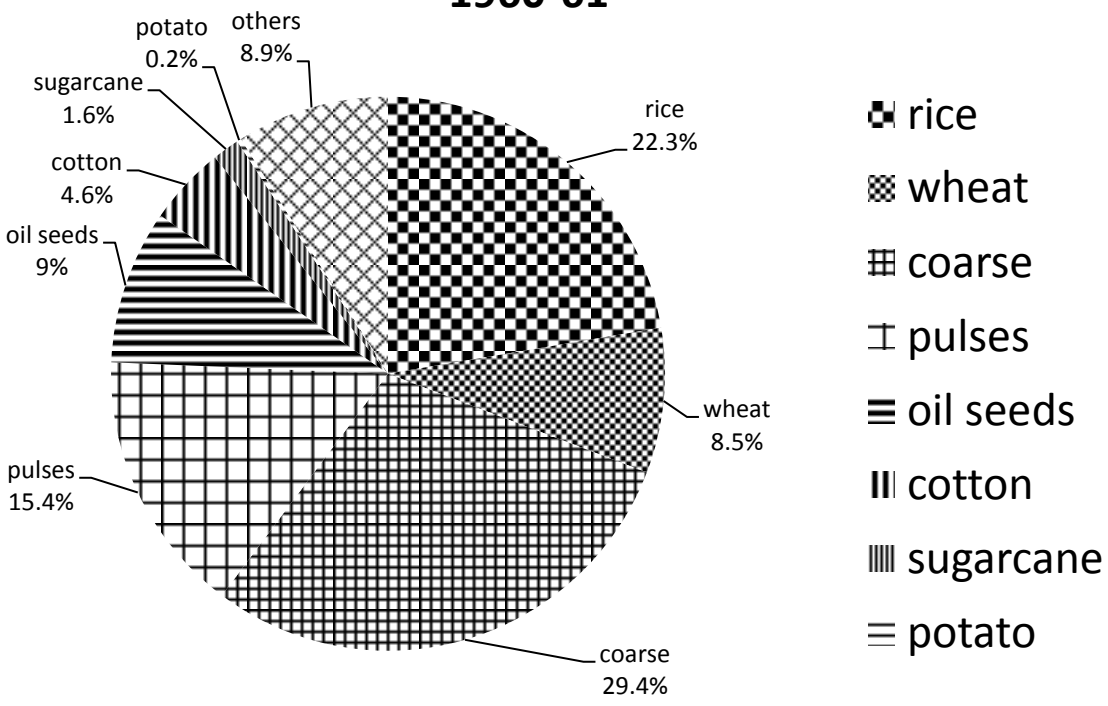
3.21 An overall analysis of percentage increase in area under different crops indicates that the share of rice area has remained nearly constant at 22-24 percent over the years. However, the share of wheat area has increased from 7.4 percent in 1950-51 to 14.9 percent in 2010-11. The area under other crops which include horticulture/ plantation crops, spices, fodder crops etc. has increased from 16.01 million ha in 1950-51 to 23.10 million ha, i.e. an increase of 7.1 million ha in 2010-11 in terms of gross cropped area, indicating a progress towards diversification though not properly designed.

3.22 According to the DAC, now with adequate reserve of rice and wheat, it is possible to design a plan of diversification to divert some of the area under staple food grains to other crops particularly oilseeds, pulses, horticultural crops, medicinal and aromatic plants, floriculture, silvi-pasture systems. The integrated farming system approach including crops, animal husbandry, piggery/poultry/fish culture and allied business is the proper way to deal with the situation.

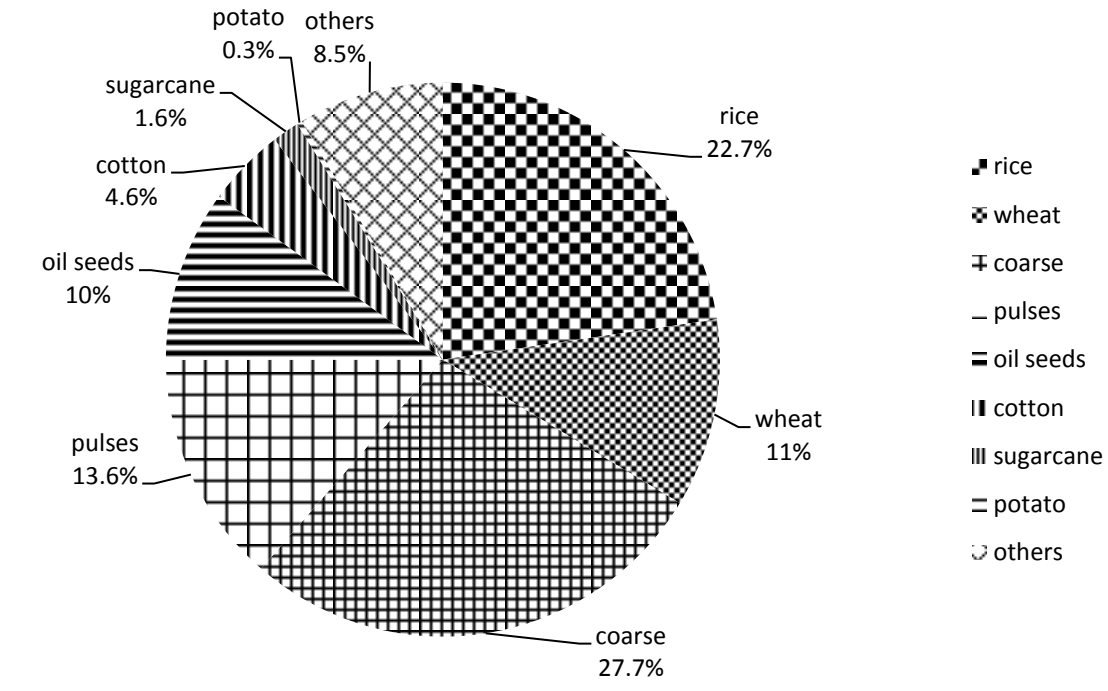
3.23 The percentage share of the different crops in the gross cropped area in the years 1950-51, 1960-61, 1970-71, 1980-81, 1990-91, 2000-01, 2010-11 are depicted in the following pie-charts:



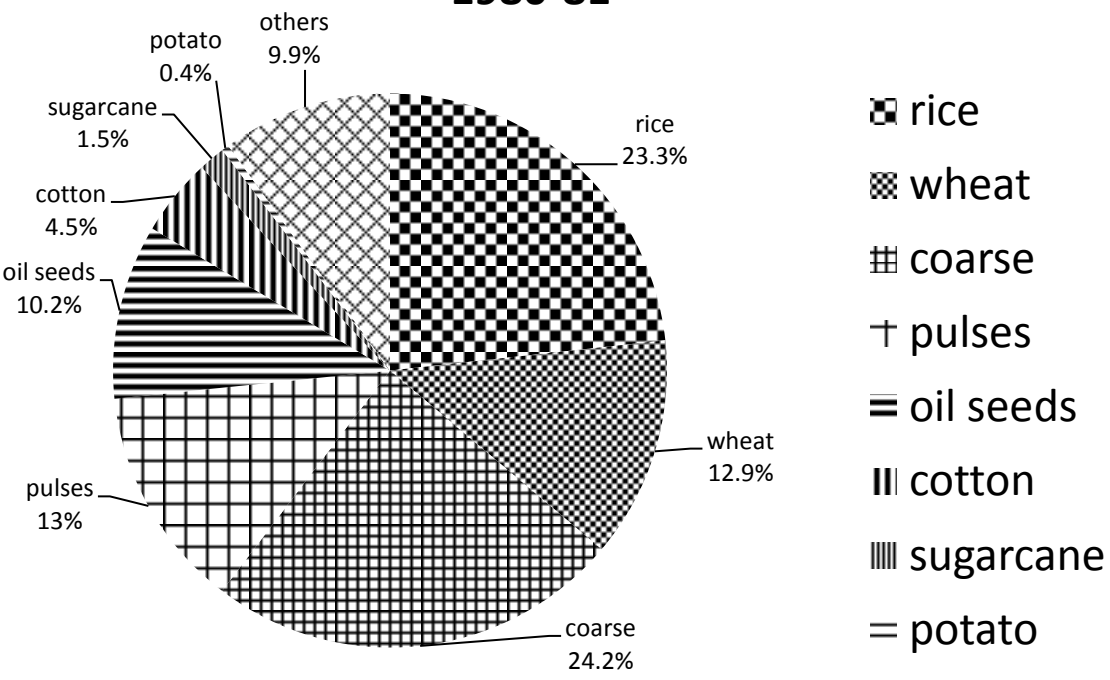
1960-61



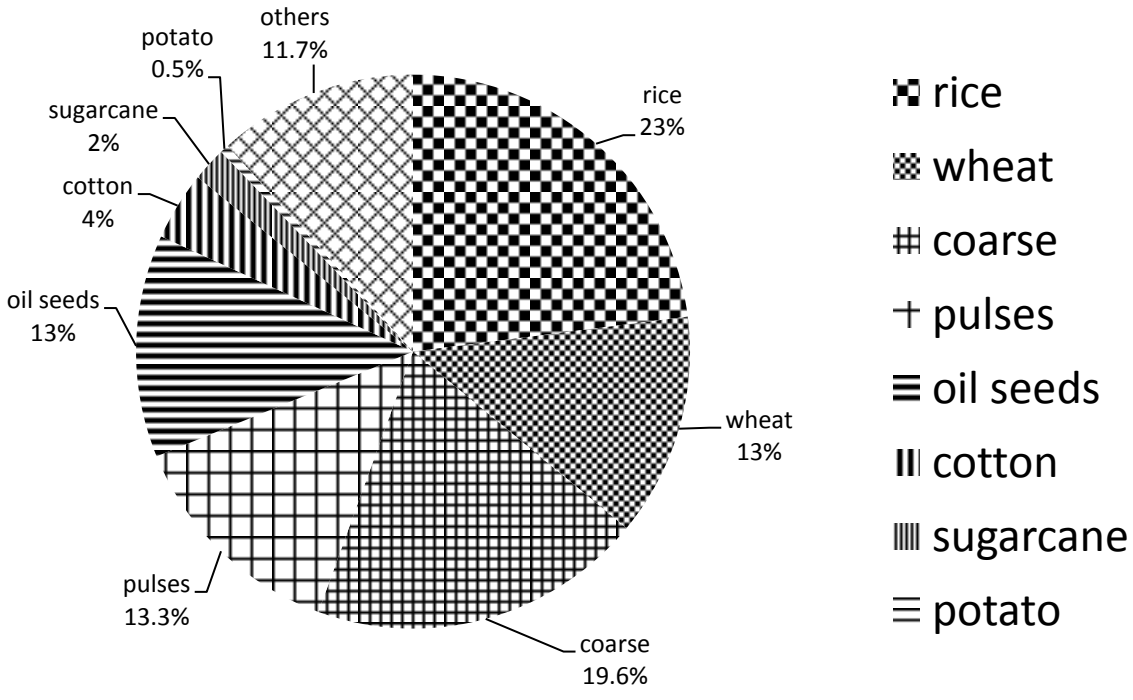
1970-71



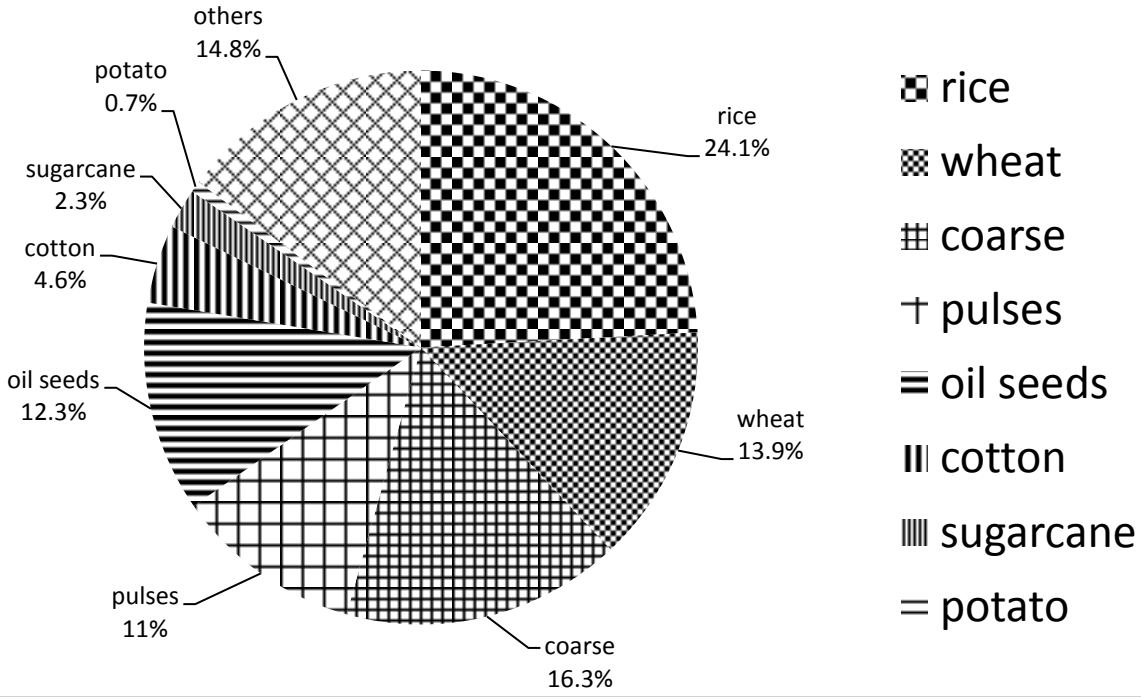
1980-81



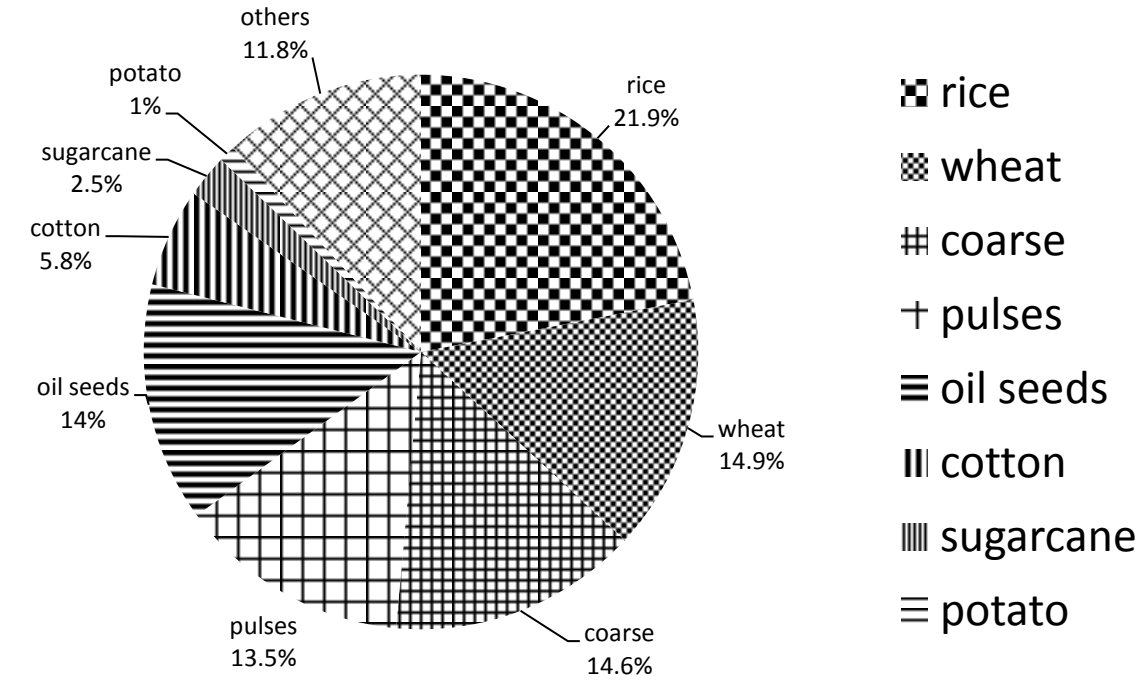
1990-91



2000-01



2010-11



Area Under Crops and Share of Crops All India

3.24 Data indicating the area under crops and share of crops from 1950-51 to 2009-10 is given at Appendix - III of this Report.

3.25 An analysis of the data provided by the DAC regarding area share of different crops indicate that the percentage share of rice has remained in the range of 22 to 24 percent from 1950-51 to 2009-10 (provisional). Whereas the percentage share of wheat has increased from 8 to 15 percent. On the other hand, the percentage share of millets, pulses, sugarcane, fruits and vegetables has decreased over the last 6 decades. It is also observed from the data furnished by the DAC that for cash crops like tobacco, tea, coffee, the area share has remained more or less the same over the last 6 decades. For instance, the percentage share of tobacco to the total crop area has remained static to 0.3 percent during 1950-51 to 2009-10 (provisional figure). On the other hand, the percentage share of tea during the said period has just increased from 0.2 to 0.3 percent. Whereas, the percentage share of coffee has increased only from 0.1 to 0.2 percent from the period 1950-51 to 2009-10 (provisional figure).

Area Under Crops and the Share of Crops in the some of the States under Crop Diversification pertaining to the period 2000-01 to 2011-12 (provisional figure).

3.26 Area under crops and share of crops in some of the States in the country is given at Appendix - IV of this Report.

3.27 An analysis of the data furnished by the DAC reveals the following trends in various States:

3.28 In the State of Gujarat, the percentage share of rice has remained static at 6 percent from 2000-01 to 2009-10. The percentage share of wheat has increased from 3.4 to 7.9 percent during the said period. In case of pulses and sugarcane, the percentage shares have remained static at 7 percent and in the range from 1 to 2 percent respectively during the said period. However, the percentage share of total

oilseeds has declined from 27 to 25 percent during the aforementioned period. The data also indicates that major area of Gujarat is occupied by cash rich crops and pulses.

3.29 In the State of Haryana, the major area is being occupied by traditional crops i.e. wheat (39.2 percent) and rice (19 percent). The percentage share of rice has increased from 17 to 19 from 2000-01 to 2009-10. The percentage share of wheat has also increased from 38.5 to 39.2 percent during the said period. In case of total pulses, the percentage share has decreased from 3 to 2 percent and in case of sugarcane it has shown decline from 2 to 1 percent during the aforementioned period. The percentage share of vegetables and total oilseeds has remained static at 1 and 7 percent respectively during the aforementioned period. The data indicates that major share is still dominated by the traditional crops i.e. rice and wheat.

3.30 In the State of Maharashtra, major cropped area is being occupied by cereals and millets, i.e. 39 percent. The percentage share of rice has remained static at 7 percent from 2000-01 to 2009-10. However, the percentage share of wheat has increased from 3.5 to 4.8 percent during the said period. In case of total cereals and millets, the percentage share has declined from 45 to 39 percent. The percentage share of pulses decreased from 17 to 15 percent. Whereas the percentage share of sugarcane and total fruits and vegetables have nearly increased by 1 percent during the aforementioned period. Whereas the percentage share of total oilseeds has shown an increase by about 5 percent. The data indicates that despite having perfect geo-climatic conditions for cash rich crops, major area is still being occupied by the traditional crops, i.e. cereals and millets.

3.31 In the State of Punjab, major area is being occupied by traditional crops i.e. wheat (44.7 percent) and rice (35 percent). During the period pertaining to 2000-01 to 2009-10, the percentage share of rice has increased from 33 to 35 percent. The percentage share of wheat has also increased from 42.9 to 44.7 percent during the said period. In case of total pulses, it has shown a decline from 0.8 to 0.3 percent and in case of sugarcane, the percentage share has shown a decline from 2 to 1 percent

during the aforementioned period. The percentage share of fruits and vegetables (2 percent) and total oilseeds (1 percent) has remained static during the aforementioned period. The data also indicates that major share is being occupied by traditional crops, whereas, the share of other crops have either decreased or remained static.

3.32 **I**n the State of Rajasthan, major area is being occupied by cereals and millets i.e. 45 percent. The percentage share of rice has decreased from 0.9 to 0.7 percent during the period pertaining to 2000-01 to 2009-10. The percentage share of wheat has also declined from 12 to 11 percent during the said period. In case of pulses, it has shown an increase from 12 to 16 percent and in case of sugarcane, the percentage share has become nil during the aforementioned period. The percentage share of fruits and vegetables has remained static at 1 percent during the aforementioned period. Oilseeds have shown an increase from 14 to 19 percent during the same. The data indicates that despite the fact that the geo-climatic conditions are more favourable for less water consuming crops, the major share is being occupied by traditional crops.

3.33 In the State of Uttarakhand, major area is being occupied by cereals and millets i.e. 76 percent. The percentage share of rice has remained 24 percent during the period pertaining 2000-01 to 2009-10. The percentage share of wheat has shown an increase from 30.8 to 32 percent during the said period. In case of pulses, the percentage share has remained static at 4 percent. In case of sugarcane, the percentage share has declined form 10 to 9 percent during the same period. The percentage share of total fruits and vegetables were in the range of 3 to 4 percent. The percentage share of total oilseeds has also remained static at 2 percent during the aforementioned period. The data indicates that share of pulses, sugarcane, fruits & vegetables and oilseeds has remained static during the last decade inspite of the State having favourable conditions for fruits and vegetables and having vast scope for increasing their production.

3.34 In the State of Andhra Pradesh, major area is being occupied by cereals and millets i.e. 38 percent. The percentage share of rice has shown a decline from 31 to 27 percent during the period pertaining 2000-01 to 2009-10, whereas the percentage

share of wheat has remained static at 0.1 percent during the said period. In case of pulses, the percentage share has increased from 14 to 15 percent. In case of sugarcane, the percentage share has remained static at about 3 percent. The percentage share of fruits and vegetables has shown an increase from 6 to 8 percent. However, percentage share of the total oilseeds has shown a decline from 21 to 18 percent. The data indicates that share of sugarcane and oilseeds has decreased during the last decade.

3.35 In the State of Karnataka, major area is being occupied by cereals and millets i.e. 42 percent. During the period pertaining to 2000-01 to 2009-10, the percentage share of rice has declined from 12 to 11 percent, whereas, the percentage share of wheat has remained static at 2.2 percent during the said period. In case of pulses the percentage share has increased from 17 to 19 percent. However, in case of sugarcane, the percentage share has remained almost static at 4 percent during the aforementioned period. The percentage share of fruits and vegetables has almost remained static at 5 percent. Oilseeds have shown an increase from 18 to 19 percent during the aforementioned period. The data indicates that share of pulses, sugarcane, fruits and vegetables has increased but the incremental growth of these crops is not very significant.

3.36 In the State of Kerala, major area is being occupied by oilseeds, i.e. almost 30 percent. The percentage share of rice has declined from 11 to 9 percent during the period pertaining 2000-01 to 2009-10. In case of total cereals and millets, the percentage share has decreased from 12 to 9 percent, whereas in case of sugarcane, the percentage share has remained almost static at 3 percent. It is also seen that the percentage share of fruits and vegetables has declined from 20 to 18 percent. Oilseeds have shown a decrease from 31 to 29 percent during the aforementioned period. The data indicates that share of pulses and sugarcane has remained static while the percentage share of oilseeds has decreased in the last decade.

3.37 In the State of Tamil Nadu, major area is being occupied by cereals and millets i.e. 45 percent. The percentage share of rice has remained static to almost 33 percent during the period pertaining 2000-01 to 2009-10. The area under pulses has shown a decline by 1 percent and the share of sugarcane has almost remained static at 5 percent. However, the percentage share of total fruits and vegetables has increased by about 3 percent. Oilseeds have shown a decrease from 18 to 16 percent during the aforementioned period. The data indicates that share of pulses and sugarcane has remained static while the percentage share of oilseeds has decreased in the last decade.

3.38 In the State of Assam, major area is being occupied by cereals and millets i.e. 64 percent. The percentage share of rice has declined from 65 to 62 percent during the period pertaining 2000-01 to 2009-10, whereas, wheat has shown a decline from 1.7 to 1.5 percent during the aforementioned period. The percentage share of total pulses and sugarcane has remained static at 3 and 1 percents respectively. The percentage share of total fruits and vegetables has increased from 7 to 11 percent. The percentage share of oilseeds has remained static at about 8 percent during the aforementioned period. The data indicates that share of pulses and sugarcane has remained static and the percentage share of oilseeds has declined in the last decade.

3.39 In the State of Bihar, major area is being occupied by cereals and millets i.e. 80 percent. The percentage share of rice has declined from 46 to 43 percent during the period pertaining 2000-01 to 2009-10, whereas, percentage share of wheat has shown an increase from 25.9 to 29.3 percent during the aforementioned period. The total percentage share of pulses has remained static at about 8 to 9 percent. The percentage share of sugarcane has also remained static at 1 percent. The percentage share of total fruits and vegetables and total oilseeds have remained static at 5 and 2 percent respectively.

3.40 In the State of Jharkhand, major area is being occupied by total cereals and millets i.e. 81 percent. The percentage share of rice has declined from 72 to 70 percent

during the period pertaining 2000-01 to 2009-10. Whereas, the percentage share of wheat has remained in the range of 3.1 to 3.5 percent during the year 2000-01 to 2011-12 (provisional figure). The percentage share of total pulses has remained static at about 7 percent. The percentage share of sugarcane has declined from 0.2 to 0.1 percent. The percentage share of total fruits and vegetables has shown an increase by 3 percent. The total oilseeds have shown an increase by 2 percent.

3.41 In the State of Odisha, major area is being occupied by total cereals and millets i.e. 54 percent. The percentage share of rice has declined from 56 to 49 percent during the period pertaining 2000-01 to 2009-10, whereas, percentage share of wheat has remained static at 0.2 percent during the aforementioned period. The total area under pulses has increased from 18 to 22 percent. The percentage share of sugarcane has remained static at 0.4 percent, whereas the percentage share of total fruits and vegetables and total oilseeds have shown an increased by 3 and 1 percent respectively.

3.42 In the State of West Bengal, major area is being occupied by cereals and millets i.e. 64 percent. The percentage share of rice has declined 60 to 59 percent during the period pertaining 2000-01 to 2009-10. The percentage share of wheat has also declined from 4.7 to 3.3 percent during the aforementioned period. The percentage share of pulses has remained static at 2 percent. The percentage share of total fruits and vegetables has shown an increase by 2 percent. The percentage share of oilseeds has remained at 7 percent during the aforementioned period.

Balancing of Crop Production through Crop Diversification

3.43 In the backdrop of the facts stated by the DAC that crop diversification would lead to a much balanced production between rice and wheat and pulses and oilseeds, the Committee enquired about the current year's ratio of production in the said two categories of crops along with the ratio of production in the last five years. In response, the DAC has furnished the following information:

Percentage share of Production of Rice & Wheat and Pulses & Oilseeds during the period 2006-07 to 2011-12

Crop	Production (Million Tonnes)											
	2006-07	percent share	2007-08	percent share	2008-09	percent share	2009-10	percent share	2010-11	percent share	2011-12*	percent share
Category - I												
Rice	93.4		96.7		99.2		89.1		96.0		104.3	
Wheat	75.8		78.6		80.7		80.8		86.9		93.9	80.8
Total (Rice & Wheat)	169.2	81.5	175.3	79.7	179.9	81.0	169.9	81.1	182.9	78.3	198.2	
Category-II												
Pulses	14.2		14.8		14.6		14.7		18.2		17.2	
Oilseeds	24.3		29.8		27.7		24.9		32.5		30.0	
Total (Pulses & Oilseeds)	38.5	18.5	44.5	20.3	42.3	19.0	39.5	18.9	50.7	21.7	47.2	19.2
Grand Total (Category – I + Category - II)	**207.6**	**100.00**	**219.8**	**219.8**	**222.1**	**100.00**	**209.4**	**100**	**233.6**	**100.00**	**245.4**	**100.00**

* 4th advance estimates

3.44 It may be seen from the above Table that the total percentage share of production of wheat and rice has shown a decline from 81.5 in the year 2006-07 to 78.3 percent in the year 2010-11, whereas the percentage share of production of pulses and oil seeds has increased from 18.5 to 21.7 percent.

3.45 Regarding the percentage share of coarse cereals, pulses and oilseeds in agricultural production, the DAC stated as under:

> "Over the years, the production of oilseeds and coarse cereals has increased in absolute terms. The production of coarse cereals has increased from 15.38 million tonnes in 1950-51 to the highest ever of 42.08 million tonnes in 2011-12. Similarly the production of oilseeds has also increased from 5.16 million tonnes in 1950-51 to 30.01 million tonnes in 2011-12. The production of pulses, which had been hovering around 13-14 million tonnes since 1988-89 increased to 18.23 million tonnes in 2010-11 and 17.21 million tonnes in 2011-12. However, the production of these crops is required to be enhanced keeping in view the future demand of growing population and also to conserve the natural resources".

3.46 When asked as to why the import of wheat has increased from 1.350 lakh MT in the year 2001-02 to 1.84 lakh MT in 2010-11, the DAC has stated that this quantity is insignificant in comparison to India's total production of 869 lakh MT in 2010-11. In fact,

with sufficient domestic availability, India has allowed export of wheat since 9.9.2011. Till the end of February 2012, India had exported 6.7 lakh MT of wheat.

3.47 Enquired about the reasons for an increase in the import of pulses from 22.17 lakh MT in 2001-02 to 25.91 lakh MT in 2010-11, the DAC has stated that pulses are important for nutritional and food security. Import duty on pulses has been reduced to zero since 8.6.2006 for meeting domestic demand and stabilizing prices. Efforts are on to increase production of pulses under National Food Security Mission.

3.48 When asked whether the DAC has ever assessed the type of soils, conditions of soils in terms of fertility, depletion of water table, suitability of the crops to be introduced for crop diversification as per the local conditions with the State Governments so that regional specific crop diversification can be introduced in the country. In response, the DAC has stated as under:

> "The country has been categorised into 15 agro-climatic regions by the Planning Commission based on the commonality of agro-climatic factors like soil type, rainfall, temperature, water resources, etc. Besides, the Indian Council of Agricultural Research (ICAR) under Ministry of Agriculture has delineated 60 agro-ecological sub-regions (AESR) based on soil, physiography, bio-climate and length of growing period (LGP). The soil fertility maps for major and micro-nutrients for efficient use of fertilizers has also been developed by Indian Institute of Soil Science, Bhopal. Crop diversification envisages growing of physiologically more efficient or economically more profitable alternative crops to existing crops being grown on a certain piece of land, or growing of additional crops during fallow period (in rotation) and/ or as intercrop in existing sole crop. A well designed and validated crop diversification option generally leads to significant improvement in system productivity and/ or profitability.
>
> Several efficient alternative cropping system options for irrigated areas of different agro-climatic zones have been identified by Project Directorate of Farming Systems Research (PDFSR), Modipuram based on the criteria of system productivity, monetary advantages, water & energy efficiency, and sustainability. Central Research Institute for Dryland Agriculture, Hyderabad have assessed the type of soils and introduced alternate crops as per suitability and local conditions for rainfed/dryland areas of the country. Studies have also been made at NBSS&LUP, Nagpur to suggest alternate land use plan for crop diversification by integrating the information on soil, climate, other bio-physical properties as well as socio-economic conditions. In order to implement crop

diversification in letter and spirit, vigorous efforts are required to reduce production risks and provide assured returns".

3.49 According to the DAC, horticulture development programmes have encouraged agricultural diversification. Liberal financial assistance for improved planting material, hi-tech inventions like micro propagation, drip irrigation, green house cultivation, etc. has encouraged farmers to grow horticultural crops. The focused attention to horticulture has resulted in crop diversification leading to increased production and export of horticultural produce. The production of horticultural crops which was only 96.56 million tonnes during 1991-92 has increased to 231.14 million tonnes during 2010-11 and the area under horticultural crops increased by 8.97 million ha as seen below. Thus, there has been a gradual shift towards horticultural crops in crop diversification.

CHAPTER - IV

CHALLENGES OF CROP DIVERSIFICATION

Some of the challenges of Indian agriculture *inter-alia* relate to rainfed agriculture, sub-optimal and overuse of resources like land and water causing negative impact on environment, excessive use of fertilizers and pesticides, weak research expansion and farmer linkages.

4.2 DAC has stated that the guiding principles of crop diversification are higher returns to farmers, conservation of natural resources and sustainability of productions for food security.

Rainfed Agriculture and Crop Diversification

4.3 According to the DAC, about 60 percent of the gross cropped area of the country is rainfed/dryland which are predominantly mono-cropped. Monoculture and continuous cropping of rice–wheat is deteriorating the fertility of soil. Besides, the risk of crop failure due to failure of rains is very high in these production systems.

4.4 According to the DAC, rainfed agriculture is complex, diverse and risk prone. It is characterized by low level of productivity and input usage which coupled with vagaries of monsoon result in wide variation and instability in yields. However, these areas, if managed properly, have tremendous potential to contribute larger share in food production and faster agricultural growth compared to irrigated areas which have reached a plateau.

4.5 To obviate the vagaries of monsoon and utilize the potential of rainfed areas, three dimensions i.e. ecological restoration, productivity enhancement and drought mitigation are the core areas which need special attention.

4.6 In this regard, the DAC has informed the Committee that the National Rainfed Area Authority (NRAA) has been established for developing inclusive guidelines for the development of watershed in the rainfed areas and to enhance the cropping area and income of the farmers. Several initiatives for the harvesting and conservation of water resources are also implemented under Integrated Watershed Development Programme and Macro management of Agriculture. Besides, Mahatma Gandhi National Rural Employment Guarantee Act provides opportunity to renovate and construct water bodies for water harvesting and recycling for protective irrigation. Efficient Water Application Tools (EWAT) are also promoted under National Mission on Micro-Irrigation to enhance the water application efficiency and cover larger area under irrigation with limited water available in the dryland/rainfed regions.

4.7 Elaborating further on the issue, the DAC has informed that to provide life saving/protective irrigation, water harvesting structures like check dams, tanks/ ponds, tube-wells, dug wells etc. are constructed under all the major programmes of the Department like Macro Management of Agricultrure (MMA) ,Rashtriya Krishi Vikas Yojana (RKVY) , National Food Security Mission (NFSM) , National Horticulture Mission (NHM) etc. Further under the Integrated Watershed Management Programme (IWMP) of Ministry of Rural Development in-situ moisture conservation and rainwater harvesting measures are taken up in rainfed areas.

4.8 The National Mission on Micro-Irrigation (NMMI) is implemented in the country to promote drip and sprinkler irrigation systems in crops including horticultural crops and vegetables which are important components for crop diversificatioin. These systems economizes the water use by 30-40 percent as compared to conventional methods of irrigation and hence the most suitable for water scarce dryland and rainfed regions. Since the inception of NMMI, an area of 13.19 lakh ha has been brought under micro Irrigation.

4.9 Taking cognisance of the significance of rainfed areas and crop diversification, the Committee enquired about the specific programmes taken up by the DAC to tap the potential of these areas. In this regard the DAC has informed that assistance is provided @ 60 per cent to small and marginal farmers and 50 per cent to other category of farmers. Since, inception of NMMI, an area of 13.19 lakh ha has been brought under Micro Irrigation with an expenditure of ₹ 2224.25 crore as central share. These systems economizes the water use by 30-40 per cent as compared to conventional methods of irrigation and hence the most suitable for water scarce dryland and rainfed regions.

4.10 As per the Annual Report of the DAC, NWDPRA project was launched in 1990-91 in 28 States and 2 Union Territories based on twin concepts of integrated watershed management and sustainable farming systems. NWDPRA scheme has been subsumed in Macro Management of Agriculture scheme since 2000-2001. This programme specifically focuses on conservation, development and sustainable management of natural resources; enhancement of agricultural production and productivity in a sustainable manner; restoration of ecological balance in degraded and fragile rainfed ecosystems by greening these areas through an appropriate mix of trees, shrubs and grasses; reduction in regional disparity between irrigated and rainfed areas; and creation of sustained employment opportunities for rural community including landless.

4.11 As per the DAC, impact evaluation studies both on ground and through remote sensing techniques have shown that watershed based interventions have led to increase in groundwater recharge; increase in number of wells and water bodies; enhancement of cropping intensity; changes in cropping pattern; and higher yields of crops and reduction in soil losses.

Rainfed Area Development Programme (RADP)

4.12 As per the Annual Report (2011-12) of the DAC, another programme has been launched on pilot basis as per advice of Planning Commission as sub scheme of Rashtriya Krishi Vikas Yojana (RKVY) during the year 2011-12 in States of Andhra Pradesh, Odisha, Tamil Nadu, Karnataka, Madhya Pradesh, Chhattisgarh,

Maharashtra, Gujarat, Uttar Pradesh and Rajasthan, with outlay of ₹ 250 crores. The broad objectives are:

(i) Increasing agricultural productivity of rainfed areas in sustainable manner by adopting appropriate farming system based approaches.

(ii) To minimize adverse impact of possible crop failures due to drought, flood or un-even rainfall distribution through diversified and composite farming systems.

(iii) Restoration of confidence in rainfed agriculture by creating sustained employment opportunities through improved on-farm technologies and cultivation practices.

(iv) Enhancement of farmers' income and livelihood support for reduction of poverty in rainfed areas.

(v) Convergence of relevant developmental programmes in project areas for optimal utilization of resources by establishing an integrated and coordinated system involving different sectors and institutions.

4.13 According to the DAC, RADP will act as a catalyst to accomplish objectives of enhanced productivity, minimizing risk of crop losses due to uncertainties of weather conditions, harnessing efficiency of resources, assuring food and livelihood/income security at farm level and strengthen farmers' capacity to adapt to climatic changes. The Committee have also been informed that 3510 clusters have been selected and about 1.7 lakh farmers have benefitted till December, 2011.

4.14 Taking into account that about 60 percent of gross cropped area of the country is rainfed, the Committee desired to know about the institutional development that have been put in place for crop diversification. In response, the DAC has stated as under:

> "States have developed Comprehensive District Agriculture Plan (CDAP) and State Agriculture Plan under the Rashtriya Krishi Vikas Yojana (RKVY). All Programmes/Missions of the Department adopt these plans for suitable crop planning including crop diversification. Major Missions/ programmes like Rashtriya Krishi Vikas Yojana (RKVY), National Food Security Mission(NFSM), National Horticulture Mission (NHM), National Mission of Micro Irrigation(NMMI), Macro Management of Agriculture (MMA) etc. have established institutional set up at National, State and District levels to ensure effective implementation of these programmes. During 2011-12 integrated farming system has been introduced under Rainfed Area Development Programme (RADP) through the

window of RKVY to propagate location specific farming system to promote remunerative crops including diversification. Several research institutions are working under the aegis of ICAR for the development of suitable agro-technologies for rainfed/dryalnd regions. Central Research Institute for Dryland Agriculture (CRIDA) located at Hyderabad is working for the semiarid regions of the country. Similarly Central Arid Zone Research Institute (CAZRI) located at Jodhpur is working for the arid regions. Coarse cereals are the major crops that are grown in the rainfed ecologies of the country. To promote product diversification and facilitate farmers-entrepreneurs linkages in processing, value addition and marketing of millets, Centre of Excellence (CoE) on sorghum, pearl millet and small millets have been established at Hyderabad, Hisar and Bangalore, respectively".

4.15 The Annual Plan 2012-13 document of the DAC states that agriculture in the country is largely dependent on vagaries of weather. This results in wide scale fluctuation on food production year to year, as seen during the Eleventh Five Year Plan period. There is need for better predictability of temporal and spatial distribution of rainwater, surface water flow and ground water status for proper agricultural planning and taking of remedial actions.

Ground Water and Crop Diversification

4.16 According to the DAC, continuous cultivation of higher water demanding crops viz. rice, wheat and sugarcane in some of the highly productive regions of the country has led to excessive exploitation of ground water reserve leading to depletion of ground water.

4.17 In the light of the above, the Committee desired to know about the steps taken to check depletion of ground water, Secretary (Agriculture) during the oral evidence held on 14.06.2012 deposed as under:

"This is not really under our control. What we have been trying to do in the Ministry of Agriculture is that we push for a higher MSP in respect of crops which are less water consuming. So, our focus, Sir, if you have noticed over the past several years, has been on increasing MSP for oilseeds, pulses and coarse cereals and less emphasis on the traditional crops such as paddy and wheat."

4.18 When asked whether the DAC has ever taken/proposed to take any steps vis-à-vis the various issues raised in the recommendations given by the Johl Committee regarding crop diversification in Punjab, the Committee have been informed that the Government has been advising the State Government to promote crop diversification and conserve natural resources.

4.19 Elaborating on the issue, the DAC apprised the Committee that to facilitate the States including Punjab, several programmes were initiated during Eleventh Five Year Plan which includes National Food Security Mission (NFSM) and Rastriya Krishi Vikas Yojana (RKVY). The conservation agriculture practices are being promoted under rice and wheat components of NFSM along with promotion of summer pulses in rice–wheat system under NFSM-pulses to improve the soil conditions and income of the farmers. The RKVY provides flexibility to States to plan and implement the site specific need based activities required for the development of agriculture. In addition to these several ongoing schemes facilitate crop diversification towards oilseeds and maize (ISOPOM), Cotton (Technology Mission on Cotton), horticulture crops and vegetables (National Horticulture Mission).

4.20 Taking into account that the Government of Punjab has adopted regulations in the form an Ordinance (The Punjab Preservation of Sub-Soil Water Act, 2009' amended in 2012) banning the transplanting of rice before 10th of June (which has reportedly helped in decreasing the water consumption during the dry summer period of May and June), the Committee enquired whether the DAC has ever studied/proposed to study similar sub-soil conditions in other parts of the country so that such positive intervention to check water depletion can be replicated. In response, the DAC has stated that the Central Ground Water Board under the Ministry of Water Resources conducts periodical studies on groundwater availability and status of depletion in the States. According to their report for the year 2012, the groundwater depletion is alarming in many States.

4.21 The details of the depletion of ground water in various States are given at Appendix - V of the Report.

4.22 It is observed from the analysis of the data that out of the total 5842 assessed Blocks/Mandals/Talukas units in the States/UTs, 73 percent blocks are safe, 9 percent blocks are semi-critical, 3 percent are critical and 14 percent are over exploited. State-wise analysis of the data reveals that 80 percent of the assessed units of Punjab indicate overexploitation of ground water followed by Delhi (74 percent), Rajasthan (69 percent), Haryana (59 percent) and Tamil Nadu (36 percent). The data also indicate that out of the total assessed units of 5842, 71 units are found to be salinity-affected. In terms of salinity of ground water, Andhra Pradesh with 38 units has the maximum saline ground water followed by Gujarat (14 units) and Tripura (11 units).

4.23 Some of the important observations/recommendations made by the Johl Committee regarding crop diversification as a medium to address the problem of degradation of natural resources, land and water and to avoid their overexploitation is given at Appendix - VI of this Report.

4.24 With regard to the recommendation made by the Johl Committee for direct seeding of rice (which reduces the exploitation of underground water by saving water upto 66 to 75 percent, as compared to transplanted rice), the DAC has informed the Committee that Direct Seeded Rice (DSR) is a feasible practice and can be adopted in most of the rice ecologies except deep water rice, where water stagnation for long time at early crop stage may cause damage to germinating seedlings. Elaborating further, the Committee have been apprised that this practice economizes the water use and reduces the cost of cultivation. In view of this, the Government is already promoting and incentivizing direct seeding of rice under National Food Security Mission-Rice. Special focus is given to States/regions (Punjab, Haryana, Western U.P.) where gap between groundwater utilization and recharge has lead to over exploitation/critical range of groundwater in majority of the blocks/districts. Demonstrations on Direct Seeded

Rice–wheat system have been introduced since 2012-13 under NFSM and Bringing Green Revolution in Eastern India (BGREI) to create awareness amongst farmers to popularize the technology.

4.25 Regarding the practice of System of Rice Intensification, Secretary (Agriculture) during the oral evidence held on 14.06.2012 stated as under:

> "I am very happy that you have mentioned about it. Now, after Tamil Nadu, I think, it is Bihar which has taken up the System of Rice Intensification in a very big way. I am told that about 20 percent of the areas are under SRI cultivation. Of course, we really need scientific validation of those practices because probably that practice is not suitable for each and every agro-ecology. So, maybe it does not make sense to push it everywhere but certainly in the ecologies where SRI cultivation is recommended, we are definitely trying to push it, and we are very much encouraged by the results specially in the East and in the North East. Generally, it is said that technology adoption is lower in the East and in the North East. But in respect of SRI, I think, over the past two to three years we have seen some very encouraging results. So, there is a glimmer of hope in this."

4.26 In the background that green revolution had led to several environmental consequences such as ground water depletion, soil fertility loss, water logging etc. especially in the States of Punjab and Haryana, the Committee desired to know about the suitability of introducing crop diversification as a strategy to address the undesired implications of Green Revolution. In this regard, the DAC has stated as under:

> "All India Coordinated Research Project on Groundwater Utilization (AICRP-GWU), Ludhiana centre has taken up demonstrations in farmers' fields and found that the laser land leveling has potential of saving irrigation water up to 20-30 percent through its uniform application. In rice–wheat area of Punjab, approximately 19 cm of irrigation water can be saved by adopting laser land leveling. If irrigated area is totally groundwater dependent, 19 cm groundwater pumping will be reduced, thus reducing the rate of groundwater table decline. This is very much important in view of declining trend of groundwater table in State of Punjab and Haryana. Similarly, for lowering groundwater depletion, All India Coordinated Research Project on Groundwater Utilization (AICRP-GWU) centre at Ludhiana has developed groundwater recharge shaft suitable for the alluvial plains of Punjab and Haryana. The farmers can construct a recharge shaft at lowest point of farm, where surface runoff accumulates during Kharif season. The excess runoff water will be used for recharging groundwater. Also crop will be saved from surface water stagnation, if there is no natural outlet for

disposal of excess water. Thus saved water can help in increasing cropping intensity in the region with appropriate crop diversification."

4.27 As per the DAC, some of the major interventions as part of the strategy of crop diversification include discontinuing free electricity for agricultural purposes, to check overuse of ground water and cash compensation for shifting area of crops enjoying much high productivity than alteration crops.

4.28 In the light of the above, the Committee desired to know whether the radical changes are under active consideration. In reply, the DAC has stated as under:

"One of the major recommendations of Johl Committee was to discontinue the free electricity supply to farmers in Punjab to avoid the indiscriminate use of groundwater. The Government of Punjab has already banned the sowing/transplanting of rice before 10th June through an ordinance (The Punjab Preservation of Sub Soil Water Act, 2009 amended in 2012). Similarly Government of Haryana has been discouraging cultivation of Sathi Rice during summer season which has a high requirement of water. Power supply being a State subject hence appropriate implementation of the Johl Committee recommendations is required at the State level. As a policy, however, Government of India advises the States to avoid excessive use of water in irrigation. As regards cash compensation to farmers for adoption of alternate crops, the Government provides assistance for seed and other critical inputs amounting to ₹ 4800-5600 per hectare under Accelerated Pulse Production Programme (A3P) for cluster demonstrations at farmers' fields to promote the proven technology in pulses. Similar assistance is also available to farmers to adopt oilseeds, maize, oil palm under ISOPOM and horticultural crops and vegetables under NHM. Besides, to reduce the gap between the economic return of rice–wheat and that of pulses and oilseeds, the Minimum Support Price (MSP) of pulses and oilseeds has been increased substantially during the period 2008-09 to 2011-12 i.e. 60 percent in Arhar, 39 percent in mung, 62 percent in gram and 32 percent in rapeseed and mustard against 19 percent in wheat and 27 percent in rice. Further, a multidisciplinary team involving representatives from the Department of Agriculture & Cooperation, the Department of Animal Husbandry, Dairy & Fisheries, DARE/ICAR and the Ministry of Food Processing Industries has been constituted under the chairmanship of Secretary(A&C) to assess the feasibility of alternate crops such as maize, sugarcane, pulses, oilseeds, vegetables and enterprises like dairying vis-à-vis rice–wheat system in Punjab and other States and suggest suitable interventions for water conservation, alternate crops, prices, marketing and processing and value additions required for promotion of crop diversification."

Use of Soil and Crop Diversification

4.29 According to the DAC, mono-culture and continuous cropping of rice–wheat system have resulted in deteriorating soil fertility. This has endangered the basic fabric of sustainability in some of the most productive zones of the country. The soil has deteriorated leading to build up of diseases and pests. The decline in productivity in the most productive regions in the country has become a major concern.

4.30 With regard to crop diversification as a means to check the menace of soil fertility depletion due to intensive cropping, the DAC has informed the Committee that serious concerns are generally expressed about soil fertility depletion due to intensive cropping over long period of time and crop diversification is one of the several measures for their correction. It has been well proved that raising similar crops repeatedly on a same piece of land leads to decline in soil fertility due to continuous mining of nutrients from the particular layer especially under cereal–cereal cropping system. For instance, rice–wheat cropping system is highly nutrient exhaustive and in the long run, it depletes inherent soil fertility, causing deficiency of several nutrients.

4.31 Elaborating on the issue, the Committee have been apprised that as the sustainability of the production system depends on the sustainable use of soil recourses, it is necessary to develop and adopt soil management technologies that increase soil organic matter contents and biological activities and improve soil physical conditions to keep lands productive on the sustainable basis. Induction of green manuring (Dhancha) and leguminous crops in the monocotyledonous-based cropping system can improve the soil health and crops productivity on sustainable basis. Also, growing different types of crops varying in their root system mines nutrients from different soil layers and thereby improves the use efficiency of the applied nutrients. The tap rooted crops such as legumes and agro-forestry interventions draw nutrients from the deeper layers unlike cereals and bring them to the surface layers. Also, shedding of leaves from these crops provides substrate to the microbes and nutrients for crops besides improving physical and biological conditions of the soil.

4.32 Further the DAC has informed that the development of salt tolerant varieties including water logging and sodicity and reclamation measures have created immense scope for crop diversification in these types of soils. CSSRI, Karnal has developed salt-tolerant varieties of rice (CSR-10, 13, 23, 27, 30, 36), wheat (KRL-14, KRL-19, KRL-210, KRL-213) and mustard (CS52, CS54, CS56) in this regard. Several Horti-silvi-pastrual-agro-foresty models have also been developed to increase the productivity and profitability of these types of soil.

4.33 Taking cognisance of the information furnished by the DAC that specialized farming in certain regions of the country, has depleted natural resources leading to soil and environmental related problems, the Committee desired to know the State/UTs which are facing depleted natural resources, soil and environmental related problems. In response, the DAC has stated as under:

> "The depletion of ground water is rampant in Punjab, Haryana, and other States which are following specialized cropping systems especially rice–wheat or rice–rice. In Punjab, about 82 percent blocks of the State have been categorized as over exploited/critical for ground water reserve, i.e. drawal/utilization is much higher than recharge. Similar conditions prevail in Haryana which has about 77 percent of Blocks under over exploited/critical category. Ground water reserve is at critical stage in Karnataka and Rajasthan as well. Besides, intensive cropping natural resources are also depleting due to various natural calamities like droughts, etc. and manmade activities, like cutting of trees, unscientific way of cultivation, etc. With a view to conserve soil and water and to enhance biomass, Ministry of Agriculture and Ministry of Rural Development are implementing Watershed Development Programmes (WDPs). Cultivation of horticultural crops, particularly perennial crops like fruits and plantations help in increasing green cover and in mitigating soil and environmental problems. Schemes like the National Horticulture Mission (NHM) is implemented for promoting horticulture as a means of diversification by adopting a cluster approach. Several agro-forestry systems involving crops, fruits and fodder and tree species have been standardized and promoted for different agro-climatic conditions which conserve soil and water by checking soil erosion and runoff losses"

4.34 In the backdrop that continuous irrigation causes the rise in water table, however, salinity of the soil increases due to accumulation of water, leading to infertility of soil, the Committee desired to know about the steps taken to develop an efficient drainage

system to resolve the problem especially in States like Punjab, Haryana and parts of North Rajasthan. In response, the DAC has stated as under:

> "As per the Government of India (Allocation of Business) Rules, 1961 amended up to 9th July 2010, the matter relating to Irrigation and drainage falls under the purview of the Ministry of Water Resources (MWR). However, ICAR also conducts research on drainage in waterlogged conditions / areas to supplement the efforts of MWR. The studies conducted by ICAR indicate that in intensively cultivated irrigated command areas of the country, rise of water table is often associated with occurrence of soil salinity and accumulation of salts on the soil surface. Because of salt accumulation, there is a problem of nutrient availability which declines the soil fertility. Water logging and soil salinity problems are observed in south west Haryana, south west Punjab and adjoining parts of Rajasthan as these areas are in topographical depression and lack natural drainage. The Central Soil Salinity Research Institute (CSSRI), Karnal under the aegis of ICAR works on reclamation and management of waterlogged saline soils. The CSSRI has collaboration with Department of Agriculture, Haryana under Haryana Operational Pilot Project (HOPP) in field of land drainage. It provides technical support to State for identification of site, design, implementation, operation & maintenance and evaluation of large scale projects at locations in the districts of Kaithal and Sonipat. It is also helping projects in Sirsa, Jhajjar, Bhiwani and other districts of Haryana. In the State of Rajasthan, Rajasthan Agricultural Drainage (RAJAD) research project was implemented as a joint venture of Government of India, Government of Rajastan and the Government of Canada, through the Canadian International Development Agency (CIDA). RAJAD introduced irrigation system management on a pilot basis, as part of an Integrated Water and Agriculture Management (IWAM) strategy in the irrigated Chambal command area of Rajasthan. Integrated surface and subsurface drainage with improved water and agricultural management to control soil salinity and water logging in irrigation commands was implemented."

Quality of Seeds and Crop Diversification

4.35 As per the Annual Report of the DAC, seeds are basic and critical input for enhancing agricultural production and productivity. The Indian Seeds programme recognizes three generations of seeds, namely, breeder, foundation and certified seeds.

4.36 According to the DAC, the Seeds Act, 1966 is proposed to be replaced by a suitable legislation to *inter-alia*, i) create an enabling climate for growth of seed industry, ii) enhance seed replacement rates for various crops, iii) boost export of seeds and

encourage import of useful germplasm, iv) create a conducive atmosphere for application of frontier sciences in varietal development and for enhanced investment in research and development. The Government introduced the Seeds Bill in Rajya Sabha in December, 2004. The Bill was referred to Parliamentary Standing Committee on Agriculture, which recommended several modifications in the Bill. Based on the recommendations of Committee and comments of concerned Ministries/Departments, Government of India approved official amendments and these were moved in Rajya Sabha. The Committee have been informed that some of the suggestions/amendments received from several Members of Parliament and VIPs have been accepted and incorporated in the Seeds Bill, 2004.

4.37 When asked about the various initiatives taken regarding Seed Crop Insurance and Seed Bank Scheme by the Government, the DAC has stated as under:

> "Seed Crop Insurance:
> The Pilot scheme on Seed Crop Insurance was launched during Rabi 1999-2000 to protect seed crops in the event of natural calamity and continued up to 2001-2002. The scheme was in operation in 10 states viz., Haryana, Karnataka, Madhya Pradesh, Orissa, Maharashtra, Punjab, Gujarat, Rajasthan, West Bengal and Uttar Pradesh. This scheme was implemented by General insurance Corporation of India (GICI), New Delhi with the following objectives:
> (i) To provide financial security and income stability to the seed breeders/growers in the event of failure of seed crop.
> (ii) To strengthen confidence in the existing seed breeders/growers and stimulate participation of new breeders/growers to undertake seed production programme of newly released hybrid improved varieties.
> (iii) To provide stability to the infrastructure established by the State owned Seed Corporations/State Farms.
> (iv) To give a boost to the Modern Seed Industry to bring it under Scientific Principles.
>
> Type of Seeds and Crops covered: The breeder, foundation and certified seeds of paddy, wheat, Maize, Jawar, Bajra and Ragi, Gram, Red gram, Black gram, Green gram, Pea, Groundnut, Soyabean, Sunfloweer, Castor, Mustard, Cotton and Potato. All the farmers who were applied for certification and registered with State Seed Certification Agency and all the seed produce organization (SPO). Under the Government or private control were covered under this scheme.
>
> Establishment and Maintenance of Seed Bank:
> Seed Bank Scheme has been implemented by Seed Division from 1999-2000 with the objective to meet requirement of seeds during natural calamities and

unforeseen conditions. Under this component, for maintenance of certified and foundation seeds of identified crops, grants are provided to various implementing agencies ".

4.38 When asked by the Committee to explain the significance and impact of Seed Bank on crop diversification in the country, the DAC has stated as under:

"Establishment and Maintenance of Seed Bank is being implemented with the objective to meet the requirement of seeds in contingent situations like natural calamities, shortfall in production/availability, etc.

Impact of Seed Bank on Crop Diversification:

Before targets are allotted to the implementing agencies by GOI, they are requested in advance to make necessary arrangement for keeping the seeds of suitable crop/varieties for contingency planning as only short and medium duration/late sown varieties of different crops having adaptability in their State and adjoining States are allowed in the Seed Bank. In order to meet the requirement of seeds, as and when first crop sown by the farmers has failed, due to contingency situation, the seeds maintained of short duration crops/ varieties, suitable for the area, are used for sowing. Seed Banks are already in operation in the States of Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Maharashtra, Madhya Pradesh, Odisha, Punjab, Rajasthan, Uttarakhand, Uttar Pradesh, West Bengal and Kerala through the State Seed Corporations/ Seeds Development Authority (SSCs) and in Tamil Nadu through State Department of Agriculture. National Seeds Corporation and State Farms Corporation of India also operate Seed Banks at National Level. The Chhattisgarh Rajya Beej Nigam has started participation in the programme from 2012-13. As of now, the States like Himachal Pradesh, J&K and North Eastern States except Assam are not having Seed Bank facility in their States. In this regard, it is added that making seeds available to the farmers in normal situation including contingency situation is the responsibility of the respective State Governments which arranges the seeds through their State Governments Farms. Organizations such as NSC, SFCI and UK&TDC also meet the requirement of seeds in normal as well as contingency situation for North Eastern States."

4.39 With regard to the mechanism available with the DAC to check the quality of seeds provided to the farmers for crop diversification in the country, the Committee have been informed that in order to regulate the quality of seeds of all crops (including diversified crops) in the country and for curbing the sale of substandard/spurious seeds, adequate provisions, viz. notification of varieties, prescription of minimum limits of

germination and purity, compulsory labeling, establishment of seed testing laboratories, appointment of seed inspectors for quality checking of seeds, penalty and imprisonment for offences, licence for seed dealers, dealers to display stock and price list are available under the Seeds Act, 1966, the Seed Rules, 1968 and the Seeds (Control) Order, 1983. The State Governments are fully empowered to take action in all such cases at their level in case any violation of the prescribed standards is detected. The Seed Inspectors notified under relevant provisions of these legal instruments have powers to draw samples, seize stocks and issue 'Stop Sale' orders and file prosecution in the court if the seed under reference contravenes the provisions of law. Besides, seed producing agencies also adopt quality checks for production and distribution of quality seeds amongst the farmers.

Research extension and Crop Diversification

4.40 According to the DAC, the shifting emphasis of Indian agriculture towards diversification, commercialization, sustainability and efficiency has made it necessary for the Government to critically examine the research extension in the field of agriculture.

4.41 As per the Annual Report of the DAC, the Centrally Sponsored Scheme, "Support to State Extension Programme for Extension Reforms" based on Agricultural Technology Management Agency (ATMA) model is an important initiative for revitalization of the Extension System in the States. The Scheme aims at promoting decentralized demand-driven and farmer-accountable extension system through an innovative institutional arrangement for technology dissemination in the form of an Agriculture Technology Management Agency (ATMA). As per the DAC, this District level institution is an apex body for coordination and management of agricultural extension system in the district. At the block level, the Block Technology Team (BTT) – a team of line Department representatives posted in the Block and Block Farmer Advisory Committee (BFAC) – a group exclusively of farmers in the block are jointly responsible for operationalisation of the Scheme's activities. Extension activities under the scheme are also promoted in Public–Private Partnership (PPP) mode with involvement of both –

the governmental and non-governmental agencies, including NGOs, PRIs, Farmers' Organizations, para extension workers, agri-preneurs, cooperatives, input suppliers and corporate sector. The Scheme has been modified and strengthened during 2010-11 to provide manpower, infrastructure and enhanced activity support as enunciated below:

i) Provision of specialist and functionary support at different levels viz. State Coordinator and faculty & supporting staff for SAMETI at State level, Project Director, Deputy Project Directors and supporting staff at District level and Block Technology Manager and Subject Matter Specialists at the Block level;

ii) Innovative support through a 'Farmer Friend' at Village Level @ 1 Farmer Friend per two villages;

iii) Revision in ATMA Cafeteria (i.e. list of extension related activities to choose from) which now includes some additional activities and also provides for enhanced unit costs for some of the activities;

iv) Farmers' Advisory Committees at State, District and Block levels comprising of a group of farmers to advise and provide inputs to the administrative bodies at each level;

v) Support to SAMETIs for creating essential infrastructure; and

vi) Delegation of powers to State Level Sanctioning Committee (SLSCs) set up under Rashtriya Krishi Vikas Yojana, to approve the State Extension Work Plan (SEWP) prepared under the Extension Reforms Scheme.

4.42 With regard to non-functioning of ATMA, the Secretary, Ministry of Agriculture during the evidence held on 14.06.2012 stated as under:

> "Yes, Sir. I am not sure how to comment on that. Actually, the concept of ATMA was very good. The ATMA concept was that there will be grass root level planning which will flow up and at that level itself there will be linkage between research system and the marketing system and the whole crop management, so as to speak, all these things would be taken care of in an integrated manner. It would not only involve agriculture, it would involve horticulture, animal husbandry, marketing and everything. It was an integrated approach. Unfortunately, the way it got implemented in most States was that it started functioning as a parallel department. Sometimes even the integration or the cooperation and consultation with the main Agricultural Department was also slightly wanting. Also, that the staffing in the ATMAs was not very sufficient because its objective was very ambitious but the staffing was very limited. "

4.43 In the Annual Plan 2012-13 of the DAC, it has been stated that even though modified ATMA Scheme has been operational in field since 2010-11, feedback received from the States reveals that States are not in a position to engage the sanctioned manpower at the Block level due to meagre fixed emoluments for Subject Matter Specialist (SMS) who are paid ₹ 8500/- per month. Moreover, North-Eastern States are finding difficult to release their State share of 10 percent in all activities and 50 percent in case of Farmers Friends.

4.44 With regard to the query of non-inclusion of Members of Parliament as Members of ATMA in every district, the Secretary, the Ministry of Agriculture during the oral evidence held on 14.06.2012 stated as under:

> "Sir, Member of Parliament is much bigger to be a member of ATMA. ATMA is a very small level organization. It is there in every district. But, I think, that may not appear to behold the status and dignity of the Member of Parliament. What we can do rather is that we might think of a larger committee at the State level in which Members of Parliament can be made its members. At the Collector level, I think, MPs should not be members in that committee."

4.45 When asked about the reason for absence of any State level committee, Secretary (Agriculture) during the oral evidence held on 14.06.2012 stated as under:

> "We have already taken note of it. We have already started moving a concept in which we will have some kind of a State level committee in which we will have wider ranging participation from everybody because district level might not be upto the status of the Hon'ble Members. Let Agriculture be an exception and you should be at the State level."

4.46 In the backdrop that due to changing face of agriculture, farmers have to make a number of complex decisions, the Committee enquired about the initiatives taken by the DAC to remove the constraint of weak research-extension-farmer linkages towards crop diversification. In this regard, the DAC has submitted the following information:

> "Strong institutional mechanism for research-extension–farm linkages exists in the country. The State Agriculture Universities has a dedicated Extension Directorates and Agricultural Technology Information Centers (ATICs) which

work as a linkage with researchers and farmers for transfer of improved technologies and inputs including seeds of improved varieties. Besides, most of the ICAR institutes conduct farmer's participatory research at farmers' fields. The Frontline Demonstrations (FLDs) conducted by ICAR-SAUs system is another unique set of arrangement which provide opportunity to researchers and extension workers to evaluate the technology at farmers' field. Krishi Vigyan Kendra (KVKs) and Agriculture Technology Management Agencies (ATMAs) at the District level disseminate the technologies developed by research centres to farmers under various agriculture development schemes and programs. Lead research institutes of ICAR are actively involved for technical backstopping under various development programs. NCIPM is associated under Accelerated Pulses Promotion Program for pest surveillance and management, CRRI is associated for monitoring of the technical components under Bringing Green Revolution to Eastern India program, CRIDA is associated for preparation of District Crop Contingency plans for different deviant scenarios of climate and weather conditions. Regular interface between research and development officials is organized with the participation of state level officials in the promotion campaigns at the beginning of each crop season – Kharif and Rabi".

4.47 When asked to be apprised about the functioning of the Krishi Vigyan Kendras, the Secretary, during the oral evidence held on 14.06.2012, stated as under:

"The issue of KVK was also raised. I think, hon. Member was referring to KVKs, which are run by NGOs. The KVK is actually run by the ICAR system, the Department of Agriculture Research. It is not run by the Department of Agriculture. But, we interact very intensively with them at the field level. We have had some very good results of cooperation with KVKs. Of course, it is not uniform. But it mainly depends upon, who is manning those KVKs, that is, the scientists there. If the quality of scientists is good, then the KVKs are functioning very well. Where the quality is not so good, then the outreach of the KVKs also gets limited. In the newer arrangement what is happening, I believe in the North East it is the major problem, that the turnover of scientists is very high. People join getting a job because that is the first entry level and then as soon as they get a better job they leave. This is something for which I am not very sure as to what can be done and this is the real issue in the North East. But across the country and nearly in every State there have been instances where KVKs have performed very well, not only in adaptive research but also in direct stretch activity to the farmers".

4.48 When enquired whether the DAC has ever taken up the issue of utilization of Common Service Centres as 'Gyan Chaupals' for dissemination regarding crop

diversification to the farmers with the Department of Electronics and Information Technology and the State/UT Governments, the DAC has stated as under:

> "In the National e-Governance Plan in Agriculture, the 12 clusters of Services identified under the plan will be delivered through multiple delivery channels including Common Service Centers (CSCs). The plan also envisages sensitization of CSC operators in Agriculture by giving them training. The Project is currently being rolled out in Himachal Pradesh, Madhya Pradesh, Assam, Maharashtra, Jharkhand, Karnataka and Kerala. A Kisan Knowledge Management System (KKMS) to provide correct, consistent and quick replies to the queries of farmers has been developed by putting therein validated information on Agriculture and allied sectors of all States. Kisan Knowledge Management System (KKMS) has its independent web site, www.dackkms.gov.in/KKMS. The web site contains knowledge database on Package of Practices on Agriculture, Horticulture and Animal Husbandry of all the States. Discussions have been held with the Department of Electronics & Information Technology (DeITY) to finalize modalities of integration of CSCs with the KKMS. The basic idea is to empower the CSC agents so that they are not only able to disseminate correct information to the farmers but also resolve their specific queries and render services to the farmers. Dissemination of correct information and appropriate technologies will cover subjects of interest to a farmer in agriculture and allied sectors and include suggestions for crop diversification to enhance income. Unresolved queries will be escalated through KKMS to experts concerned in the State Government, Agriculture Universities and ICAR System."

CHAPTER V

POLICY INTERVENTION

(a) Land use Policy Reforms

As per the information furnished by the DAC, an environment of favourable policy support particularly in the areas of land policy, land leasing, contract farming, land Share Company and price support mechanism would be necessary to promote designed agricultural diversification.

5.2 According to the DAC, it is now widely recognized that agricultural growth can be accelerated through mutually supportive forward and backward integration leading to better post-harvest management and higher value addition in the agricultural sector. This would require substantive reforms in the land use policy of the country to achieve economies of scale in agriculture, boost agro-processing, facilitate development of post-harvest and marketing infrastructure in rural areas to promote agricultural diversification and thereby help improve socio-economic conditions of small farmers and landless labourers.

(i) Contract Farming

5.3 According to the DAC, promotion of contract farming, land leasing and land sharing company with some adaptation will lead to the desired vertical integration of all aspects of diversification leading to rural transformation.

5.4 The Committee have also been informed by the DAC that contract farming can help in promoting demand driven agricultural diversification in a big way. At present, contract farming is not wide spread in India. Although cultivation of commercial crops like cotton, sugarcane, tobacco, tea, coffee, rubber and dairy enterprises have had some elements of contract farming. Crops like tomato, groundnut, chilli, barely, potato, cotton, etc. have come under contractual agreements in recent years with some centralized processing and marketing units. Some notable examples are Hindustan

Lever Ltd. in tomato; Pepsico in tomato and basmati rice; United Breweries in barley; Mahindra Shublabh Services Ltd. in maize; Sharp Menthol India Ltd. in mentha in Punjab; Maxworth fruits in horticultural crops in Andhra Pradesh, Karnataka and Tamil Nadu; VST National Products Ltd. in cucumber, paprika in Andhra Pradesh; Cadbury in cocoa in Karnataka and NDDB in banana in Maharashtra. Similar success stories of contract farming are Amul and NDDB for milk procurement, sugarcane cooperatives in Maharashtra and Prawn Aqua culture in Andhra Pradesh.

5.5 The Committee have further been informed that presently most of the contract farming arrangements are informal in nature and in case of violation of contract, there is no legal remedy. In case of pest attacks and diseases, contract farmers are often left in lurch by contracting parties. Sometimes, there is lack of effective linkage between the company and agricultural research and extension system in the matter of technology diffusion which is crucial for expansion and sustainability of contract farming.

5.6 The Committee have also been informed that the share croppers who are not generally recognized by law in most States do not enjoy security of tenure to participate in contract farming. Small farmers and marginal farmers are unorganized and have limited bargaining power vis-à-vis the companies. Therefore, there is a need to have a legal framework which can take care of all these constraints and provide fair and just environment for promotion of the contract farming.

(ii) Land Leasing

5.7 According to the DAC, land leasing is another instrument which can help in promoting agricultural diversification. If permitted, land leasing can provide economy of scale by attracting potential investors in agriculture. This can also help in creating large scale captive production centres for processing as well as export units.

5.8 As per the information furnished by the DAC, presently there is an informal land lease market in all the regions of the country despite the legal provisions to the contrary

in the States. The main apprehension regarding liberalization of land leasing is that the land leasing in areas with poor infrastructure for non-farm development and employment may encourage reverse tenancy by alienating the marginal farmers from land without having alternative sources of employment and income. According to the DAC, it may also lead to concentration of operational holdings in a few hands and thus there is a need to have a legal framework which promotes land leasing and also protects the interests of small and marginal farmers by having appropriate safeguards. A proper regulatory mechanism may help in allaying some of these fears.

(iii) The Concept of Land Sharing Companies

5.9 As per the information furnished by the DAC, land sharing companies will not only provide economy of scale but will also help in establishing forward and backward linkage to production systems. The concept of land-share company in agriculture does not exist in India. However, it is possible to float a land share agro processing company in which farmers of all categories may have the option to become share holders in proportion to their size of holding. Development of such participating land share companies in agriculture is likely to accelerate the pace of both agricultural and non-agricultural development in rural areas. According to the DAC, the company based on the land share system should be made eligible to receive concessional credit and other investment subsidies allowed for the promotion of agro-processing enterprises.

High Tech Interventions

5.10 According to the DAC, agriculture has become capital intensive and knowledge based enterprise in the era of globalization. High-tech interventions like micro propagation, micro-irrigation, etc. are required along with intensive use of inputs to make agriculture competitive. The small and marginal farmers who account for more than 80 percent of land holdings are unable to manage agriculture production professionally in view of their limited capacity and reach. According to the DAC, the concept of land sharing company may provide an answer to this problem.

iv) Use of Wastelands

5.11 Regarding the use of wasteland for cropping, the DAC has informed the Committee that as per Wastelands Atlas of India (2011), about 46.71 million hectare is wastelands in the country, as compared to 68.35 million hectare in 2003. This reduction in extent of wastelands is mainly due to implementation of various watershed interventions including Integrated Wastelands Development Project (IWDP) of Government of India. Gross cropped area depends on rainfall in a particular year, and accordingly gross cropped area defers from year to year.

(b) Price Support Policy Reforms

5.12 As per the information furnished by the DAC, though crop diversification has been a continuous process in agriculture production system in the country, there is no proper mechanism in place to promote designed diversification. The Minimum Support Price policy is being used as an instrument to promote crop diversification by announcing higher prices of certain commodities in comparison to others. The MSP of foodgrains like wheat and rice were increased substantially in comparison to other crops. Therefore, there was substantial increase in production of these commodities.

5.13 According to the DAC, of late, the focus of Government has shifted to increasing the production of oilseeds and pulses. Therefore, the increase in MSP of oilseeds and pulses has been much higher in comparison to cereals. This has encouraged farmers to increase area coverage under oilseeds and pulses. Thus the instrument of MSP has been effective to some extent in increasing the production of a particular crop through diversification. However, the benefit of the present MSP regime has gone to cereal growers in certain areas like Punjab, Haryana, Uttar Pradesh, Andhra Pradesh, Tamil Nadu and West Bengal whereas the farmers in other areas have not been benefited to the desired extent. Further, cereal crops like rice and wheat have benefited most by the existing MSP policies whereas coarse cereal crops have been neglected. The capacity of nodal agencies like FCI and NAFED in undertaking procurement under MSP throughout the country is also often questioned.

5.14 According to the DAC, the role of the State Governments has become important in the recently introduced decentralized procurement system but majority of the States have limitations in undertaking large scale procurement operations. There is a need to appropriately strengthen the existing system of implementing MSP in an effective and transparent manner to promote crop diversification in the country.

5.15 According to the DAC, in view of the inherent limitations of the existing MSP system there is a need to explore alternate Price Support System to promote agricultural diversification. In view of the surplus production of cereals like rice and wheat, diversification is required to be focused to high value and more remunerative crops like oilseeds, vegetables, horticulture, floriculture and commercial crops. Cultivation of rice and wheat crops is relatively risk free. The rice–wheat and rice–rice system has therefore, become attractive for the farmers in most productive regions in the country. To manage the production of these crops in proportion to demand there is a need to have a strategy to promote designed diversification in the areas having rice–rice and rice–wheat systems in the country. Since these systems are confined to certain areas only it is easier to implement designed diversification in these areas. The payment of cash compensation of the difference between the income from rice or wheat crop and the alternative crop to be promoted, can be an attractive proposition for the farmers to go for designed diversification.

5.16 According to the DAC, the Price Support Policies can also be designed to increase production of a particular crop during a particular period. The MSP of a targeted crop may be increased exponentially to increase the production of that crop significantly throughout the country. However, the Government should have the option of scaling down the level of MSP of that commodity as and when the production and productivity has reached the desired level. Such policy may help in designing the diversification for increasing the production of a particular crop in a particular period in the country. However, this policy is required to be supported with proper procurement infrastructure throughout the country. Alternatively, Government may make payment to the producers of the difference between fair market price and the MSP announced by

the Government for that particular commodity through a well thought-out mechanism. This will avoid any distortion in the market and interests of both producers as well as consumers will be taken care of.

5.17 As per the Annual Report of the DAC, the Directorate of Economics and Statistics, examines the reports submitted by the Commission for Agricultural Costs and Prices (CACP) on price policy for principal agricultural crops and other aspects of agriculture. The Price policy for agricultural commodities reflects an important element of overall agricultural policy. Government's price policy for agricultural produce seeks to ensure remunerative prices to growers for their produce with a view to encourage higher investment and production, and to safeguard the interests of consumers by making available supplies at reasonable prices. The price policy also seeks to evolve a balanced and integrated price structure in the perspective of overall needs of economy.

5.18 To achieve the above goal, the Government announces for each season Minimum Support Prices (MSPs) for major agricultural commodities and organizes purchase operations through public, cooperative and other agencies designated by State Governments. The Government decides on support price for various agricultural commodities taking into account the recommendations of the CACP, the views of State Governments and Central Ministries, as well as other factors considered important for fixation of support prices.

5.19 The Directorate of Economics and Statistics collects retail prices of agricultural commodities from 87 designated centers, and compiles and disseminates them to various Ministries and Departments. The wholesale prices and market arrivals of agricultural commodities are also collected on weekly/monthly basis from 700 centres spread all over the country. Out of these price quotations, about 404 quotations on wholesale prices are disseminated to the Office of Economic Adviser, the Ministry of Commerce and Industry for construction of Wholesale Price Index on weekly basis.

International prices of selected agricultural commodities are regularly collected and disseminated through publication of Agricultural Prices in India.

5.20 In view of the fact that subsidy on fertilizers has been withdrawn by the Government, the Committee enquired whether there has been any plan to revise the MSP of foodgrains, cereals, fruits and vegetables so that the farmers interest are protected, the DAC stated as under:

> "The subsidy on fertilizers has not been withdrawn but made nutrient based in place of product based to promote balanced use of fertilizers rather than over use of cheaper products. Government's Price Policy for agricultural crops seeks to ensure remunerative prices to the growers with a view to encourage higher investment and production, and at the same time safeguard the interest of consumers by making available supplies at reasonable prices. The Price Policy aims to evolve a balanced and integrated price structure in the perspective of overall need of the economy. The CACP, while formulating its recommendations on price policy, considers a number of important factors which includes the expenses incurred on use of fertilizers as part of the cost of production. Thus, the effect of withdrawal of subsidy on fertilizers on the cost of production, if any, is captured by the CACP while recommending Minimum Support Prices (MSPs). Further, MSP is in the nature of a minimum guaranteed price for the farmers offered by the Government for their produce in case the market prices fall below that level. When the market offers higher price than MSP, the farmers are free to sell at that price. At present the MSP for vegetables and fruits is not implemented. However, Government is implementing Market Intervention Scheme (MIS) for agricultural and horticultural commodities viz. fruits and vegetables not covered under the Price Support Scheme."

5.21 The details of MSP pertaining to the period 2007-08 to 2011-12 for 26 identified crops is given at Appendix - VII of this Report.

(c) Marketing and Processing

5.22 As per the information furnished by the DAC, marketing and processing are the two basic pre-requisites for promoting crop diversification in a given agro-ecological condition. Once the alternate produce is ready with the farmers, there must be a chain of retail outlets or regulated markets so that the farmers can have open opportunity to sell their produce at a remunerative price. Similarly, the rural marketing systems need

to be strengthened and modernized to provide ample opportunity for the marketing of produce of alternate crops. The various options in Agriculture Produce Marketing Committee Act (APMC) need to be looked into and streamlined for efficient marketing of agro-produce throughout country.

5.23 As per the Annual Plan 2012-13 of the DAC, in case of horticulture mission for the North-East and other Himalayan States, where potential for horticulture is more, availability of quality planting material of horticulture crops in the region is a matter of concern. Post-harvest loss needs to be minimized through introduction of tools and technologies appropriate to the region. Mechanism for production of quality planting material needs to be strengthened through involvement of SAUs/ICAR systems. Transport subsidy on horticulture products needs to be ensured. Establishment of at least one terminal market in each production cluster with all components of such infrastructure. There are large number of old and senile orchards in States and efforts should be made to manage these orchards properly through techniques of rejuvenation/canopy management (in new plantation) to enhance its productivity.

5.24 According to the DAC, storage and transportation are equally important in achieving the goal of diversification. The producer may be provided with enough storage facilities preferably nearest to the production site to minimize the loss of agri-commodities, especially those of perishable nature like fruits and vegetables. Policy decisions are required to promote storage and processing facilities to avoid the loss of agri-horti produce.

5.25 With regard to scheme relating to post-harvest infrastructure, the Committee have been informed that the DAC is providing assistance under various schemes for setting up the Post-Harvest infrastructure, processing and cold storage units for storage of perishable horticultural crops through its schemes like National Horticulture Mission (NHM), Horticulture Mission for North Eastern and Himalayan States (HMNEH) and National Horticulture Board (NHB). Under NHM scheme, financial assistance is

provided for taking up various activities related to horticulture including primary processing and development of Post-Harvest Management and Marketing infrastructure. Post-harvest infrastructure includes setting up of pack house, pre-cooling unit, cold storage, CA/MA storage, refer transport, ripening chambers etc. Credit linked back ended subsidy at the rate of 40 percent of the project cost in general areas and 55 percent in case of hilly and schedule areas for individual entrepreneurs is available.

5.26 When enquired about the position of available storage facilities in the country. the Secretary, the Ministry of Agriculture deposed on 14.06.2012 as under:

> "On warehousing, we have a rural godown scheme, which is meant for the farmers. It has very favourable subsidy patterns and schemes. It is also meant for entrepreneurs but it is mainly meant for farmers. The farmers get higher rate of subsidy than the other entrepreneurs. From a level of 220 crore last year budget for this scheme, I think, this year we have increased to 1,300 crore or so. So, there is a lot of money and if the projects come through or proposed to us, we are in a very easy position to sanction that. In addition to that, other schemes are also under the RIDF, the NABARD Package, the FCI scheme and so on and so forth. So, there are lots of schemes but the Department of Agriculture also runs the rural godown schemes on which we have sufficient funds."

5.27 Emphasizing on the need for cold chain development, the Committee enquired about the initiatives taken by the DAC in this regard. In response, the DAC has stated as under:

i. Rural Infrastructure Development Fund (RIDF) for warehousing including cold chain/storage

   Finance Minister in his budget speech for 2012-13 proposed to earmark ₹ 5,000 crore for creating warehousing facilities (including cold storages) from the allocation under RIDF. During 2011-12, there was provision of ₹ 2,000 crore under RIDF for the first time.

ii. Reduction of Excise Duty on Import of Cold Storage Equipment

   During 2011-12, full exemption from excise duty was extended to air-conditioning equipment and refrigeration panels for cold chain infrastructure, including conveyor belts.

iii. External Commercial Borrowing (ECB)

External Commercial Borrowing (ECB) can be raised for investments in new projects, modernization/expansion of existing production units in real sector – industrial sector including infrastructure sector for creating cold storages or cold room facility, including farm level pre-cooling, for preservation or storage of agricultural/horticultural and allied produce.

iv. Foreign Direct Investment (FDI)

100 percent Foreign Direct Investment (FDI) is allowed under automatic route in storage and warehousing including warehousing of agriculture products with refrigeration, i.e. cold storages.

v. National Mission on Food Processing

In order to have a better outreach and to provide more flexibility to suit local needs of fruits and vegetables, it has been decided that a new centrally sponsored scheme titled “National Mission on Food Processing” would be started, in cooperation with the State Governments in 2012-13 under which cold storage for processing purposes will also be developed. This mission will be implemented by MoFPI as a centrally sponsored scheme.

vi. Introduction of Horti Train

Introduction of dedicated train and reefer van is also expected to bridge the gap between the producers and consumers thereby ensuring remunerative prices to the farmers.

The first Horticulture Train, nonstop trail run was conducted between Bhusawal – Azadpur (New Delhi) sector in the month of January, 2012 which carried about 1100 MT of banana from Bhusawal to Azadpur market yard in 26 hours.

Another round of Train run with potato was successfully conducted between Agra – Turbhe (New Bombay) sector on 12th June, 2012. The Train reached its destination in a record time with extremely good condition of produce at APMC Turbhe, Vasi Market.

Another round of trail run of full rake load of onion from Khedwadi (Niphad, Distt. Nashik) to Chitpur, Kolkatta (West Bengal) was done in June, 2012.

After conducting trial run on various sectors and with different commodities, service of Horticulture Train is proposed to be formally launched on viable origin – destination (OD) pairs, i.e. Agra – Turbhe – Tuglaqabad/Azadpur – Agra.

vii. Technical Standards Notification

Following Technical Standards for storing fresh fruits & vegetables had been notified for implementation w.e.f. 01.04.2010.

a. Fresh Horticulture produce Not requiring pre-cooling before storage (Technical standards number NHB-CS-Type 01-2010)
b. Fresh Horticulture produce requiring pre-cooling before storage (Technical standards number NHB-CS-Type 02-2010)
c. Control Atmosphere (CA) Cold Storage (Technical Standards Number NHB-CS-Type 03-2010)
d. Fruit Ripening Units (Technical standards number NHB-CS-Type 04-2010)

viii. Negotiable Warehouse receipt system in Cold Storages Warehouse for horticulture crops

The Warehousing Development and Regulatory Authority (WDRA), a statutory body, in consultation with NHM, Department of Agriculture & Cooperation has introduced, in June 2012, negotiable warehouse receipt system in cold storage warehouses for the major horticulture produce so that the farmers producing horticulture crops may also avail the benefit of loan from the banks against the deposit of their produce in the registered warehouses (cold storages). This will help in commercialization, effective post-harvest management and integrated development of agriculture including horticulture in the country. The WDRA has notified 26 horticulture commodities for the issuance of NWRs by the registered warehouses (cold storages). The WDRA has also finalised the checklist for accreditation of warehouses (cold storage). The Authority has also approved following 5 Government organisations as accreditation agencies for the cold storage warehouses. They are (i) National Institute of Agricultural Marketing (NIAM) (ii) Directorate of Marketing and Inspection (iii) National Cooperative Development Corporation (NCDC) (iv) National Productivity Council (NPC) (v) The Rail India Technical and Engineering Services (RITES) Ltd.

5.28 When the Committee desired to know about the region-wise, capacity-wise and commodity-wise distribution of cold storages in the country, the DAC furnished the following information:

"North and East zone are better placed in terms of the number of cold storages and their capacity as these regions are the major producers of potato which is largely stored in the cold storages.

Zone	Number of Cold Storages	Capacity (in '000 MT)
Central	376	1474
East	899	7424
North	2408	12126
South	805	1605
West	893	1822

Sector Wise distribution of Cold Storages

S.No.	Sector	Capacity (tonnes)	percent of total	No. of Cold Storages
1	Private	234,06,745	95.73	4885
2	Cooperative	9,36,865	3.83	356
3	Public	1,07,042	0.44	140
	Total	**244,50,652**		**5381**

Commodity-wise distribution of Cold Storages

S.No.	Commodity	Capacity (tonnes)	percent of Total	No. of Cold Storages
1.	Potatoes	184,26,316	75.36	2862
2.	Multi-purpose	56,44,316	23.09	1584
3.	Fruits & Vegetables	96,427	0.39	160
4.	Meat and Fish	1,88,496	0.77	497
5.	Milk and Milk products			
	Others	68,230	0.28	191
6.		26,524	0.11	87
	Total	**244,50,652**		**5381**

5.29 When pointed out that North-East States with their huge potential for horticulture development and productivity are lagging behind in terms of their cold storage facility and marketing capability and because of this, every year, tonnes of horticulture produce are being left to rot and waste. In this regard, the DAC informed the Committee as under:

> "The extent of damage of produce after harvesting depends on various factors such as perishability of the produce, post-harvest handling, transport and storage. As per the report of Central institute of Post-Harvest Engineering and Technology (CIPHET), the post-harvest losses of fruits and vegetables were found to be in the range of 5.8-18 percent. In order to minimize the wastage of fruits and vegetables, Department of Agriculture & Cooperation under the centrally sponsored scheme on "Horticulture Mission for North East and Himalayan States (HMNEH)", provide financial assistance for creation of

adequate infrastructure facilities for post-harvest management including cold storage, transport and marketing."

5.30 When enquired about the actual amount disbursed and utilized by the North-Eastern States to augment the storage and marketing facility of horticulture, the DAC has stated as under:

"Under Horticulture Mission for North East and Himalayan States (HMNEH), an amount of ₹ 4733.83 lakh was released to North-East and Himalayan States and the cold storage capacity for 179657 tonnes were created during 2001-02 to 2011-12. As regards marketing infrastructure, 48 whole sale markets, 306 rural primary markets and 70 apni mandies were created during the same period in these States with the expenditure (releases) of ₹ 4826.44 lakh.

5.31 A statement regarding financial assistance utilized by North-Eastern States is given at Appendix - VIII of the Report.

5.32 The DAC has also stated that under Mini Mission-III of HMNEH, assistance is provided for setting up of cold storages @ 55 percent of the cost of the project as credit linked back-ended subsidy. The details of cold storages setup in different States since inception 2001-02 to 2011-12 are as under:

States	**No. of cold storages**	**Capacity**
Arunachal Pradesh	1	3983
Assam	22	105494
Mizoram	1	3471
Nagaland	1	5000
Tripura	2	9731
Jammu & Kashmir	5	17014
Himachal Pradesh	7	22745
Uttarakhand	4	12219
Total	**43**	**179657**

5.33 As per the Annual Plan 2012-13 of the DAC, available storage capacity and type is of great concern. Agricultural produce are perishable in nature and therefore requires appropriate storage capability (structure). There is serious shortage of appropriate storage capability in the country resulting in agricultural produce of substantial value getting lost every season. This also leads to distress sale of produce, primarily in case of fruits and vegetable and provides middle man with the opportunity to play with market forces.

Part - II

OBSERVATIONS/ RECOMMENDATIONS OF THE COMMITTEE

1. The Committee note that while predominant monoculture and continuous cropping of rice-wheat have led to self sufficiency in foodgrains, they have also created many agro-ecological problems like deterioration in soil cultivation, excessive exploitation of underground water, etc. The per capita availability of foodgrains is 439 grams per day against the recommended level of 500 grams per day whereas the availability of oils and fats is about 20 grams per day against the requirement of 40 grams per day and availability of pulses less than 32 grams per day against recommended level of 55 grams per day. The Committee feel that in order to ensure nutritional security and to address adverse agronomical conditions, there is a need for diversification from cereals dominated production system to horticulture, oilseeds and pulses. Our country is bestowed with diverse agro-climatic conditions favourable for cultivation of diverse crops. Though efforts have been made over the years to move towards crop diversification, the Committee feel that well thought out strategy coupled with concerted action is necessary to achieve desired results in crop diversification. The Committee would like to be apprised of action taken in this regard.

2. The Committee have been informed that over the years priority was given to pulses and oilseeds following a regionally differentiated strategy that suited the agro-climatic regions. During the period 1950-51 to 2010-11, this initiatives have reportedly been resulted in increase in area by 16.49 million ha in oilseeds; 7.23 million ha under pulses; 1.65 million ha in potatoes; 7 million ha in vegetables, fruits and others; 5.36 million ha in cotton; and 3.7 million ha in sugarcane. During the period 2006-07 to 2011-12 (estimates), the production of wheat and rice has grown from 169.2 million tonnes to

198.2 million tonnes (increase of 17 per cent) and production of pulses and oilseeds has grown from 38.5 million tonnes to 47.2 million tonnes (increase of 23 per cent). The Committee feel that in the light of the need for accelerated crop diversification and achieving self sufficiency in production of pulses and oilseeds, specific targets must be fixed in this regard for the Twelfth Five Year Plan and strategy evolved to achieve the same. The Committee would await action taken in this regard.

3. There are five Schemes implemented by the Ministry of Agriculture (Department of Agriculture and Cooperation (DAC)), to facilitate crop diversification towards more remunerative and productive crops. The Committee feel that the achievement under National Food Security Mission (NFSM), left much to be desired. There has been under-utilisation of budgetary provision to the extent of ₹ 222 crore in 2008-09 and ₹ 347 crore in 2009-10, ₹ 89 crore in 2010-11 and ₹ 61 crore in 2011-12. It is disappointing to note that distribution of hybrid seeds under the programme achieved just 44 per cent of the target, during 2011-12. Distribution of hybrid seeds and farmers' field schools did not meet their stipulated targets. For instance, in the year 2011-12, only 44.41 percent of the set target could be achieved in the component of distribution of hybrid seeds. Similarly, under the National Horticulture Mission (NHM) Scheme, the shortfall in utilisation of budgetary provision was as much as ₹ 861 crore during the Eleventh Five Year Plan period (2007-08 to 2011-12). For the Scheme on Horticulture Mission for North-East and Himalayan States (HMNEH), the shortfall in utilisation of budgetary target was ₹ 816 crore during the period with Himachal Pradesh and Uttarakhand utilising less than 50 percent of the allotted funds. The Committee desire that the reasons for underutilisation of funds under the schemes should be gone into and remedial steps taken to ensure full utilization of funds and effective performance of the schemes during the Twelfth Five Year Plan period.

4. The Committee appreciate that the Department of Agriculture Cooperation (DAC) has undertaken a programme 'Bringing Green Revolution to Eastern India (BGREI)' under the Rashtriya Krishi Vikas Yojana to bring crop diversification in the States of Assam, Bihar, Chhattisgarh, Jharkhand, Odisha, Eastern Uttar Pradesh and West Bengal. Since many of these States have high rainfall areas, the management of surface and ground water has reportedly been prioritised by the DAC. As many of these States periodically battle issues regarding water logging and inundation affecting their agricultural productivity, the Committee hope that these States will take advantage of new varieties of rice, wheat and mustard suitable for such areas, emerged from the research carried out by CSSRI, Karnal. The Committee also hope that the initiative to introduce pulses in the agricultural systems in the States implementing BGREI would be successful in ensuring economical use of nitrogen content in the soil, which gets depleted due to continuous sowing of rice and wheat. The Committee would like to be informed of the targets and achievements under BGREI during each of the last five years.

5. The Committee note that steps have been taken for increasing production of vegetable oils through promotion of oil palm cultivation by launching a special Scheme on Oil Palm Area Expansion (OPAE) under Rashtriya Krishi Vikas Yojana (RKVY) during 2012-13. The OPAE scheme includes a strategy which indicates the State-specific targets for area expansion, intervention for oil palm research and development, institutional linkages and initiatives for creating facilities in needy States. The Committee desire to know the physical targets set for utilisation of ₹ 100 crore budgeted for financial year 2012-13 under the scheme and the achievement there against during the year. The Committee would also like to be apprised of the roadmap, if any, prepared to enhance the production of vegetable oils and reduce its import from other countries.

6. Coarse cereals like maize, jowar, bajra and small millets contain nutrition and have health benefits. The Committee are unhappy to note that the area of total coarse cereals has reduced by 9.24 million ha during the period 1950-51 to 2010-11. It is only in the year 2010-11, a dedicated programme on Initiative on Nutritional Security through Intensive Millet Programme (INSIMP) has been launched for promotion of millets in 1000 compact blocks covering about 25000 villages. The scheme is aimed to provide market linked production support, upgrade millet processing technologies and cereals, awareness regarding health benefits to promote balanced nutrition. The Committee desire that the programme should be expanded to cover the entire arid and semi-arid regions of the country. The Committee would like to be informed of the results of the programme.

7. The Committee are also of the firm view that the proactive measures are necessary to increase the percentage share of cropped areas for coarse cereals, which can be grown in regions characterized by scanty rainfall, and wastelands as there is still 46.71 million hectare of wastelands in the country according to the Wastelands Atlas of India (2011). The Committee feel that the Ministry of Agriculture in coordination with the Ministry of Rural Development undertake identification and reclamation of wastelands and its use for cultivating coarse grains for expanding diversified agriculture. The Committee would like this aspect to be examined and necessary action taken expeditiously under intimation to them.

8. The Committee observe that as against the budgetary target of ₹ 550 crore during the year 2011-12 under the "Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM)", the actual was ₹ 616 crore. The Committee regret to note that although the actual expenditure exceeded the budgetary target by ₹ 66 crore, the achievement of the targeted area expansion under oil palm was merely 24.4 per cent. As against the target of 270 ha during

the year 2011-12, the achievement was just 65.91 ha. The Committee urge the Ministry of Agriculture to look into the reasons for this dismal performance under the scheme and take such remedial measures as necessary under intimation to the Committee to ensure targeted achievement.

9. The Committee feel that there is need for sustained and accelerated efforts to considerably augment production of horticultural/plantation crops in view of the changing dietary pattern and growing demand for fruits/ vegetables. Further, the huge potential in North-East States and the sub-Himalayan Northern States endowed with necessary agro-climatic conditions for horticultural plantation, must be fully harnessed by proper planning and setting targets.

10. As agriculture in the country is largely dependent on the vagaries of monsoon, there is wide-scale fluctuation on food production year after year. The Ministry of Agriculture has stated that there is need for better predictability of temporal and spatial distribution of rainwater, surface water flow and ground water for proper agricultural planning. The Committee would like to be apprised as to what efforts were made to realize the aforesaid need and the outcome thereof.

11. It is observed from the State-wise data regarding exploitation of underground water that Punjab has the highest percentage of exploitation of ground water at 80 percent followed by Delhi (74 percent), Rajasthan (69 percent), Haryana (59 percent) and Tamil Nadu (36 percent). As regards salinity of ground water found in 71 units, Andhra Pradesh leads with 38 units followed by Gujarat (14 units) and Tripura (11 units). It appears that adoption of direct seeding of paddy reduces the exploitation of underground water upto 66 to 75 percent when compared to transplanted

rice. The Committee desire that factual position in this regard be ascertained, practicability of direct seeding of paddy examined and if the outcome is positive, urgent measures be taken to propagate the method in all the aforesaid States.

12. The Committee urge that the results of the project on reclamation and management of water-logged and saline soils, carried out by the Central Soil Salinity Research Institute, Kerala and the experiment carried out by the All India Coordinated Research Project on Ground Water Utilization, Ludhiana, which has indicated potential of saving irrigation water upto 20-30 percent by adopting the laser land levelling technique, need to be published so that similar projects are taken up for implementation, subject to viability.

13. The Committee appreciate the steps taken by the DAC to train the Common Service Centre operators in Agriculture with a view to enhancing their capacity to address specific queries from the farmers including those relating to crop diversification. Since the facility of dissemination of information through CSC has been rolled out only in a few States i.e. Himachal Pradesh, Madhya Pradesh, Assam, Maharashtra, Jharkhand, Karnataka and Kerala, the Committee stress that steps should be taken to extend the facility in all States within a time frame under intimation to the Committee.

14. The Committee note that the 'Seed Bank Scheme' has been implemented by the Seed Division of the DAC from 1999-2000 with the objective of meeting requirements of seeds during natural calamities and unforeseen conditions. The objective of the scheme is to address the contingency salvation, if the first crop sown by the farmer has failed. The Committee would like to be informed as to why such Seed Banks have not been

established in the States of Himachal Pradesh, Jammu and Kashmir and North-East States and when these States will be covered under the scheme.

15. According the Department of Agriculture and Cooperation, promotion of contract farming, land leasing and land sharing Company with some adaptation would lead to desired vertical integration of all aspects of diversification leading to rural transformation. The Committee feel that such reforms in land use policy ought to be preceded by a thorough study of merits and de-merits, impact on landless labourers and agricultural population, establishment of regulatory mechanism and so on. The Committee suggest that an expert Committee be formed to go into all aspects of the matter in depth and the Committee be informed of its recommendations.

16. The Minimum Support Price (MSP) can be used as an instrument to promote crop diversification by announcing higher prices of certain commodities in comparison to others. The Committee, however, note that MSP as an instrument of crop diversification can be effective only if all the States are capable of undertaking large scale procurement operation. As majority of the States do not have proper procurement infrastructure, the Committee desire that the Centre should take necessary steps to ensure that States strengthen the existing system of implementing MSP in order to promote crop diversification in the country.

17. Marketing and processing are the two basic pre-requisite for promoting crop diversification. According to DAC, rural marketing systems need to be strengthened and modernised. The foremost requirement for the same is to promote storage and processing facilities to avoid the loss of agri-horti produce. The Committee would like to be informed as to what action has

been taken in this regard and the targets and achievements during each year of the last three years.

18. According to the Report of Central Institute of Post-Harvest Engineering and Technology, the post-harvest losses of fruits and vegetables were found to be in the range of 5.8-18 per cent. The Committee find that cold storage in the country is hugely lopsided in respect of only one commodity-potatoes. It is observed from the commodity-wise distribution of cold storage in the country that the cold storage capacity meant for fruits and vegetables is as little as 0.39 per cent whereas the capacity for potatoes is 75.36 per cent and multipurpose cold storage capacity is 23.09 per cent. The Committee hardly need to emphasize that the serious imbalance in cold storage capacity requires to be addressed urgently with a view to promoting production of fruits and vegetables and other horticulture produce and to prevent distress sale of produce by farmers.

NEW DELHI
____ April, 2013
Vaisakha , 1935 (S)

FRANCISCO SARDINHA,
CHAIRMAN,
COMMITTEE ON ESTIMATES