GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
NATIONAL COMMISSION ON FARMERS

SERVING FARMERS AND SAVING FARMING

Fifth and Final Report, 4 October 2006

Towards Faster and More Inclusive Growth of Farmers' Welfare

"To those who are hungry, God is bread" – Mahatma Gandhi, 1946

"Everything else can wait, but not agriculture"- Jawaharlal Nehru, 1947

Our work during the last two years has been guided by the above words of the architect of our independence on the one hand, and by the prime mover of planned development designed to promote faster economic growth coupled with social and gender equity, on the other. The approach to the XIth Plan is "faster and more inclusive growth". Obviously this aim should cover 70% of our population, who live in villages and whose major occupation is crop and animal husbandry, fisheries, agro-forestry and agro-processing. The four reports submitted by us since December 2004, all contain concrete suggestions on how this goal can be achieved.

This fifth and final report deals with some of the key issues confronting our farmers and farming such as the economic survival of farmers with small holdings in a globalised economy, shaping the economic destiny of farmers, strengthening the ecological foundations essential for sustainable agriculture, attracting and retaining youth in farming, and restoring the glory of Indian farmers and farming. It presents an action plan for making hunger history. The Revised Draft National Policy for Farmers is submitted separately, based on widespread consultations throughout the country as well as extensive advice received from Central and State Government Departments, farmers, farmers' organizations, tribal families, women's organizations, academia, civil society organizations, political parties, panchayat institutions, mass media representatives and individuals.

We are indebted to Shri Sharad Pawar, Union Minister for Agriculture, Food, Public Distribution and Consumer Affairs, for his continuous guidance and encouragement and for being the major source of inspiration in our work.

We have chosen for the cover of this Final Report an extract from the Visitors Book of the National Dairy Research Institute, Bangalore, showing the Father of the Nation identifying himself as a "Farmer". It is this pride in farming, both as a way of life and means to livelihood that we should revive. This is the pathway to "Purna Swaraj" and this report shows the way.

M S Swaminathan
(Chair)

R B Singh
(Member)

Y C Nanda
(Member)

Atul Sinha
(Member-Secretary)

Atul Kumar Anjan
(Member-Part time)

Jagadish Pradhan
(Member-Part time)

R L Pitale
(Member-Part time)

Chanda Nimbkar
(Member-Part time)

National Commission on Farmers

Serving Farmers and Saving Farming

Towards Faster and More Inclusive Growth of Farmers' Welfare

Fifth & Final Report

VOLUME I

Contents

ABOUT NATIONAL COMMISSION ON FARMERS

National Commission on Farmers was set up under the Chairmanship of Shri Sompal vide Resolution No. 8-2/2003- Policy (ES) dated 10th February,2004. The Commission was reconstituted under the Chairmanship of Prof. M.S. Swaminathan vide Resolution No. 8-2/2003- Policy (ES) dated 18th November, 2004 with Terms of Reference which reflected the priorities listed in the Common Minimum Programme of the United Progressive Alliance Government. The Terms of Reference of the Commission and its composition are at pages iii to v.

The National Commission on Farmers has held 37 formal meetings during the last two years. The Commission addressed the various issues facing farmers and farming as per its Terms of Reference by organizing a series of Technical Consultations in various parts of the country involving the principal stakeholders. A list of Technical Consultations is at Annexure A at pages 265-267.

The results of these Consultations were assimilated with the work of the Commission on specific issues. These were incorporated in four Reports of the Commission, which were submitted to the Union Agriculture Minister in December 2004, August 2005, December 2005 and April 2006 respectively. Presentations were also made to the Planning Commission, Government of India and the National Advisory Council. The list of these Reports and the dates of their submission are at Annexure B at page 268. In particular, Chapter 2 in the Fourth Report contained Jai Kisan: "A Draft National Policy on Farmers" which was proposed for comments, public debate and consensus building and which was based on the work done and recommendations made by the Commission since its formation.

The Draft National Policy was thereafter discussed in State level Consultations with farmers including women farmers, and other stakeholders including NGOs, Bankers, Media and Scientists. A list of these Consultations is at Annexure C at pages 269-270. Based on these Consultations, where the women farmers and other farmers as well as

their organizations were heard first, and the written suggestions and representations received from individuals, institutions and organizations, the Draft National Policy for Farmers was revised and elaborated. The Revised Draft Policy for Farmers is submitted separately. The National Commission on Farmers requests that the National Policy for Farmers, after the approval of Cabinet and National Development Council, may be adopted by the Parliament of India on 15th August, 2007 which would mark the 60th Anniversary of India's Independence.

A table connecting the Terms of Reference with the Chapters in the Reports of the National Commission on Farmers is at Annexure D at pages 271-276.

NCF hopes that its recommendations will receive serious and urgent consideration by both the Government of India and State Governments.

TERMS OF REFERENCE
FOR
NATIONAL COMMISSION ON FARMERS

- Work out a comprehensive medium-term strategy for food and nutrition security in the country in order to move towards the goal of universal food security over time

- Propose methods of enhancing the productivity, profitability, stability and sustainability of the major farming systems of the country based on an agro-ecological and agro-climatic approach and the harnessing of frontier technologies.

- Bring about synergy between technology and public policy and recommend measures for enhancing income and employment potential in rural areas through diversification, application of appropriate technology including IT for information on market, weather, credit facilities and e-commerce, training and market reforms.

- Suggest measures to attract and retain educated youth in farming and recommend for this purpose; methods of technological upgrading of crop husbandry, horticulture, animal husbandry, fisheries (inland and marine), agro-forestry and agro-processing and associated marketing infrastructure.

- Suggest comprehensive policy reforms designed to enhance investment in agri-research, substantially increase flow of rural credit to farmers including small and marginal, triggering agricultural growth led economic progress, which can lead to opportunities for a healthy and productive life to rural families.

- Formulate special programmes for dryland farming for farmers in the arid and semi-arid regions, as well as for farmers in hilly and coastal areas in order to link the livelihood security of the farming communities living in such areas with the ecological security of such regions. Review in this context, all ongoing Technology Missions like those relating to pulses, oilseeds, maize, cotton, watershed etc. and recommend methods of promoting horizontal integration of vertically structured

programmes. Also suggest credit-linked insurance schemes, whicha can protect resource poor farm families from unbearable risks. Further, suggest methods of strengthening and streamlining the National Horticulture Development Board.

- ❖ Suggest measures for enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive through providing necessary facilities and application of frontier sciences and promote quality literacy for codex alimentarius standard, sanitary and phyto-sanitary measures among farmers through reorienting and retooling extension machinery. Also suggest methods of providing adequate protection to farmers from imports when international prices fall sharply.

- ❖ Recommend measures for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership.

- ❖ Suggest methods of empowering male and female members of elected local bodies to discharge effectively their role in conserving and improving the ecological foundations for sustainable agriculture like land, water, agro-biodiversity and the atmosphere with priority attention to irrigation water.

- ❖ Consider any other issue, which is relevant to the above or is specially referred to the Commission by Government.

The Commission is to submit a medium term policy for food and nutrition security in the country in order to move towards the goal of universal food security over time within the next three months and to submit its recommendations on other Terms of Reference as soon as practicable and in any case on or before 13th October, 2006. The Commission, however is permitted to submit interim reports on any of the Terms of Reference it deemed fit or expected of it.

[Resolution F. No. 8-2/2003- Policy (E.S.) Dated 18.11.2004 published in Gazette of India, Extraordinary, Part- I Section – I on 20.11.2004]

COMPOSITION OF THE
NATIONAL COMMISSION ON FARMERS

The composition of the reconstituted National Commission on Farmers is as under : -

Chairman

Prof. M.S. Swaminathan

Full-Time Members

Dr. Ram Badan Singh
Shri Y.C. Nanda

Part-Time Members

Dr. (Ms) Chanda Nimbkar
Shri Atul Kumar Anjan
Dr. R.L. Pitale
Shri Jagadish Pradhan

Member Secretary

Shri Atul Sinha,
I.A.S. (Retd.)

[Resolution F. No. 8-2/2003- Policy (E.S.) Dated 18.11.2004 published in Gazette of India, Extraordinary, Part- I Section – I on 20.11.2004]

CHAPTER 1

PUTTING FARMERS FIRST

1.1 Introduction

1.1.1 The National Commission on Farmers (NCF) has held consultations over the last two years with State Governments, Financial and Insurance Institutions, Representatives of Farm and Tribal Women and Men, and Civil Society Organisations, Academia and Media Representatives working on problems relating to farming and farmers. In addition to several meetings in New Delhi, Consultations have been held at various locations across the country, based on the issue being addressed, as per the terms of reference. State-wise Consultations have also been held for feedback on the Draft National Policy for Farmers. Four Reports have already been submitted and this is the Fifth and Final Report. This chapter is a synoptic account of some of the major recommendations made in the earlier Four Reports. A box on a **Livelihood Security Compact** for the agrarian distress hotspots is also included.

1.1.2 To achieve secure and adequate livelihood for all farmers, as defined in the draft Policy, they must be assured of access to and some control over the basic resource base for livelihood. These are both natural and societal. The first category includes land, water and bioresources; while the second refers to human and institutional resources such as credit and insurance, technology and knowledge management, markets, and other inputs and services.

1.1.3 The ecological foundations essential for sustained advances in agricultural productivity in India, such as soil, water, biodiversity and forests are under severe anthropogenic pressures. The ecosystem's capacity to support the human and farm animal population has been exceeded in many parts of the country. The quantity and quality of groundwater, which is now the dominant source of irrigation water, is fast deteriorating. Although India has over 20% of the world's farm animal population, good grazing lands are practically non-existent. Fodder and feed production is also not

adequate. Compounding current problems, the possibility of adverse changes in rainfall, temperature and sea level due to global warming and climate change is no longer just a theoretical possibility.

1.1.4 In the area of farm economics, resource flow to the agriculture sector is declining, and indebtedness of small and marginal farm families is rising. Input costs are increasing, while factor productivity is declining. The cost-risk-return structure of farming is becoming adverse, to over 80 million farming families operating small holdings, since the resource-poor families cultivating 1 to 2 hectares (ha) or less are unable to benefit from the power of scale at either the production or post-harvest phases of farming. Both meteorological and marketing factors influence the well-being of small farm families, who lack the capacity to withstand the shock of either crop failures or uneconomic market prices for their produce.

1.1.5 A technology "fatigue" has further aggravated farmers' problems, since the smaller the farm the greater the need for sustained marketable surplus, in order to have cash income. Linkages between the laboratory and the field have weakened and extension services have often little to extend by way of specific information and advice on the basis of location, time and farming system. Good quality seeds at affordable prices are in short supply and spurious pesticides and biofertilisers are being sold in the absence of effective quality control systems. Input supply is in disarray, particularly in dry farming areas. Micronutrient deficiencies in the soil as well as problems relating to soil physics are crying for attention. Farmers have no way of getting proactive advice on land use, based on meteorological and marketing factors. Though it is now over twelve years since the WTO regime started operating in agriculture, serious attempts are yet to be made in rural areas to launch movements for quality literacy (sanitary and phytosanitary measures and *Codex Alimentarius* standards of food safety), trade literacy (likely demand-supply and price situation), legal literacy (IPR, Farmers' Rights), and genetic literacy (genetically modified crops). No wonder the prevailing gap between potential and actual yields, even with technologies currently on the shelf, is very wide. Such a knowledge deficit pointed out in the reports of the NCF has been highlighted in the Approach Paper to the Eleventh Plan.

1.1.6 1968 marked the beginning of the Green Revolution leading to quantum jumps in the productivity and production of wheat and rice. But the last 10 years have witnessed a fatigue in the Green Revolution with the growth rate in foodgrain production falling below population growth for the first time since then. It implies human numbers are increasing faster than our capacity to make the goal of Food for All a reality. At the same time, consumption per capita is not going up, due to inadequate purchasing power at the household level. A "famine" of jobs/ livelihoods as a result of poor growth of opportunities for employment in the rural non-farm and off-farm sectors is leading to a "food famine" at the household level. According to the Union Planning Commission, we are off-track in achieving the UN Millennium Development Goal of reducing the number of hungry persons by half by 2015. Also, we are off-track in reducing infant and maternal mortality rates and in achieving universal primary education.

1.1.7 To double annual foodgrain production from the present 210 million tonnes to 420 million tonnes within the next 10 years, (by 2015), will call for producing at least 160 million tonnes of rice from 40 million ha, and 100 million tonnes of wheat from 25 million ha. Pulses, oil seeds, maize and millets will have to contribute another 160 million tonnes. In addition, the national goal is to raise the production of vegetables and fruits to over 300 million tonnes by 2015. Since land is a shrinking resource for agriculture, the pathway for achieving these goals can only be higher productivity per unit of arable land and irrigation water. Factor productivity will have to be doubled, if the cost of production is to be reasonable and the prices of our farm products are to be globally competitive. The average farm size is going down and nearly 80% of the farm families belong to the marginal and small farmer categories. Fortunately, the ownership of livestock is more egalitarian. Enhancing small farm productivity, increasing small farm income through crop-livestock integrated production systems and multiple livelihood opportunities through agro-processing and biomass utilisation, are essential both to meet food production targets and for reducing hunger, poverty and rural unemployment. Programmes designed to achieve these goals must be "engendered",

since there is increasing feminisation of agriculture, poverty and under-nutrition, not to mention the increase of HIV/ AIDS cases.

1.1.8 2005 was a difficult year both for the nation and for farm and fisher families. Beginning with the titanic tsunami of 26 December 2004, and ending with the disastrous earthquake in Kashmir and floods in Tamil Nadu, our farm and fisher families have been subjected to the fury of nature in the form of drought, unseasonal and heavy rains (like the one which caused damage to the onion crop in Maharashtra), and floods. Institutional support to small farmers is weak. The same is true of post-harvest infrastructure. For example, even now paddy is being dried on the road in many places. The spoilage losses can be as high as 30% in the case of vegetables and fruits. Institutions which are supposed to help farmers, such as research, extension, credit and input supply agencies, are by and large not pro-poor and pro-women. Mechanisms for risk mitigation are poor or absent. There is no minimum support price (MSP) or procurement arrangement for the crops grown in dry farming areas. Hardly 10% of farmers are covered by crop insurance. Farm families are also not covered by health insurance. There is no Agricultural Risk Fund. Both risk mitigation and price stabilisation are receiving inadequate policy support. The cost of production is invariably higher than the minimum support price, due to ever-increasing prices of diesel and other inputs. Investment in agriculture has suffered a decline over the past two decades. Capital formation in agriculture and allied sectors in relation to GDP started declining in the 1980s and is only now being reversed. This has adversely affected irrigation and rural infrastructure development.

1.1.9 The cost-risk-return structure of farming is becoming adverse. Consequently, indebtedness is growing in rural areas. In Maharashtra, over 55% of the State's farm households are in debt. Average household size of farmers is 5.5 at the all-India level. In the low-income groups, the average size goes up to 6.9. According to NSSO-59th Round, the average monthly per capita consumption expenditure of farm households across India was Rs. 503 in 2003. Endemic hunger (i.e., chronic undernutrition), is high both in families without assets like land or livestock, as well as in families with small land holdings but no access to irrigation. An unfortunate consequence of the constellation of hardships faced by small farm families is the growing number of suicides among farmers.

The situation is particularly alarming in parts of Vidarbha in Maharashtra. To our shame, the suicide hotspots include Wardha district, where Mahatma Gandhi spent a significant part of his life fighting for freedom from colonial rule, so that the country could be rid of hunger, poverty and gender injustice.

1.1.10 Indebtedness of farmers is rising not only because of farming-related expenditure, but also because of the need for healthcare. The public healthcare system in villages is in a state of collapse. Pandemics like HIV/AIDS and tuberculosis are spreading in villages, with women being the main sufferers. Because of protein-energy undernutrition, as well as micronutrient deficiencies, a purely drug-based approach to the control of diseases is not adequate. A nutrition support programme is equally important.

1.1.11 Policy reform in agriculture is thus long overdue. Such policy reform should be pro-small farmer and pro-women and pro-landless agricultural labour. It should pay particular attention to the promotion of conservation agriculture and remunerative marketing. If we do not attend to the problems of small farm and landless agricultural labour families with a sense of urgency and commitment, the Indian enigma of the co-existence of enormous technological capability and entrepreneurship on the one hand, and extensive under-nutrition, poverty and deprivation on the other, will not only persist, but will lead to social disruption, violence and increasing human insecurity. Without peace and security, enduring economic progress will not be possible. NCF therefore recommended in its Third Report that the agricultural year 2006-07 be designated as the **Year of Agricultural Renewal or the Year of the Farmer.**

1.1.12 We would like to stress that agriculture being a State subject, State governments are also accountable for providing adequate support, particularly to meet the needs of location-specific agricultural problems, as well as the health, education, drinking water, social security and other social and production infrastructure essential for farm and agricultural labour families to have an opportunity for a healthy and productive life.

1.1.13 The seven core areas needing urgent attention to make farming a viable activity for farmers are land, water, and bioresources on the one hand and credit and

insurance, technology, knowledge management, markets, and inputs and services on the other.

1.2 Land

1.2.1 The basic issues of access to land for both crops and livestock, and some control over its use are:

- unfinished agenda of land reform,
- speedy distributions of ceiling-surplus and waste lands,
- land rights for women,
- preventing diversion of prime agricultural land and forests to corporate sector for non-agricultural purposes
- ensuring grazing rights and seasonal access to forests to tribals and pastoralists and access to common property resources;
- Equally important are the technical issues concerning land.

1.2.2 The second Green Revolution has to begin in dry farming areas, which need particular attention from the point of view of overcoming macro- and micronutrient deficiencies. An important reason for the low return per unit of water is the lack of synergy between a genetic strain, irrigation water and soil nutrition. "Hidden hunger" in the soil resulting from micronutrient deficiencies results in "hidden hunger" in both farm animals and human beings. Soil health enhancement holds the key to improving the return from investment in other inputs like seeds and water.

1.2.3. Reliable soil tests for 13 macro- and micronutrients are critical for improving crop productivity. This requires sophisticated, finely-tuned equipment that are currently unavailable in most soil testing laboratories. The objective should be to provide a complete soil test analysis at the commencement of each cropping season, specifying the crops most suitable for cultivation according to the soil profile and providing detailed instructions on how to enhance the soil to ensure proper plant nutrition for optimal yields and profitability. Soil test results will be of little value unless expert advice is available to the farmers to interpret the significance of nutrient levels and recommend appropriate

steps to enhance soil nutrition. Computerised systems must be developed for at least 20 major crops, customised to different agro-climatic zones.

1.2.4 Initially, farmers may not fully appreciate the value of a complete soil test, so the government should conduct an intensive programme of free tests for the first one or two years, demonstrating the efficacy of the approach. Thereafter, fees can be charged to recover costs. In the first phase, there should be a minimum of one laboratory per district, each with the capacity to conduct a minimum of 10,000 complete soil analyses per month.

1.2.5 A Soil Health Card containing integrated information on the physics (soil structure, occurrence of hard pan in the subsoil, etc.), chemistry (soil organic matter and macro- and micro-nutrient status), and microbiology (occurrence of earthworms, soil micro-organisms etc.) of the soils should be issued to each farm household. Such cards combined with the required advice can gradually lead to the technological upgrading of farm practices

1.2.6 Implementation of the technology will require a quantum jump in the number of soil testing laboratories and soil test analyses conducted throughout the country. Existing laboratories should be upgraded and supplemented by new testing facilities. A national monitoring agency must obtain and compare test results on standard samples on a regular basis to maintain test accuracy. If a commercial fee structure is fixed at around Rs. 200 to Rs.250 per test, then farm graduates will be attracted to supplement the government effort by establishing agri-clinics which can undertake such tasks as soil health monitoring and management as well as pest proofing on an area basis. Agri-clinics can also be established in Farm Schools and Village Knowledge Centres.

1.2.7 The tsunami that swept over coastal areas in Tamil Nadu, Kerala, Pondicherry and the Andaman and Nicobar Islands in December 2004 caused untold damage to soil and water bodies. There was deposition of slushy grayish brown clay and sand on agricultural soils. Seawater entered prime agricultural land adjoining the coast, rendering both soil and water saline. Many of the small water ponds that are the source of irrigation

for the second and third crop were severely affected. Ad hoc recommendations were being given to the affected farmers by both NGOs and government departments. NCF, therefore, organised a travelling workshop comprising a team of scientists with the best possible technical expertise available in the country. The scientists visited affected villages and made their recommendations on soil health restoration, water management and seawater replacement, crop and varietal choice, introduction of livestock farming for supplementary nutrition and income, and producer-oriented marketing.

Box I

LAND

1. Reforms related to access and control over land and forest resources including unfinished agenda of land reform, speedy distributions of ceiling-surplus and waste lands, land rights for women, preventing diversion of prime agricultural land and forest to corporate sector for non-agricultural purposes, ensuring grazing rights and seasonal access to forests to tribals and pastoralists, and access to common property resources. Equally important are the technical issues concerning land

2. A National Land Use Advisory Service should be immediately established and linked to State and Block Level Land Use Advisory Services on a hub and spokes model. These can be virtual organisations with the capacity to link land use decisions with ecological meteorological and marketing factors on a location and season specific basis.

3. Indian Trade Organisation (ITO), a virtual body specialising in WTO matters and serving as an information bank on potential surpluses and shortages in major agricultural commodities. It should be set up, linked to the National Land Use Advisory Service and have continuous contact with all credible national and international sources of information on domestic and international markets.

4. Agricultural universities, research institutes, Krishi Vigyan Kendras, fertiliser companies, government departments, farmers' associations and panchayats should take up Soil Health Advancement as the theme for the Year of Agricultural Renewal, 2006-07 and plan campaign of activities.

5. Set up a mechanism to regulate the sale of agricultural land, based on quantum of land nature of proposed use and category of buyer.

1.3 Water

1.3.1 Rainfed agriculture, however risky and vulnerable, continues to play an important role in India, contributing 60 per cent of the cropped area and 45 per cent of the total agricultural output. Out of the gross sown area of 192 million ha, only 43 per cent is estimated to be irrigated, while the rest is dependent on rainfall. Water for agriculture, including both crops and livestock, remains the most critical and perhaps the most

limiting factor on its growth. The decreasing prices of cereal grains in the world, has contributed to making the irrigation infrastructure in the developing world even more difficult to sustain. Farmers of the South find it difficult to compete with the subsidies for grain production in the industrialised world and this makes them devalue their natural capital – water for irrigation. Further, as the cost of infrastructure has increased, it has not been possible to recover the cost of the capital investment and operation and maintenance of the system from individual farmers. In most States of the country, less than 30 percent of the costs of maintenance of the system are recovered. This has led to deterioration in systems, with an estimated 20-25 million ha of surface water irrigated canals in need of desperate repair.[i] Further, water charges are based on the area of land and type of crop and not on the volume of water used, which then leads to inefficient use and resultant scarcity.

1.3.2 The recently concluded 3rd minor irrigation census finds that as much as 62.4 million ha -- 75 to 80 per cent of the irrigation potential is under groundwater.[ii] The roughly 19 million wells – dugwells, shallow and deep tubewells – in the country form the bulk of irrigation infrastructure in the country and a large part of it is in private hands.

1.3.3 The issue of water is not just about scarcity but about its careful use and equitable and well distributed access, so water management strategies need to be carefully designed. Water management must be designed to harvest, augment and use local water resources leading to equitable local wealth generation. This new water infrastructure will need new forms of institutional management and here we must learn from our traditional community based water management systems.

1.3.4 The use of water in agriculture will face greater and greater competition from other sectors — in industrial and urban areas — and this will inevitably lead to conflict, and need policies for conserving water in all sectors. The use of water in agriculture is "consumptive": that is the used water is consumed and 'virtually' transferred to us via a

[i] Planning Commission 2004, Report of the Inter Ministerial Task Force on efficient utilization of Water Resources, GoI, New Delhi, June

[ii] Ministry of Water Resources 2005, Report on 3rd Census of Minor Irrigation Schemes, Minor Irrigation Dept, GoI, New Delhi, June

product in our food. This is different from the use of water as a process, where water is mostly discharged after use and rejoins the water cycle. For instance, cities discharge 80 per cent of the water consumed as sewage back into the hydrological system.

1.3.5 In water scarce areas, emphasis should be placed on the cultivation of high value and low water requiring crops, such as pulses and oilseeds. In paddy and sugarcane, water-saving methods of cultivation like those inherent in the System of Rice Intensification (SRI) methodology should be popularised. Seawater farming should be promoted in coastal areas through the crops that thrive in salt water. Investment in research to promote water-efficient crops is essential. "More crops per drop of water" should not remain just a slogan.

1.3.6 Worldwide research suggests that groundwater is actually more productive (producing more crops per hectare) than surface water, because farmers who use groundwater can get as much water as they need, whenever and wherever they want. So that, while canal irrigation had been the main driver of irrigated agriculture in the 1970s, groundwater became the major force by the 1990s. The Central Groundwater Board estimates that groundwater is over-exploited in 65 per cent of the districts in the country. The electricity subsidy worsens the situation, with farmers using almost double the water for each unit of crop when they have access to cheap or free power, as compared to pump-sets using paid diesel. But worse, electricity supply to farmers is always uncertain and unreliable, which affects their capacity to take decisions. A policy for agricultural reform, must take into account the need to evolve programmes for recharge and management of the groundwater reserves of the country, so that extraction is limited only to what we can annually recharge. Today, much of the recharge is natural and incidental and depends on various factors like rainfall, soil characteristics and geomorphology. The Central Groundwater Board estimates that the highest infiltration is between 20 to 25 per cent (in sandy areas). There is a need to rebuild reserves through artificial recharge using rainfall and monsoon flows in rivers.

1.3.7 Water harvesting is not about an instant (annual) miracle. It will take time and investment to replenish our rural capital, like a bank account on which we have an

overdraft. Villages which have practised water conservation for 7 to 10 years at a stretch are able to build capacity to withstand even prolonged drought. But the challenge is to build this programme with farm families, as they alone can invest in their water security. In this context, the government programme to "launch a massive scheme to repair, renovate and restore all the water bodies that are linked to agriculture" is of paramount importance.

Box II

WATER

1. Reforms to enable farmers / users to have sustained and equitable access to water must be put in place. Women must be represented in Water User Associations. A comprehensive set of Aquarian Reforms must be developed to foster sustainable and equitable use of both coastal and inland waters for capture and culture fisheries.

2. Water literacy and water quality management movements should be launched with panchayats as the leading players and **increasing water supply through rainwater harvesting and recharge of the aquifer should become mandatory**. "Million Wells Recharge" programme, specifically targeted at private wells should be launched. Rain, river, ground, sea, and treated sewage water should all be included for effective use of available water resources, with regulations for sustainable use of groundwater.

3. A greatly enhanced investment in irrigation sector is needed under the 11th Five Year Plan apportioned between large surface water systems; minor irrigation and new schemes for groundwater recharge. The funds under the Bharat Nirman Programme must be allocated for this purpose.

4. The National Programme for Repair and Renovation of Water Bodies linked to Agriculture, under the Union Ministry of Water Resources, must be reviewed for more effective implementation with increased investment. Funds under the National Rural Employment Guarantee Act, the proposed Backward Area Programme and the National Watershed Programme should also be targeted for soil and water conservation.

5. The private investment in groundwater by farmers needs supportive and affirmative programmes to address recharge and long-term sustainability.

1.4 Bioresources

1.4.1 India is well endowed with rich flora and fauna as well as microflora and microfauna. Rural and tribal families depend for their nutrition and livelihood security on a wide range of bioresources. Bioresources for spreading biohappiness among local

communities should be the motto of all research and development programmes in biodiversity rich areas. Therefore the following areas require attention from both public policy makers and technologists.

1.4.2 Livestock production in India is largely by small holders and contributes to livelihood of over 70 million rural households. Unlike land holdings, livestock holdings are fairly equitable with over 70 % of all species owned by smallholders. Livestock provides a major source of supplementary income for a huge majority of rural households and sustenance during drought and other natural calamities. Fisheries both inland and coastal, also contribute substantially to food supplies and to livelihoods in coastal and riverine areas.

1.4.3 The aim of policy is to conserve the rich biodiversity resources, utilize them sustainably for the livelihoods of communities and enhanced production, and share the benefits equitably. At the same time, access of communities, especially tribals / women to sources of biodiversity, such as forests and common property, should be protected. Enabling holders of traditional knowledge (TK) about biodiversity, especially women to get recognition and reward is another important aim.

1.4.4 In addition to conservation, enhancement and improvement of crops and farm animals as well as fish stocks through breeding, is an important dimension.

1.4.5 Development of new forage varieties and popularization of proven techniques of forage conservation such as silage making should be given priority.

1.4.6 Conservation and Genetic improvement of breeds

1.4.6.1 Community-based breed conservation (i.e. conservation through use) should be the preferred policy as far as possible with a scheme of incentives to reward those who maintain pure breeds.

1.4.6.2 Ex-situ conservation (e.g. cryo-preservation of semen/embryos) of all endangered breeds should also be adopted as per international guidelines.

1.4.6.3 Export of indigenous breeds should be allowed. Farmers/livestock keepers who rear breeds for which there is good demand from abroad (e.g. Gir cattle, Murrah buffaloes, Jamnapari goats) should be encouraged and facilitated to form producer companies

1.4.6.4 Import of suitable breeds should also be allowed to increase productivity of non-descript animals.

1.4.6.5 Private entrepreneurs and industrialists should be encouraged to set up nucleus and multiplier flocks rearing units of local breeds where scientific selection should be carried out for genetic improvement. Indirect subsidies such as tax exemption should be provided for the first five years to these entrepreneurs. The flocks will become self-sustaining by selling breeding animals after that and the breed conserved. They should be included under the venture capital scheme of NABARD.

1.4.6.6 Field based breeding and selection programs with field performance recording are necessary with farmer participation. Studies show that on the national or macro economic level, investments in breeding interventions are highly profitable, mainly due to the fact that the progress made is transferred to the subsequent generations.

1.4.6.7 Community-based organizations should be encouraged as service providers and these can become platforms for further livestock development initiatives. Establishing support services is especially important for farmer-suicide affected areas where livestock are to be provided to farmers as an alternative source of income.

Biosecurity

1.4.6.8 Agricultural biosecurity covering crops, trees, and farm and aquatic animals is of great importance since it relates to the livelihood security of nearly 70 per cent of the population, and the food, health, and trade security of the nation. Concerned with the impact of invasive alien species on the livelihood security of farm women and men, NCF in its first report (Dec 2004) stressed the need for a thorough review of the present

infrastructure and institutional framework in the area of agricultural biosecurity, including WTO specifications

1.4.6.9 A **National Agricultural Biosecurity System** should have the following principal goals:

- To safeguard the income and livelihood security of farm and fisher families as well as the food, health, and trade security of the nation through effective and integrated surveillance, vigilance, prevention, and control mechanisms designed to protect the productivity and safety of crops, farm animals, fish and forest trees.
- To enhance national and local level capacity in initiating proactive measures for monitoring, early warning, education, research, and international cooperation.
- To introduce an integrated biosecurity package comprising regulatory measures, education and social mobilisation.
- To organise a coordinated National Agricultural Biosecurity Programme on a "hub and spokes" model with effective home and regional quarantine facilities. This should be capable of insulating the major agro-ecological and farming zones of the country from invasive alien species of pests, pathogens and weeds.

Box III

Bioresources

1. Access to non-timber forest products including medicinal plants, gums and resins, oil yielding plants and beneficial micro-organisms is important, particularly to tribal families. Women in particular need access to bioresources since the task of collecting fodder and fuel wood falls on them.
2. Tribal and rural families have been playing an important role in the conservation and enhancement of biodiversity for a long time. As a result their traditional knowledge of medicinal, aromatic and other plants of value to human kind is very high. Traditional rights to access to biodiversity need to be safeguarded and strengthened. Also, their contributions to agro-biodiversity conservation and enhancement should be recognized and rewarded under the provisions of the Biodiversity Act and Protection of Plant Varieties and Farmers' Rights Acts. Suitable and transparent methods of recognition and reward should be developed for this purpose. Such procedures must be gender sensitive since women play the dominant role in genetic resources conservation and selection.
3. Traditional knowledge systems must be protected and enriched. In the past tribal and rural families depended on more than a hundred species for their health and food security; both dying crops and vanishing wisdom must be protected and revitalized.
4. Steps should be taken to impart legal literacy to women and men in biodiversity rich areas, so that their rights and intellectual property can be safeguarded.
5. The utilization of bioresources for improvement of crops and farm animals must be done in a sustainable and equitable manner. Educational techniques like the preparation of local Community Biodiversity Registers and the organization of Genome Clubs in Schools will help to spread bio-literacy and enable the conversion of bioresources into products of commercial value. Community seed and germ plasm banks should be encouraged for both conservation and breeding purposes.

1.5 Financial Services - Credit and Insurance

1.5.1 Inspite of government pronouncements, credit is becoming increasingly difficult to access. It is obvious that dire financial straits are driving hapless farmers to take to extreme steps including suicides, which have assumed alarming proportions. Also, the credit disbursal system is ridden with corruption, of which there are numerous instances. There is also a large amount of diversion of credit for non-agricultural purposes. Distress sales by small/ marginal farmers to square off their debts or for immediate consumption purposes soon after harvest are quite common. It is normal for a farmer to get 10-15 percent discounted price for spot payment for his produce. According to reliable resources, about 50 percent of the marketable surplus of small/marginal farmers is disposed of in this manner. At present credit is generally available only for

improved technologies like hybrid crops, crossbred cows, etc., and not for sustainable farming practices.

1.5.2 The Kisan Credit Card (KCC) is a major innovation in agricultural credit, but of the nearly 4.5 crore KCC issued by the banks, very few cards have been given to women farmers, and no separate data are available in this regard. Since there are a very large number of women-headed farming families in the rural areas, a system to speed up issue of KCC to women farmers, as well as proper documentation should be evolved.

1.5.3 It is not just credit availability but the interest rate at which loans are given to resource-poor farmers that is the major problem today. Credit reform should include not only enhancement of the total amount available for farm loans, but also reduction in interest rates and support for market linkages.

1.5.4 The spread between the deposit and lending interest rates in India is high by international standards. Improved efficiency in financial intermediation must be by controlling both the transaction cost and the risk cost. Speed and manner in which the debt recovery and settlement process operates would need to be considerably improved.

1.5.5 Also, interest should be waived on loans in areas hit by drought and floods and for crops under heavy pest infestation. Compounding of interest on arrears should be applied only in the case of recalcitrant borrowers who do not pay their dues in spite of having adequate repaying capacity.

1.5.6 Lakhs of farmers have seen their insurance policies lapse after the initial payments. There are provisions in the insurance laws that allow LIC to revive the lapsed policies. If done, this would place large sums back in the farmers' accounts and give them a sense of confidence. Crop insurance, which now covers only about 14 percent of the farmers, has to cover all farmers and all crops in a time-bound manner, with reduced premiums.

1.5.7 Natural calamities like drought, flood which are frequent and recurrent occurrences and pest infestation are serious and crippling risks. Rescheduling and

restructuring of their loans are not enough. Waiver of loans is also needed. An Agriculture Risk Fund, set up with contributions from the Central and State governments and banks in a predetermined fashion, could provide relief to farmers in the form of waivers in full/ part of loans and interest.

1.5.8 An integrated micro insurance policy (*Parivar Bima*) providing floating cover for health and various risks will go a long way as a safety net for the poor.

Box IV

Credit and Insurance

1. The outreach of the formal credit system has to expand to reach the really poor and needy with special emphasis on women, tribals, dry land areas and for viable projects of sustainable farming practices. The rate of interest for crop loans should be reduced to 4 per cent simple, with government support. There is a need for moratorium on debt recovery, including loans from non-institutional sources, and waiver of interest on loans in distress hotspots and during calamities, till capability is restored. An Agriculture Risk Fund should be established to provide relief to farmers in the aftermath of successive natural calamities.
2. Kisan Credit Cards should be issued to women farmers, with joint *pattas* as collateral. Till these are available, indemnity bonds from husband or other male relative or guarantee from independent local persons of standing should be acceptable.
3. An integrated credit-cum-crop-livestock-human health insurance package should be developed and set in place. Crop insurance cover needs to be immediately expanded to cover the entire country and all crops, with reduced premiums and a **Rural Insurance Development Fund may be created to take up development work for spreading rural insurance.**
4. Livelihood finance, which is a comprehensive approach to promoting sustainable livelihoods for the poor, is the need of the hour. It comprises of:
   (i) Financial services (insurance for life, health, crops and livestock
   (ii) Infrastructure (finance for roads, power, market and telecommunications
   (iii) Investments in human development, agriculture and business development services (including productivity enhancement, local value addition, and alternate market linkages and
   (iv) Institutional development services (forming and strengthening various producers' organisations such as self-help groups, water user associations, forest protection committees, credit and commodity cooperatives, empowering panchayats through capacity building and knowledge centres)

Box V

Moving From Suicide Relief to Suicide Prevention: 9 Point Action Plan

The NCF has in its various Reports addressed the issue of agrarian distress in rural areas of the country and the need to address the farmer suicide problem on a priority basis. This has to be on the basis of a three-pronged strategy, viz. i) Relief & Rehabilitation Measures to alleviate the distress and suffering of the affected families in the short term, ii) Address the issues responsible – unfavorable economics, risky technology, unfavorable weather, lack of irrigation water, institutional credit and remunerative markets, and iii) Psycho-Social Counseling. While the first measure is to provide immediate relief, the other two are preventive long-term measures.

The distress sweeping rural India flows from market failure and the gradual collapse of public services. The cost-risk-return structure of farming is adverse. Almost all the suicide and otherwise crisis-hit households record high health expenditures and are indebted to moneylenders. There is urgent need for both affordable health insurance, and the revitalization of primary healthcare centres. The National Rural Health Mission should be extended to such suicide hotspot locations on priority basis. The NCF in its Second Report stressed on the need for a **Farmers' Livelihood Security Compact.** This has to be an integrated package of measures comprising:

1. Setting up State level Farmers' Commission with farm men and women represented for ensuring dynamic government response to farmers' problems.

2. Credit: Microfinance policies should be restructured to serve as **Livelihood Finance,** i.e. credit coupled with support services in the areas of technology, management and markets. The outreach of the formal credit system has to be expanded. In most cases, the indebtedness of farmers in distress areas is to informal moneylenders. The cut-off amount for debt waiver could be worked out in consultation with Panchayats and farmers' representatives in the distress hotspot areas. Just interest waiver does not help a farmer in distress. In drought prone areas, credit should not be just for the season, but for a **Credit Cycle** of 4-5 years and include consumption credit, so that the farmer has the capacity to spread his/her liabilities and meet the repayment requirements.

3. Insurance: All crops should be covered by crop insurance and insurance relief should be immediate, with the village and not block as the unit for assessment. There should be a Social Security net with provision for old age support and health insurance. Lapsed life insurance policies of farmers should be revived as per extant rules and not allowed to expire. The integrated family insurance policy (***Parivar Bima* Policy**) recommended by NCF in its First Report deserves to be examined and introduced to begin with, in dry farming areas.

4. Irrigation Water: Aquifer recharge, rain water conservation, equity, fairness and public good will have to be the basis of water policies. Decentralised water use planning has to be undertaken and every village should aim at *Jal Swaraj* with Gram Sabhas serving as *Pani Panchayats*.

5. Access to quality and affordable inputs is crucial: The government must urgently intervene to ensure that quality seed and other inputs reach farmers at affordable costs and at the right time and place. An integrated farming approach should be encouraged with support services in place

6. Technology: Resource poor farmers have no coping capacity to withstand the shock of crop failure, particularly those associated with high cost technologies like Bt cotton. Low risk and low cost technologies which can help to provide maximum income to farmers should be recommended. Risk distribution agronomy should be propagated. Similarly, best possible advice based on remote sensing data should be used to identify locations for drilling wells.

7. Remunerative Market and Price: Swift action is required to overhaul the **ryuthu bazars** or farmers' markets, most of which are controlled by traders. There is also need for focused **Market Intervention Schemes** (MIS) in the case of life-saving crops such as cumin in arid areas. A **Price Stabilisation Fund** should be in place to protect the farmers from price fluctuations. Swift action on import duties to protect farmers from international price is necessary (as in the specific instance of cotton farmers' suicides in Vidarbha).

8. Information Dissemination and Delivery System: The vital role of the Agriculture Extension Officer must be recognised and the system revived and strengthened. KVKs in each district should function as *Krishi Aur Udyog Vigyan Kendra***,** with a post harvest technology wing for providing training in value addition. **Farm Schools** maybe established in the fields of good farmers. **Village Knowledge Centres** (VKCs) or *Gyan Chaupals* should be setup in the farmers' distress hotspots. These can provide dynamic and demand driven information on all aspects of agricultural and non-farm livelihoods and also serve as guidance centres.

9. Psychosocial Measures: There is need for public awareness campaigns to make people identify early signs of suicidal behavior, make them aware of different socially acceptable measures for solving problems and information on helpline centres; develop a group of volunteers from the community to provide counsel, encourage increased communication within families, media education on internationally accepted guidelines for reporting suicides and creation of taluk level mental health services. Agricultural and Animal Sciences Universities could form **Hope Generation Teams** (like NSS) of young male and female students who could stay in the distress villages for a few weeks and extend both technical and psychological support. An environment of Hope and Care has to be created.

1.6 Technology Development and Dissemination

1.6.1 The growing gap between technology, research and development and its clients, the farming community is becoming more and more obvious. Farmers both need and lack sound advice and expertise on a range of issues. There is also a tendency among some resource-poor farmers to take to high cost technology without the capacity to incur losses due to factors beyond their control.

1.6.2 Post-harvest technology is poor and there is little value addition particularly in the case of fruits, vegetables and spices, including a wide range of tubers and medicinal and aromatic plants. Sustainable intensification, ecologically, economically and nutritionally desirable diversification, and value addition to the entire biomass are important for raising small and marginal farm families above subsistence level. All this will call for initiating an era of knowledge intensive agriculture. Modern information and communication technologies (ICT) afford an opportunity for launching a knowledge revolution in rural India. The torch bearers of this revolution should be rural women and men. Participatory research and knowledge management involving farm women and men should be the principal pathways of research, education and extension. Farmers should be regarded as partners and innovators in bringing about agricultural transformation.

1.6.3 The Eleventh Schedule (Article 243G) of the Constitution, 73rd Amendment Act 1992, lists “agriculture, including agricultural extension” as the first among 29 items entrusted to panchayats for attention and action. There are nearly 240,000 elected panchayats and local bodies in the country and more than one million elected women members of the panchayats. If panchayats are empowered technically, financially and legally to assume these responsibilities, they could become catalysts of accelerated agricultural progress, particularly in the areas of sustainable natural resources management and productivity enhancement. At least one male and one female member of each panchayat/local body could be trained in integrated pest management, integrated nutrient supply, and scientific water management, as well as in new technologies such as biotechnology and ICT. Thus, a cadre of Rural Farm Science Managers can be established.

1.6.4 Technologies should help in promoting labour diversification and not displacement. Women farmers and farm workers particularly need to be assisted with implements and equipment which will help to reduce drudgery and the number of hours of work, while adding economic value to each hour of work.

1.6.5 Revitalisation of small farmer-friendly technologies should be based on sound principles of economics and participatory research and knowledge management. Lateral learning among farm women and men should be fostered, since farmer-to-farmer learning is based on the principle that "one ounce of practice is worth tons of theory". In order to multiply the benefits from the experience and skills of outstanding farm men and women, Farm Schools should be established in their fields.

1.6.6 The veterinary curricula in use in the country at present generally neglect small ruminants, rabbits, camels, yak, mithun and pack animals. There should be adequate emphasis in the syllabus on these species so that veterinary graduates can ably handle the diseases and other problems specific to these species such as trypanosomosis in camels.

1.6.7 Incentives should be given to setting up hygienic medium-sized slaughter facilities that can handle 100-500 animals per day in rural areas. This will prevent their transport through long distances, generate local employment and clean packaged meat can be made available to nearby medium-sized towns and big cities.

1.6.8 Establish "Fish for All" training centres, which will enhance the capacity of fisher women and men in all aspects of the capture to consumption chain.

1.6.9 To impart a sense of grassroot realism to the capacity building programmes, there should be a system of on-farm training to farmers. Village-based farm schools can be set up with the assistance of agro-industries, Krishi Vigyan Kendras, agricultural colleges and research institutes. Agricultural graduates and lead farmers can be certified as instructors and offered incentives for establishing private farm schools to train local farmers. Farm schools should be linked to Village Knowledge Centres to provide access to multimedia training materials, computerised expert systems, and web-based technical and marketing information.

1.6.10 Technology Missions are tending to become “subsidy rich” and “technology poor”. Accountability is also lacking, with the result that in several important crops like pulses and oilseeds, domestic production is stagnating and imports are increasing. This is one of the causes for the mounting farmers’ distress in dry farming areas. The smaller the farm, the greater is the need for productivity improvement, so that the farm family can have additional marketable surplus. Enhancement of small farm productivity coupled with assured and remunerative marketing opportunities is the most effective means of reducing rural poverty. Fortunately, there is much scope for enhancing productivity even with the technologies currently on the shelf, provided market linkages can be tied up.

1.6.11 There should be a convergence of appropriate Technology Missions (like those relating to oilseeds, pulses, maize, cotton, horticulture, or milk) around a watershed or the command area of an irrigation project, together with the active involvement of panchayat institutions and local bodies. Convergence and synergy among the numerous Technology Missions now in progress will improve their utility and impact and also help to reduce overall transaction costs.

1.6.12 The cultivation of fruits, vegetables, flowers, spices, medicinal and aromatic plants is now happening in a big way in several parts of the country. Being perishable commodities, horticultural crops need effective infrastructure support in the areas of production, processing, storage, transportation and marketing. In villages adjoining large consumption centres (both for home and export markets), small farmers can be helped to organise Small Farmers’ Horticulture Estates covering an area of 200 to 500 hectares. Such estates will confer on farmers cultivating one to two hectares the power of scale both at the production and post-harvest phases of the horticultural enterprise. Specialised activities like seed production, tissue culture propagation, production of compost, vermiculture, biofertilisers, biopesticides as well as e-commerce can be carried out at those estates. Low cost greenhouses coupled with fertigation techniques can be promoted, in addition to high-tech horticulture which can be undertaken by farm and home science graduates. The production of good quality, disease-free planting material in all clonally propagated species and seeds and planting materials of varieties suitable for processing will help farmers in areas where production and processing are linked. Such symbiotic

linkages between producers and processors will facilitate sourcing of good quality raw material for the processing industry.

1.6.13 The textile sector is one of the major providers of employment and income in the national economy. With the coming to an end of the multi-fibre arrangement two years ago, our cotton producers, weavers, and the textile industry on the whole face both new opportunities and threats. Without enhanced efficiency, it is impossible to take advantage of emerging market opportunities. Technological upgrading of all the components of the cotton production-processing-marketing cycle will be needed to prevent problems and setbacks in this vital sector of our economy, particularly with reference to both employment and export earning potential. A revolution is needed in productivity, quality and value addition in cotton production and processing. To provide overall coordination and policy support it will be advisable to establish a multi-stakeholder National Cotton Council, with government participation and support.

Box VI

Technology

1. Research, education and extension systems should be revitalised to avoid both technology fatigue and technology gaps.Agricultural and rural universities, Home Science colleges and research institutes should foster participatory research and knowledge management systems with farm women and men. The linkages between agricultural universities and farm communities must be restructured and strengthened.
2. Farm Schools should be set up in the fields of farmers who have achieved outstanding success in their operations in order to foster farmer-to-farmer learning of new technologies.
3. There should be a proper match between production and post-harvest technologies and a post-harvest technology wing should be added to every Krishi Vigyan Kendra.
4. A cadre of Rural Farm Science Managers should be developed by training women and men members of every Panchayat/ local body in the management of farm technologies.
5. An umbrella organization of Farm Technology Mission should be set up for coordination and to avoid duplication and conflicting approaches.

1.7 Inputs and Services

Access to affordable inputs and services are crucial for the success of farming, especially for poor farmers.

1.7.1 Input Supplies

1.7.1.1 Input prices have shot up and are still escalating. Resource poor farm families are left to the mercy of input dealers who have emerged as the new moneylenders of the countryside. Quality control is becoming increasingly important. Control has to be exercised over false and exaggerated claims for inputs with laws in place for penalty. Companies have drastically lowered the minimum germination rate they assure farmers. In the case of seed, this has fallen to as low as 60 per cent which implies that a village buying 1000 bags of seed pays for that number, but gets only 600 in effect. Quality control is equally urgent in the case of fertilizers, bio-fertilisers, pesticides and bio-pesticides. There has to be a suitable agency for strict quality control of animal feed, drugs, vaccines and other biological products. Animal-rearers need to be protected from exploitation by unscrupulous manufacturers. It should be mandatory to print the digestible energy and protein content of the concentrate on the bag and the contents of the mineral brick on its packing.

1.7.2 Centralised Services

1.7.2.1 Management procedures which can confer the economy and power of scale to small and marginal farm families, such as Small Holders' Cotton and Horticulture Estates, should be popularised.

1.7.2.2 Agriculture and aquaculture service centres run by trained managers who are available to the farmers to provide reliable technical advice, arrange for procurement of quality seed, feed and probiotics, provide information on the market and price fluctuations, should be set up with the active involvement of the farmers in different production areas.

1.7.2.3 Small farmers groups and women's SHGs involved in livestock rearing need support services like feed and fodder banks, training in scientific rearing techniques, veterinary health care, marketing and credit and insurance.

1.7.2.4 Organized centralized support services are needed to support decentralized small scale fisheries production (e.g. Mother Ships based in Andaman & Nicobar and Lakshadweep group of islands), upgradation and construction of new minor fish harbours and fish landing centers, large wholesale markets for larger and more hygienic handling of catch and greater employment generation.

1.7.3 Rural Energy

1.7.3.1 Farm families need energy both for domestic needs as well as for farm operations. At the moment they depend largely on firewood, cow-dung and agricultural residues for meeting their domestic needs. For agricultural purposes, the major sources are electricity, where available, and diesel. An integrated Rural Energy System is recommended for the purpose of meeting the energy needs of farm families in a holistic manner. Particular attention will have to be paid (a) to **harnessing renewable energy** technologies such as biogas, wind and solar including solar thermal and solar photo-fuel technology and (b) to conventional energy sources including electricity from grid, kerosene, diesel and soft coke and fuel from social forestry programmes. A **Comprehensive Integrated Rural Energy Programme during the 11th plan period is needed for meeting the needs of rural families in their totality**. Particular attention should be paid to renewable energy technologies like Biogas Plants, Solar Photovoltaic Technology, Biomass Gasification, Mini Hydro Power and Biofuel Technologies. The availability of energy is also essential for non-farm enterprises including agro processing.

1.7.4 Protective Services

1.7.4.1 Emphasis should be on development of vaccines against diseases for which no vaccines exist at present e.g., bluetongue in sheep. The thrust should be on prevention and eradication of diseases. Disease diagnostic and investigation laboratories should be set up with a separate cadre of appropriately trained personnel.

1.7.4.2 Following the outbreak of Avian Influenza (AI) in some of the Asian / European countries, the Government of India had banned the import of various poultry products. **Quarantine and testing facilities at all ports of entry should be established** before the ban is lifted, as such safeguarding measures are absolutely necessary for the health and survival of the poultry industry and for the protection of livelihood of millions of farmers and others dependent on this industry.

1.7.4.3 A 100% quarantine of all imported birds for a minimum period of six weeks should be strictly implemented, as in countries which have a developed poultry industry.

1.7.4.4 The High Security Animal Disease Laboratory (HSADL) Bhopal is the only laboratory which is equipped and authorized for testing for Avian Influenza. A high level committee of experts may be constituted to test the suspected cases thoroughly before any declaration of bird flu and other major diseases is made, instead of leaving it to the decision of one person. It is also necessary to establish atleast one or two more laboratories equipped on par with HSADL, Bhopal,

1.7.4.5 There is no facility for testing the safety and efficacy of imported poultry vaccines before they are allowed to be marketed, as is there in the case of human vaccines. 90% of human infections and deaths due to bird flu were reported from countries where the birds were vaccinated for Avian Influenza, so imports could be allowed only after testing.

1.7.5 Support Services for Women

1.7.5.1 Women suffer from a multiple burden on their time due to their home making, child rearing, and income earning responsibilities. When they work the whole day in fields and forests, they need appropriate support services like crèches and child care centres. Adequate nutrition is also important.

1.7.5.2 The food-for-work programme should enlarge the concept of *work* in the case of women by including activities like running crèches and child care centres, preparing

noon meals in schools, undertaking immunisation of children and providing family planning services.

1.7.5.3 A **Gram Panchayat Mahila Fund** should be established to enable self-help groups and other women's groups to undertake community activities that help to meet essential gender-specific needs.

1.7.5.4 Credit, insurance, technology development and dissemination, health care, education, input supply, output marketing and rural employment should all be engendered.

1.7.5.5 The feminisation of agriculture, due to male out-migration, needs specific attention with reference to gender-sensitive farm and credit policies. All research, development and extension programmes in agriculture, and all services must be engendered

Box VI

Inputs and Services

1. Mechanisms are required for quality control and regulation of all input supply
2. Agriculture and aquaculture service centres run by trained managers who can provide reliable technical advice, arrange for procurement, and provide information on the market should be set up, as well as centralized services to support decentralized small scale fisheries production.
3. A Comprehensive Integrated Rural Energy Programme during the 11th Plan Period is needed for meeting the needs of rural families in their totality, including both renewable energy technologies and conventional energy sources.
4. Quarantine and testing facilities at all ports of entry should be established. Safeguarding measures are absolutely necessary for the health and survival of the poultry industry and for the protection of lives and livelihoods. Testing the safety and efficacy of imported poultry vaccines before they are allowed to be marketed is a must
5. Women farmers suffer from a multiple burden on their time due to their home making, child rearing and income earning responsibilities. All research, development and extension programmes in agriculture and all services must be engendered.

1.8 Markets

1.8.1 The gross marketing margin in farm commodities is estimated at Rs.1009 billion, out of which nearly 70% is accounted for by marketing cost. About 77% of marketing costs are estimated to be avoidable losses during handling, storage and transport. Quality, labeling, brands, taxes, subsidies, sanitary and phytosanitary (SPS) issues, price volatility, removal of quantitative restrictions on imports and the absence of a level playing field in international trade due to the very high support (nearly 1 billion dollars per day for 10 million farming families) extended to farmers in OECD countries, are all becoming significant factors in agricultural marketing.

1.8.2 Raising the agricultural competitiveness of farmers with small holdings is a major challenge. Systems designed to confer the power of scale to small farm families both at the production and post-harvest phases of farming are an urgent necessity. Productivity improvement to increase the marketable surplus must be linked to assured and remunerative marketing opportunities. A basket of choices should be available to farm women and men cultivating 1 or 2 ha or below to enhance their income earning capacity.

1.8.3 Pre-production agreements for sale between farmers and corporate houses and processing companies are being increasingly used in the case of certain vegetables, fruits, and medicinal plants. These agribusiness models are being loosely referred to as ‘contract farming’ though in many of these cases there is no formal contract between the farmers and the prospective buyer. The advantage of such arrangements could be biased in favour of the agribusiness organisation. However, there could be beneficial effects of such arrangements to the farmers in the matter of access to adequate and timely credit, good quality inputs, new technology, employment generation, introduction to new crops, separation of production and marketing risks, better farm practices, etc. The need is to develop a comprehensive, clean, equitable and farmer-centric model agreement, which cannot be abused against the farmers. Special care needs to be taken regarding clauses dealing with quality standards, withdrawal conditions, pricing standards, paying arrangements, natural calamities, and arbitration mechanisms.

1.8.4 Swift action is required to overhaul the *rythu bazaar*s or farmers' markets, most of which are presently controlled not by farmers but by traders. Even the "farmers' markets" are now heavily loaded against the small producers and cartels and trader networks manipulate these and rig prices systematically.

1.8.5 Assured and remunerative marketing for dryland farm products such as pulses, oilseeds, millets, vegetables, fruits, milk, and meat should be put in place. Due to shortage of wheat and rice in government stocks, the Government of India plans during 2006 to purchase millets, ragi, bajra, and jowar for use in the public distribution system (PDS). These "underutilised crops" are rich in micronutrients and minerals and should be referred to as "nutritious cereals" and not as "coarse cereals" as is being done now. The decision to include ragi, bajra, jowar, and other millets in the PDS should be a permanent one. This will help to enhance nutrition security, on the one hand, and the productivity and economic sustainability of improved dryland agriculture, on the other.

1.8.6 Small farmers should not be subjected to experiments in the area of crop diversification without first linking the farmers with the market for the new commodities. Crop-livestock-fish integrated production systems are ideal for small farmers since this can also facilitate organic farming. Success in agricultural progress should be measured by the growth of farmers' incomes and not just by production figures.

1.8.7 While import of wheat, pulses, sugar, and oilseeds may have been necessary during 2006 to prevent an undue rise in prices, we should avoid the danger of making this a habit. Our food budget should be managed with home-grown food, since agriculture is the backbone of our rural livelihood security system.

1.8.8 Farm families should be enabled to become quality conscious, with reference to both home and external markets. Our agricultural competitiveness in the external market can be improved only if we help farm families to increase both productivity and quality of crops in demand in the global market.

Box VII

Basmati Case Study

A case in point is basmati rice exports. Despite the Ministry of Commerce's notified standards on basmati, several high yielding semi-dwarf stature aromatic rices are being released by research institutions under the name. Such a dilution of the pristine properties of traditional Indian basmati is now seriously threatening our export earnings from basmati rices. Also, traditional basmati varieties are being adulterated with the dwarf "basmati" grains. The appellate **basmati** is used only for traditional fine grain aromatic rices of great antiquity and of a specific geographic origin. The new high yielding fine grain aromatic rices can be given other appropriate names, since they have good market potential without being called basmati. They can stand on their own merit, without diluting the historic halo which surrounds the traditional Indian basmati rice.

1.8.9 With the liberalisation of procedures, the commodity future market is expanding at a fast pace. The trade turnover in the commodity exchange touched Rs. 5,70,000 crores during 2004-05. The time has come to ensure the healthy and regulated growth of this market and make small farmers benefit from its development. If spot and futures prices of farm commodities are available to farmers as well as to the agro- and food-processing industries, agriculture as a whole will benefit. Farmers given dependable data can take decisions on the crops to be sown and on post-harvest sale of commodities. The Agriculture Produce Marketing Committee (APMC) yards across the country are now being networked electronically by the Multi-Commodity Exchange of India (MCX), Mumbai. The National Commodities and Derivative Exchange (NCDEX) operates online trading through nearly 6000 terminals covering 33 agricultural commodities and linking 430 cities and towns across the country. It will be very useful if the Village Knowledge Centres are linked to NCDEX and MCX so that they can disseminate data on spot and futures price among farmers. It is also now possible to transmit such data on cell phones.

1.8.10 As a national self-empowerment measure, we should establish an Indian Trade Organisation (ITO) and our own boxes for domestic agricultural support on the

model of WTO's Blue, Green and Amber Boxes. The value of our annual agricultural production including livestock in 2002-03 was Rs. 5,60,516 crore.[iii] The value of our exports of farm commodities in 2002-03 was only Rs. 34,654 crore (6.18 % of total agricultural production).[iv] Only a small proportion of our agricultural commodities enter the global market, since with a population of over a billion, there is a large home market. Hence, we must segregate the very modest support we extend to our farmers into two groups: those which are of the nature of life and livelihood saving support to small farm families, and those which could be considered as trade distorting in the global market.

Box VIII

Markets

1. Commodity-based farmers' organisations like Small Cotton Farmers' Estates, Small Farmers' Horticulture Estates, Small Farmers' Poultry Estates and Small Farmers' Medicinal Plants Estates should be promoted to combine decentralised production with centralised services such as post-harvest management, value addition and marketing, for leveraging institutional support and facilitating direct farmer-consumer linkage.
2. Implementation of MSP needs considerable improvement. Arrangements for MSP needs to be put in place for crops other than paddy and wheat, such as millets. Side by side, millets and other nutritious cereals should be permanently included in the PDS. Market Intervention Schemes (MIS) should operate for sensitive crops and a **Price Stabilisation Fund** for all crops should be setup.
3. Pre-production agreements for sale (contract farming) should be comprehensive, clean, equitable and farmer-centric.
4. Data about spot and future prices of commodities should be made available to the farming community through the Multi Commodity Exchange (MCD) and the NCDEX and the APMC electronic networks covering 93 commodities through 6000 terminals and 430 towns and cities.
5. The role of the State Agriculture Produce Marketing Committee Acts [APMC Acts] relating to marketing, storage and processing of agriculture produce need to be reviewed. From regulation they need to shift to one that promotes grading, branding, packaging and development of domestic and international markets for local produce, and move towards a Single Indian Market.

[iii] National Accounts Statistics of India, 1950-51 – 2002-03, EPW Research Foundation, Mumbai, 2004
[iv] Agricultural Statistics at a Glance 2004, Ministry of Agriculture, Govt. of India

1.9 Mission 2007 – Every Village a Knowledge Centre: Knowledge Management and Dissemination

1.9.1 In its first Report submitted in December 2004, NCF stressed the need for knowledge connectivity in rural India, since farm families urgently need the right information at the right place and at the right time in order to enhance agricultural efficiency and competitiveness. The importance of developing and sustaining two-way flows of information between the farm families and experts/agencies of all kinds was emphasized. The Mission 2007 Alliance whose goal is to build a knowledge center in every village was cited as a means to realize this vision. The need for a national effort to build gateways of digital information for agrarian prosperity was identified and an alliance of data-generating organizations was also recommended, covering the public, the educational and the private sector.

1.9.2 Knowledge Connectivity has been made a key component of Bharat Nirman designed to provide a New Deal for Rural India. The NCF proposal received support in the Union Budget for 2005-06, with the finance minister announcing that the government will allow NABARD to provide Rs. 100 crore out of the Rural Infrastructure Development Fund for supporting Mission 2007 to set up a Knowledge Centre in every village by 15 August 2007, the 60th anniversary of India's attaining Independence. The NCF welcomes the recent approval of the Cabinet to support the Common Service Centre (CSC) Scheme as a national programme under the National eGovernance Plan. While the Scheme is anticipated to be rolled out in PPP mode, it should be ensured that the principles of social inclusion guide the establishment of the 100,000 CSCs, proactively soliciting support from village Panchayats who would be both the beneficiaries as well as the main stakeholders of the services offered by the Government, the private sector and civil society. In particular, the Fellows of the National Virtual Academy could be helped to emerge as Village Level Entrepreneurs (VLEs).

1.9.3 The following steps are needed to further this thrust:

1.9.3.1 Setting up a series of nation-wide online grids for content sharing in all areas that have relevance to agrarian prosperity through forming an alliance of information sources

1.9.3.1.1 Research and educational and training organizations in our country have for long developed information materials of good quality that are useful for adaptation and use in the VKCs. The challenge however is one of timely access. These sources **need to be digitized** on a very large scale. The Ministry of CIT, along with several institutes, and the Carnegie Mellon University, has embarked on a large program of digitization of publications and the agricultural, health and Panchayat administration sectors should be covered on a priority basis. Agricultural and health research, development, training and educational organizations should be enabled to digitized their publications for access in the public domain in all Indian languages. The emerging practice of creating grids of information sources should be adopted. The users and facilitators at the VKC should be able to gain access to any relevant document, be it text, image or audio/video clips, irrespective of its origin or original location. The grid content of all kinds should be shareable and re-usable on a mandatory basis without the original creator losing all the copyrights, and new practices such as the Creative Commons should be adopted. The Ministries of Agriculture, Rural development and Health should take steps to initiate such a grid-creation program on a priority basis so that the equivalent of one million pages can be digitized in FY 2007-08. The IIT system has been successful in transforming itself into a consortium of quality-content institutions through the National Programme on Technology Enhanced Learning (NPTEL) program and that experience should be used in the development sector.

1.9.3.2 Forming an alliance of Educational and Training Organizations for Rural Capacity Strengthening to cover at least a million women and men in the next five years

1.9.3.2.1 Strengthening of capacity among rural families is fast becoming an urgent necessity because of the continuing deterioration in natural resources quality, increasing

pressures of trade/markets, and increased incidence of weather-induced uncertainties in production and processing in rural areas. There is a need for capacity strengthening on a mass scale in matters of **NRM, weather, trade and quality literacy** and in matters related to area-specific disaster-preparedness. The current paradigms of instruction and learning need to be supplemented by new approaches to mass education that requires technology-mediation on a large scale. A blend of non-formal and flexible learning approaches is necessary. An alliance of training and educational organizations should be enabled to use a range of technologies to provide new and effective opportunities for learning in rural areas. The **Open Universities, adult literacy organizations, extension wings of SAU's and rural development agencies** should be at the forefront of these activities, while the alliance should also include **broadcasting and mass media organizations and technology organizations** for deepening reach. **Community radio and local publishing** are important allies in this endeavor. The experience of the Jamsetji Tata National Virtual Academy in identifying about 500 rural academicians is highly valuable, and these academicians should be considered as the nucleus of the entire process of capacity strengthening on a mass scale. The ISRO-MSSRF project on VRC's provides a model for the new kind of rural capacity building.

1.9.3.3 E-Governance Processes in Rural Areas and Village Knowledge Centers should be rendered complementary and synergistic

1.9.3.3.1 The country is making significant investments in promoting E-governance and both the Union Government and many State Governments have started to evolve strategy-based plans of action. Studies in the patterns of usage of information in existing VKC's reveal that nearly half the use is about government and governance information. Therefore, it would be meaningful to create synergies between **upcoming E-Governance initiatives in rural areas and the practice of VKC's**. The synergies make both the processes highly effective. E-Governance processes through VKC's should go beyond provision of government documents or petition-gathering to providing agro-advisories and livelihood-related advice that can be considered by the rural users as authentic. The national Institute of Smart Governance, which is evolving the codes of practices in E-Governance, should be encouraged to develop various scenarios of synergy. Since a

significant component of rural E-governance will relate to disaster preparedness, it would be useful to position the VKC's as E-governance channels in relation to this aspect.

1.9.3.4 Establish a Technology Resource and Support System for the Promotion of Village Knowledge Centres

1.9.3.4.1 Implementing the foregoing recommendations requires a significant level of technological intensity and development organizations cannot be expected to handle these processes on their own. The Mission 2007 Alliance has fostered a sense of voluntarism among the partners where the technology-oriented partners support the wholly development-oriented ones. This requires to be mainstreamed. Every institution that has advanced skills in IT design/development/instruction/research should be invited to become a participant in a new **National Alliance for Development Informatics and Standards**, to be hosted in the IIT system. Such an alliance will make fundamental contributions in the area of **share ability of content and data across institutional and linguistic boundaries**. Such an alliance is also necessary to take advantage of the rapid diffusion of mobile telephony in semi-urban and rural areas, to make it a channel to promote information sharing and learning. Due recognition of such contributions in the form of the equivalent of President of India awards for invention may be considered.

1.9.3.5 **Virtual and real communication linkage:** Mobilising science and technology for agriculture, through the ICTs needs linking agricultural specialists with farmers through both virtual and real communication. ICTs can bridge the knowledge divide and help to overcome the prevailing knowledge deficit among our farming communities by permitting geographically distributed organizations to work together more effectively, allowing them to provide mutual mentorship and support as demonstrated in the ICRISAT's VASAT programme. The GoI should replicate the VASAT model in all regions covering all crop, livestock and horticultural practices.

1.9.3.6 **ICTs for Agricultural Trade:** ICTs have the potential to offer trade opportunities for farmers by linking smalholders into increasingly globalised production

chains. What the ITC's e-Choupal has gained can easily be replicated by the GoI through the Gyan Choupals in India.

1.9.3.7 **National Agricultural and Farmers' Knowledge System:** Knowledge is an increasingly significant factor of production. Government could consider establishing a national knowledge management system for agriculture and farmers in all Indian languages that will facilitate interactivity between farmers and specialists; and among farmers themselves. The role of intermediaries is critical for the identification of client needs and suitable knowledge delivery methods and to provide feedback on the quality of agricultural knowledge services. Hence, the GoI should consider working closely with the NVA Fellows who champion knowledge brokerage at the local level, linking the farming community with the rest of the world.

1.9.3.8 **Gyan Choupals to Champion Agricultural Knowledge transfer:** We have already witnessed attempts to establish well-equipped Gyan Choupals (Village Knowledge Centres) with alternative models of connectivity such as the shared and inexpensive mobile phones, DVDs, CD-ROMs and offline internet models. These centres linked to the Village Resource Centres established in collaboration with the Indian Space Research Organisation have already demonstrated the possibilities of connecting farmers with their peers and specialists, a facility inaugurated by the Hon'ble President of India at the Indian Science Congress in January 2006. A combination of VRC and Gyan Choupal can help create, process, disseminate relevant content into agriculture mini-enterprises and support and the delivery of training and skills enhancement among farmers in new technologies. Integrating agricultural content development as well as capacity building for users through Gyan Choupals should be taken up in each and every Panchayat in the country.

1.9.4 National Level Agricultural Databases

1.9.4.1 National Village Level Soil Database: A database containing the physical, chemical and microbiological details of soil tested in different climatic zones. This will enable the development of mass media campaigns through Gyan Choupals about the

value of soil health and the serious hazards resulting in misuse, leading to rationalization of the use of fertilizer inputs.

1.9.4.2 National Land Information system for Planned Cultivation: A nationwide land information system for planning cultivation patterns must cover cultivatable lands, pasture lands, forests and fallow lands as well as information on land holding of small, marginal and big farmers. This would lead to appropriate strategies for providing the power of scale to small farmers through cooperative, group and self-help group farming methods linking them with contract, corporate, and State farming.

1.9.4.3 National Water Management Information System: A GIS based water information system with village level disaggregated data will enable assessing the level, status and quality of ground and surface water resources, and various water harvesting methods ranging from water aquifer recharge structures to roof-top rain water harvest. Under the Rural Employment Guarantee Scheme, local people can help map these resources and form part of a water literacy campaign using e-learning and mass media material through Gyan Choupals.

1.9.4.4 National Seed Information System: An information system for quality seed to track production, preservation and distribution will facilitate the timely procurement of quality seeds and the maintenance of seed banks and seed grids all over the country depending upon the geographical priority. This database will also help to analyse diseases and pests that affect the yield and in monitoring the use of plant protection chemicals.

1.9.4.5 National Agro-processing and Marketing Information System: An agro-processing database in Indian languages would aim to provide adequate knowledge to groups of farmers on post-harvest technologies and ICT-enabled demonstration of various tools and techniques used in agro-processing, value addition and packaging. Farmers can move from mere producers to small-scale entrepreneurs especially in food processing.

1.9.4.6 National Credit and Insurance Information and Advisory System: The linked credit plans adopted by the agricultural banks and financial institutions will need to be supplemented by strong credit information, advisory services and credit counseling to ensure social inclusion, and participation of rural poor in such schemes. A database system with sector wise information will help in developing strategies for micro-insurance schemes. Such schemes will have the potential to expand to plants, perishable commodities, animals, weather and water resources.

1.9.4.7 National Local Heritage Databases: Databases to redeem the dying practices and knowledge to ensure that the indigenous knowledge of crops, livestock and cultivation processes and methodologies are captured. A living heritage gene bank of local breeds like cattle, sheep and poultry, with pedigree information would help in protecting the genetic wealth of Indian animals and in creating a brand name based on community-based conservation methods for these species. Gyan Choupals will be the perfect vehicles for protecting the local heritage by involving the community knowledge workers, especially women, and in tribal areas.

1.9.5 With the participation of NGOs, government research agencies and the international institutions such as ICRISAT, FAO and IFPRI a national agricultural gateway to develop, adapt and disseminate digital content on agriculture and farming practices can be developed.

1.9.6 A new cadre of **agricultural knowledge workers** attached to Gyan Choupals and linked to the Village Resource Centre has to be created on a priority basis. India needs half a million such **champions** to help our farmers. These champions will play a critical role in providing feedback to specialists and at the same time provide the much-required link with farming communities. These steps will help to generate more than a million skilled jobs in rural India, since atleast one woman and one man will be involved in the management of a Gyan Chaupal.

CHAPTER 2

MAKING HUNGER HISTORY

Medium Term Strategy for Food and Nutrition Security with a view to move towards the goal of universal food security over time

2.1 The Mid-term appraisal of the Tenth Plan reveals that we are lagging behind in achieving the Millennium Development Goal of halving hunger by 2015. Under-nutrition and malnutrition are still widespread. National Sample Survey (NSS) data show a clear trend of decline in calorie intake. In rural India, the average calorie intake per capita per day fell from 2266 Kcal in 1972-73 to 2183 Kcal in 1993-94. It fell further to 2149 Kcal in 1999-2000. Among the lowest 30% of rural households in respect of consumer expenditure, the per capita calorie intake fell from 1830 Kcal in 1989 to 1600 Kcal in 1998. In 1999-2000, almost 77% of the rural population consumed less than the poverty line calorie requirement of 2400 Kcal. The average calorie intake in 2004-05 across the eight States of Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Madhya Pradesh, Orissa, Maharashtra and West Bengal was only 1907 Kcal as per provisional data released by the National Nutrition Monitoring Bureau (NNMB), indicating a declining trend. Further, 35.5% adults in these States, suffered from Chronic Energy Deficiency and 54.4% children in the age-group 1-5 years were undernourished with 16.5 % suffering from severe under-nutrition. Maternal and foetal under-nutrition results in the birth of babies with low birth weight which reinforces itself in the absence of corrective measures.

2.2 Hunger Hotspots

2.2.1 The National Institute of Nutrition (NIN) Survey 2002, collected detailed data for different age groups based on the Recommended Daily Allowance (RDA) specified by the Indian Council of Medical Research (ICMR) for specific age and sex groups, including extra energy needed for special groups such as expectant and lactating mothers. There are 7 age and sex groups for which calorie intake data has been collected and compared with the recommended daily calorie intake for that age and sex group. The data

is however available for only 9 States of the country, excludes large populous States such as UP although UP is in the list of NNMB States for nutrition monitoring and refers only to rural area of these States. The findings of the study in respect of median calorie intake[1] of the States for each of the 15 age and sex groups compared to the respective RDA are given in the Table 1 in Annexure 2.1. With very few exceptions, the median calorie consumption is far below the RDA levels in all the States for all groups. In all the age groups of children: 1-3 yrs, 4-6 yrs, 7-9 yrs, the RDA is higher than the median calorie intake in all the nine States, with Gujarat, Orissa, Tamil Nadu and Kerala recording the lowest levels. With regard to pregnant women and lactating mothers the median is below the RDA in seven States, the scenario for pregnant women being the worst in Kerala and West Bengal and for lactating mothers, in Tamil Nadu, Madhya Pradesh and Maharashtra.

2.2.2 The NNMB data being partial in coverage (leaving out many States where the hunger situation might be worse) and being State level data, these are not particularly helpful in identifying hunger hotspots in the country. Another source of data on food intakes and energy levels is the India Nutrition Profile (INP), last published by the Women and Child Development Department of the GOI in 1998. This also has the limitation of partial coverage, in that it is confined to a few States. However, it has the merit of providing district level data. Since it is unlikely that dramatic changes for the better would have occurred in respect of nutrition between 1998 and now, one may also use the INP data to throw light on some hunger hotspots in the country. Using INP 1998 data, the attached tables 2 – 4 in Annexure 2.1 provide a list of the districts of the States of Assam, Bihar, Haryana, Punjab and Rajasthan, which report a mean level of the relevant variable (intake of cereals and pulses in grams per consumption unit per day, energy level in kilocalories per consumption unit per day) below the RDA specified by the ICMR. It can be seen that the situation is especially serious in terms of the intake levels of pulses.

[1] The median value is that value below which half the population lies. In other words, the implication is that more than half the population in each of the concerned age groups in the States mentioned, has an intake below the RDA.

2.2.3 The above findings are forebodings of serious consequence for the future physical and intellectual capital of India and need to be heeded posthaste. The consequences of child under-nutrition for morbidity and mortality are enormous. Child malnutrition is responsible for 22 percent of the country's burden of disease. The minimal loss to GDP due to Vitamin and Mineral Deficiency (VMD) malnutrition per year is reportedly Rs. 27,720 crores[2]. In such a scenario, addressing food and nutrition security and building a sustainable food and nutrition security system have to be flagged as urgent tasks for sustained economic progress.

2.3 Food and Nutrition Security

2.3.1 The concept of food and nutrition security implies that -

i) every individual has the *physical, economic, social and environmental access* to a balanced diet that includes the necessary macro- and micro-nutrients, safe drinking water, sanitation, environmental hygiene, primary health care and education so as to lead a healthy and productive life.

ii) food originates from efficient and *environmentally benign production technologies* that conserve and enhance the natural resource base of crops, farm animals, forestry, inland and marine fisheries. (Science Academies Summit, MSSRF, 1996)

2.3.2 This comprehensive definition of food and nutrition security provides guidelines for developing an effective operational strategy for achieving the goal of freedom from hunger.

2.3.3 Hunger has three major dimensions:

i) Chronic or endemic hunger resulting from poverty-induced undernutrition.

ii) Hidden hunger arising from micro-nutrient malnutrition, caused by the deficiencies of iron, iodine, zinc and vitamins in the diet.

[2] http://wcd.nic.in/statewcd, presentation of Dr Saraswati Bulusu, Micronutrient Initiative India, April 2006

iii) Transient hunger caused by seasonal fluctuations in food availability and disruptions in communication and transport arising from **natural or manmade disasters**.

2.3.4 A sustainable national food and nutrition security system should cover all these three categories of hunger. It must also address the three issues of availability, access and absorption.

i) *Availability* of food at the household level depends upon (a) food production, and the operation of a resource-poor consumer-friendly Public Distribution System (PDS) operated with homegrown foodgrain stocks and or imports.

ii) *Access* to food depends on livelihoods / purchasing power.

iii) *Absorption* of food is influenced by access to clean drinking water, environmental hygiene and primary healthcare.

In recent years, there is cause for concern on all the three counts of food availability, food access and food absorption.

2.3.5 Food Availability

2.3.5.1 In the nineties, foodgrain growth rate has slowed down drastically to 1.7% and has fallen below the population growth rate of 1.9 %, so that per head annual net foodgrains output has fallen by about 3.5 kg from a peak of 180 kg. in the three years ending in 1994-95 to, 176.5 kg. by the three-year period ending in 2000-01. (Utsa Patnaik, www.macroscan.org, August, 2002). The situation has not improved significantly since then.

2.3.5.2 The decline in per capita net availability of cereals and pulses over the last 15 years (from 510 grams per capita a day in 1991 to 463 gms in 2004) has been unprecedented. Estimate of requirement of cereals in 2020, range from 224 million tonnes to 296 million tonnes[3]

[3] Bhalla, G S, P Hazell and J Kerr (1999), Prospects for India's Cereal Supply and Demand to 2020, IFPRI Discussion Paper 29, Washington DC, USA

2.3.5.3 The High level Committee on Long Term Grain Policy, 2004[4], arrived at a projection of 260 million tonnes, i.e. production will have to increase by 69 million tonnes from the present level of 191 million tonnes, i.e. doubling of the current rate of production. **The decline in per capita foodgrain availability and its unequal distribution have serious implications for food security in both rural and urban areas.**

2.3.5.4 In 1999-00, the *average* calorie consumption of a consumption unit in urban areas was 2637 kcal/day, not much higher than the norm of 2100 kcal/day, set for an urban adult. It is especially important to note that while there are visible signs of an enormous increase in conspicuous consumption by the urban rich, there are also signs of increasing inequality in urban areas - in 1999-00, the bottom 10 percent of urban population obtained on the average only 1890 kcal/ day. That is, nearly 28 million people in urban areas have unacceptably low levels of calorie consumption. (Food Insecurity Atlas of Urban India, MSSRF-WFP, 2002)

2.3.5.5 The Planning Commission had earlier estimated the proportion of population below the poverty line at 27.09 percent in rural areas and 23.62 percent in urban areas in 1999-2000. However, these highly contested estimates now stand revised. The Draft Approach Paper for the 11th Plan notes that the proportion of households below the poverty line was as high as 28% in 2004-05 as per the most recent NSS full sample round. This is close to 300 million persons. The problem at hand is therefore of enormous dimensions. Besides, there are regional variations as well in the incidence of poverty. Across the nation, the poorest States are Orissa, followed by Bihar, Madhya Pradesh and Assam.

2.3.5.6 Though official data on poverty suggest a reduction in the percentage of population below the poverty line, there is reason for presuming that the incidence of hunger is increasing. Data on nutritional intakes suggest that income poverty is increasingly divorced from the calorie norm of 2400 kcal per consumption unit per day underlying the original official definition of poverty line. The data show that the

[4] Abhijit Sen Committee

percentage of population consuming diets providing less than 2400 kcal per capita per day is much higher now than the percentage below poverty line as estimated by the Planning Commission. Recent work by Professor V S Vyas[5] suggests that in as many as eight major States, the proportion of the rural population accessing less than 1800 kcal/day (the level below which malnutrition can cause irreversible damage) exceeds 30 percent. This is indeed cause for concern.

2.3.5.7 **Farmers as Consumers**: An important feature of the Indian situation in the area of nutrition security at the level of each individual is that the producers of agricultural commodities i.e., farm men and women, constitute the majority of the population. Hence, the nutrition security of farmer-consumers becomes important to achieve the goal of hunger-free India. As mentioned earlier, in 1999-2000, almost 77% of the rural population consumed less than the poverty line calorie requirement of 2400 calories. Low productivity and income appear to be the single most important cause of endemic under- and malnutrition among farmer-consumers.

2.3.6 Food Access

2.3.6.1 Access to foodgrains is related to the purchasing power of the population and the nature of public distribution system that is prevalent. Purchasing power of large sections of the rural population has been weakened in recent years by the crisis in agriculture and rural livelihoods. In urban areas, the weakening of the PDS has exacerbated the problem of food insecurity.

2.3.6.2 **Rural Food Insecurity**

i) Several studies have shown that the poverty is concentrated and food deprivation is acute in predominantly rural areas with limited resources such as rain-fed agricultural areas. Agricultural labour and migrant labour are susceptible to hunger. In India, of the 310.7 million rural workers, 103.12 million are agricultural labourers. Of these, about 48.37 million are females. Female agricultural labourers are especially vulnerable to food insecurity on account of lower wages as well as the

[5] Vyas V S, Moonis Raza Memorial Lecture, New Delhi, April 4, 2005

effects of migration. One-third of the rural work force is dependent on casual employment. This segment faces uncertainties of wage and work and is highly susceptible to food deprivation.

ii) About 40.14 percent of the rural workers are cultivators. Of the total 124.68 million cultivators, about 40.64 million cultivators are women with inadequate resources and credit facilities. In hilly areas and rain-fed under developed areas, often there are more female cultivators than male cultivators. Besides rural agricultural and non-agricultural labourers, small and marginal farmers also face food insecurity. Not only do they not get remunerative prices for their produce, they are also affected by the rise in retail/PDS foodgrain prices, being net buyers of grain. Input costs are constantly going up, while output price does not show commensurate rise[6].

2.3.6.3 **Urban Food Insecurity**

i) It is often presumed that, since urban areas are covered by the PDS, food security is not a major issue in urban areas. This is not true. During the 1990s, the PDS has been weakened, both by repeated increases in the issue prices of foodgrains and by the switch to a system of targeted PDS. Studies show that the bottom 10% of the urban population is not really helped by the prevalent system of PDS for accessing foodgrains. In 1999-00, average cereal consumption of bottom 10% of urban population was 9.55 kg/month in urban India. Of this, less than one kg/month was accessed from PDS (Food Insecurity Atlas of Urban India, MSSRF-WFP 2002).

ii) This brings out the need to have a system of PDS that is flexible so as to ensure larger coverage. **People should be able to access grains from PDS whenever they want, wherever they want and in any quantity they want, subject to a few ground rules to prevent purchase for hoarding and subsequent sale at high prices.** That is, flexibility with regard to time, place and quantity of purchase needs to be fitted in to the PDS. Accessing subsidized foodgrains is absolutely essential not only for the settled urban poor but also for the migrant population from villages.

[6] See Annexure 2.2

iii) As for purchasing power, the quality and quantum of employment of the population determine their income earning ability and therefore their ability to purchase foodgrains in the market. Casual employment normally fetches an income that is low and irregular; regular employment on a decent wage ensures a relatively better access to food. In 1999-00, in urban India only 4 out of every 10 workers belonged to the regular wage category; among the bottom 10 percent of urban population, nearly 4 out of 10 persons are casual labourers. The nature of the employment problem varies across different size classes of towns. Proportion of casual labour among males as well as females is much higher in small towns compared to the metropolitan cities or big towns. Similarly, the proportion of workers in regular employment is much lower in small towns compared to bigger towns. (Food Insecurity Atlas of Urban India, MSSRF-WFP, 2002)

iv) Given the magnitude of the employment problem in urban India, particularly in the small towns, there is a strong case for a **National Urban Employment Guarantee Programme, as part of the New Deal for Urban Areas. Such an Employment Guarantee Programme could be used for activities like sanitation, pollution control, tree planting and protection, energy generation from wastes and compost making.**

2.3.7 Food Absorption

2.3.7.1 Biological absorption of food in the body is related to the consumption of clean drinking water as well as environmental hygiene. The situation on this front is serious in India. For instance, in urban areas –

i) Slums that have inadequate facilities of sanitation and drinking water provide shelter to nearly 22 % of urban population in the country. In the early nineties, one third of slums did not have any drinking water facility and nearly half the slums did not have toilet facilities.

ii) Access to basic amenities - safe drinking water, toilets, electricity, are much lower for households living in small towns.

iii) In 1998-99, 15.4 % of children were severely stunted and 11.6 % were severely underweight.

iv) While there are wide variations in the nature and extent of the problem of food insecurity across urban areas, small towns are especially vulnerable.

v) Diseases like HIV/AIDS, Tuberculosis and Malaria are spreading

2.3.7.2 A National Food Security System should therefore give concurrent attention to the landless poor in villages and to casual and migrant labour families in urban areas.

2.4 Hunger-Free India: Components of Action Plan

A six-point Action Plan is suggested below for achieving the goal of Hunger-Free India.

2.4.1 Reform of the Delivery System:

2.4.1.1 The overall approach should be life cycle based and involve appropriate supplementation programmes. The delivery systems relating to all nutrition support programmes must be restructured on **a lifecycle basis**, starting with pregnant women and 0-2 infants and ending with old and infirm persons. An illustrative list of the programmes, which will benefit from a lifecycle based delivery system, is given in the Table below. Elected Panchayats and local bodies should be involved in restructuring the delivery system. All these programmes should be implemented throughout the country.

Table 1: Current Status of Interventions

S.No	Stage of Lifecycle	Intervention / Action
1.	Pregnant Mothers	Food for Nutrition to avoid maternal and foetal mal- and under- nutrition resulting in LBW children
2.	Nursing Mothers	Support needed for breast feeding, for at least six months
3.	Infants (0-2 years)	Not being reached by ICDS
4.	Pre-School Children (2-6 years)	Integrated Child Development Services
5.	Youth going to School (6-14 years)	Noon Meal Programme
6.	Youth out of School	Not being attended to
7.	Adults (18-60 years)	Food for Eco-Development (Sampoorn Gramin Rozgar Yojana), PDS, TPDS, Antyodaya Anna Yojana, Employment programmes under the REGA
8.	Old & Infirm Persons	Annapoorna and Food for Nutrition Programmes
9.	Emergencies	Food during natural calamities

2.4.1.2 With regard to the PDS, it is high time we went back from the TPDS to a universal PDS with uniform prices. The allocation per household in the PDS should be based on the number of consumption units in the household. The cost implications of universalizing the PDS are given in the box below.

Box I

IS UNIVERSAL PDS ECONOMICALLY FEASIBLE ?

1. Let us assume that the PDS is made universal in the sense of reaching around 80 per cent of our population who are either malnourished or at the risk of malnutrition, that is, food insecure. The PDS should only exclude (if necessary by self selection or voluntarily) the richest 20 per cent of our population. So the target group is about 800 million persons.
2. Let us assume that 80 per cent of the population is given the present BPL allocation and price, that is, 35 kg of grain at the subsidized price of Rs 4.15 for wheat and Rs 5.65 for rice
3. If the economic cost is Rs 1286 per quintal of rice and Rs 983 per quintal of wheat (estimates for 2005-06 in the Economic Survey), then the unit subsidy is Rs 7.21 per kg of rice and Rs 5.68 per kg of wheat.
4. If 800 million persons are to be included, it can be assumed to be 160 million families (average of 5 persons per family).
5. So, first, the grain requirement for the PDS will be 160 million times 35 kg (ceiling) or 56 million tones. In 2005-06, the PDS offtake was 49.7 million tonnes (including Antyodaya), so this is quite feasible. (In 2004-05, the offtake was 30 million tonnes).
6. The cost of the food subsidy, assuming all the grain is distributed at the same price will be

For 30 million tonnes of wheat	Rs. 17,040 crores
For 26 million tonnes of rice	Rs. 18,746 crores
Total	Rs. 35,876 crores

The above estimates of a grain requirement of 56 million tonnes and a subsidy of Rs 35,000 crores is an overestimate since all 160 million households are unlikely to purchase 35 kg of grain a month.

Further, the total subsidy works out to just a little over 1 per cent of GDP. If the tax to GDP ratio, which has fallen since 1991, can be raised by 1 percentage point, then this can be easily financed. This expenditure will be more than compensated by the rise in national income arising from higher productivity as a result of eliminating endemic hunger and malnutrition.

Source: Dr. Madhura Swaminathan, ISI Kolkata

2.4.1.3 Besides foodgrain, other essential commodities such as pulses, edible oil, cloth, salt and other essential items of daily consumption should also be distributed by the PDS. This will also help ensure the viability of the PDS outlet. Ration shops should be strengthened and made viable through the provision of appropriate margins or subsidies. To ensure effective utilisation of the PDS by the public, the PDS outlets must remain open on all days. Further, the public must be free to draw their allocations on a weekly basis. Migrants should be able to access PDS allocations in the area where they work.

2.4.1.4 The centralisation that took place under the TPDS should be reversed and State governments should, in the first instance, have the right to determine the required allocation under PDS for their State. PRIs may also be actively involved in the monitoring of the PDS. Women SHGS supported by micro-credit could operate the PDS, wherever possible.

2.4.2 Community Food Security Systems

2.4.2.1 While a universal PDS and appropriate supplementary programmes funded by the government are critical to ensuring food security, there is also an important role for community based food security systems, such as **Community Foodgrain Banks (CFB)**. Community food security systems appear especially relevant in socially cohesive communities characterised by limited income inequality and in locations, which find it difficult to access other delivery mechanisms such as PDS. To ensure sustainability, such initiatives may work closely with elected local bodies. Policy must promote the establishment of **Community Grain and Water Banks**, involving Panchayats and other local bodies. This programme should be based on the principle "**store grain and water everywhere**".

2.4.2.2 The Community Grain / Food Bank system will help to widen the food security base by including a wide range of millets, grain legumes and tubers. **While these can be operated by the nearly 240,000 Panchayats and Urban Local Bodies in the country, using flexible implementation mechanisms suited to local needs, the programme should financially supported and regulated by the State to ensure social**

inclusion and sustainability. The steps involved in setting up and operating CFBs has been described in detail in Chapter II of the Second Report of the NCF (NCF Second Report, August 2005).

2.4.2.3 There is an urgent need to promote the growth of **community water security systems** based on a 5-pronged strategy consisting of:

i) Augment supplies through mandatory water harvesting and conservation

ii) Give attention to demand management by eliminating all sources of unsustainable use of water and promoting "more crop and income per drop" methodologies of crop cultivation

iii) Harness new technologies relating to improving domestic water use efficiency, de-salination of sea water, breeding of drought and salinity tolerant crop varieties, bioremediation, etc.

iv) To begin with, each district in the country could develop a sustainable water security system. Community action should however start at the village level.

v) Promote seawater farming through integrated agro-forestry and aquaculture production systems in coastal areas.

vi) Pay attention to water quality. The quality of drinking water is deteriorating due to pesticide and bacterial contamination in ground water. Equal attention should be paid to the improvement of drinking water quality and the augmentation of water supplies. Bioremediation techniques will have to be used for removing arsenic and heavy metals from tube well water.

2.4.3 Eradication of hidden hunger

2.4.3.1 Hidden hunger caused by micronutrient deficiencies must be addressed based on natural food cum food fortification approaches. For example, salt fortified with iron, iodine, minerals and vitamins, coupled with the consumption of beta-carotene rich sweet potato or vegetables will be very helpful to fight hidden hunger. Local SHGs can be trained to make nutritious biscuits as an income earning activity. Nutritional literacy should be promoted at the school level. High priority should go to the elimination of iron deficiency anaemia among pregnant women. The following basic recommendations are made in this regard:

- Food security is a prerequisite for nutrition security. Hence steps taken for mitigation of micro nutrient malnutrition should also simultaneously address Protein Energy malnutrition.

- While food and nutrition insecurity need to be addressed at all stages of life cycle, certain groups such as pregnant and lactating mothers, adolescents and children under three years of age need to be given special attention because of their physiological needs.

- Food and nutrition security needs to be addressed through integrated complementary strategies, namely dietary diversification, supplementation, food fortification and community and public health measures, along the following lines:

  - *Enlarging the Food Basket* – Many millets and other underutilized crops like tubers are rich in micro-nutrients as can be seen in table 2.2 below. They should hence be included in the PDS.

Table 2.2 Comparative Nutritive Value of Millets and other Staple Grains

Grain	Energy K Cal	Fiber %	Mineral mg	Ca mg	P mg	Iron mg
Rice	345	0.2	0.6	10	160	0.7
Wheat	346	1.2	1.5	41	306	5.3
Maize	342	2.7	1.5	10	348	2.3
Finger millet	328	3.6	2.7	344	283	3.9
Foxtail millet	331	8.0	3.3	31	290	2.8
Little millet	341	7.6	1.5	17	220	9.3

Compared to Rice:
Ragi is > 34x (times) in Calcium, 5x in Iron, 2x in Phosphorus, 2x minerals
Little millet is 12x in Iron, 1.5x in Calcium and Phosphorus
Foxtail millet is 5x in Minerals, 3x in Calcium, 4x in Iron

- *Dietary diversification* – increased availability of fruits and vegetables through horticulture interventions.

- *Supplementation* – rather than neglecting / abandoning the programmes that are poorly functioning, (such as iron and folic acid supplementation) we need to strengthen them systematically.

- *Food Fortification* – Iodine supplementation through iodized salt should be strengthened to ensure universal availability and accessibility and should be channelized through PDS, MDM and ICDS. Staple food should be given priority for fortification.

-*Community and public health measures* - Since nutritional security is influenced by healthcare, safe water and sanitation, these must be ensured through adequate public health measures.

- *Special attention to pandemics like HIV/AIDS* – There are indications that the incidence of HIV/AIDS and tuberculosis is increasing in rural India. The supply of free drugs should be extended to villages in order to contain the spread

2.4.3.2 The quality of service delivery needs to be improved. The ICDS is a very critical intervention programme and the *anganwadi* worker plays a key role in the convergence of services for the mother and the child under six years of age. She should be recognized as a regular full time employee with specific skills and her remuneration should be revised accordingly.

2.4.4 New Deal for the Self-employed

2.4.4.1 Between 1993-94 and 2004, the current daily status unemployment rate rose from 5.6% to 9.0% for rural males and from 5.6% to 9.3% for rural females. The corresponding urban increases were from 6.7% to 8.1% for males and 10.5% to 11.7% for females.

2.4.4.2 Rural employment grew at 0.67% and agricultural employment at 0.02% between 1993-94 and 1999-2000. According to the 55th round of survey of NSSO, the share of self-employed in 1999-2000 was about 53%. Of the self-employed, 58% (133 to 134 million) were in the primary sector, i.e., agriculture and allied activities.

2.4.4.3 Detailed analysis of the causes of food insecurity in rural and urban India have revealed that inadequate purchasing power due to lack of job/livelihood opportunities is now the primary cause of endemic or chronic hunger in the country. Since opportunities for employment in the organized sector are dwindling, we have to create a policy environment that enlarges opportunities for remunerative self-employment in rural India in order to avoid an era of jobless, or worse, job-loss economic growth.

2.4.4.4 It follows from our brief review of the employment scenario during the period of economic reforms that the policies of indiscriminate liberalisation, privatisation and globalisation, which, have contributed a great deal to the rural and agrarian crisis, should be reversed. The economic policies should be reoriented to provide adequate support for India's agriculture and its vast rural population. In particular, policies must provide

adequate rural infrastructure and promote employment, besides ensuring credit facilities and remunerative prices for produce for our farmers.

2.4.4.5 The unfinished agenda of land reforms must be completed including, distribution of ceiling surplus land and attention to common property resources such as public land and water. There should be substantial increase in public investment in agriculture-related infrastructure such as irrigation and drainage, land development, water conservation, development of road connectivity etc. Such investments are specially needed in the poorer and low rainfall areas of the country.

2.4.4.6 Substantial investments need to be made in health and education especially for the rural population. This, along with reversal of macroeconomic policies so as to enhance aggregate demand, will enhance the prospects of the growth of rural employment.

2.4.4.7 Agriculture, comprising crop and animal husbandry, fisheries, forestry and agro-forestry and agro-processing, is the largest private sector industry in India, providing livelihood opportunities for over 600 million women and men. There is need to intensify efforts to create more opportunities for gainful livelihood opportunities in both the farm and non-farm sectors. According to FAO, malnutrition is high in areas where a very high percentage of population depends solely on agriculture for their livelihood. One reason for the high prevalence of hunger in villages is inadequate growth in opportunities for remunerative non-farm employment.

2.4.4.8 The menu of income earning opportunities for the self-employed needs to be enlarged. This calls for a paradigm shift from **micro finance to livelihood finance. Micro-credit Banks should be developed into Sustainable Livelihood Banks (SLB), through backward linkages to technology and credit and forward linkages with management and market.** NCF had recommended in its first report that all the existing Krishi Vigyan Kendras (KVKs) should be provided with a post-harvest technology wing. In addition, there is an urgent need for at least **50 SHG capacity building and mentoring centers** in every State, to enhance the management and marketing capacities of members of the SHGs. Such centers can be established in existing institutions like

Agricultural, Rural and Womens' Universities, IITs, institutions operated by NGOs, etc. Village Knowledge Centres can provide SHGs with e-commerce facilities. Accounting software will have to be introduced. SHGs will be sustainable in the longer term only if they have backward linkages with technology and credit, and forward linkages with management and marketing. Sustainable Self-help Groups (SSHGs) will emerge only if we build the capacity of the key members (both women and men of SHGs). **The SHG Capacity Building and Mentoring Centres** may be financially supported by the Union Ministry for Rural Development. This should be an essential component of ***the New Deal for the Self-employed.***

2.4.4.9 Regarding the livestock sector, there is a need for establishing a **Livestock Feed and Fodder Corporation** to assist communities, including SHGs, to produce good quality animal feeds. These may also develop into bodies, which provide seeds and planting material of improved varieties for local production. The production can be sourced and supplied by decentralized Community Feed and Fodder Banks. At present, such banks which are of great use during calamities like drought, are generally not accessed during normal season when green fodder is available in plenty, making their operation non-viable. This can be avoided by linking their operation with complete feed production units at the village level managed by veterinary graduates that will also provide local employment. The feed units should source inferior quality biomass such as dried grass from forests or agricultural by-products like paddy straw, sugarcane bagasse and mix them with concentrate and feed additives to enrich the nutritive value and compact into bricks or blocks. Special feed can be prepared for different categories of animals, growing and milching animals, dairy sector etc, depending on the local demand. Such village level complete feed production units are in vogue in Israel and can be a boon for the landless in our country to access quality fodder. The unsold fodder from the Feed and Fodder Banks can be converted into complete feed for supplying to needy farmers not only in the locality but also other areas including peri-urban areas where large numbers of landless maintain livestock. The Banks can also have linkages with procurement agencies and district administration for supplying surplus feed to needy agencies.

2.4.4.10 Agri-clinics operated by veterinary and farm science graduates can help enhance the income of dairy farmers through higher productivity. This can also help improve the nutritional value of the food basket of our population.

2.4.5 Enhancing the Productivity and Profitability of Small Holdings

2.4.5.1 Nearly 80% of the land holdings in India are below 2 ha in size. Unlike in industrialized countries where only 2 to 4% of the population depends upon farming for their work and income security, agriculture is the backbone of the livelihood security system for 2/3 of India's population. **Therefore, farmers constitute the largest proportion of consumers**. The smaller the farm, the greater is the need for marketable surplus in order to get cash income. **Hence, improving small farm productivity, as a single development strategy, can make the greatest contribution to the elimination of hunger and poverty**.

2.4.5.2 Indian soils are both hungry and thirsty. Hence, soil health enhancement and irrigation water supply and management hold the key to the enhancement of small farm productivity. The following steps are urgently needed:

i) National network of advanced **soil testing laboratories** with facilities for the detection of micronutrient deficiencies. **As a single agronomic intervention, supply of the needed micronutrients in the soil has the greatest impact on increasing yield.** Hidden hunger is as widespread in soils as in human beings. In fact, the two have causal relationships.

ii) Million Wells Recharge Programme

iii) Restoring water bodies and promoting mandatory water harvesting.

iv) Establishment of 50,000 Farm Schools to promote farmer-to-farmer learning.

v) Organisation of Small Farmers' Horticulture, Cotton, Poultry, aquaculture and other Estates, to promote group farming and to confer the power of scale to small producers both at the production and post-harvest phases of farming.

2.4.5.3 Farming is becoming a gamble both in the monsoon and the market. Hence small farmers urgently need **proactive advice** on land and water use. Land use decisions are also water use decisions. For this purpose, State Land Use Boards should be restructured, retooled and reactivated on the lines indicated in Fig 1. *This is a task of the utmost priority.*

2.4.5.4 The *Every Village a Knowledge Centre or Gyan Chaupal* movement can help to give farmers dynamic advice on meteorological, management and marketing factors.

2.4.5.5 We suggest that the following areas may receive priority in technology support:

i) Short and medium term weather forecasting, in order to assist Land Use Advisory Boards to give proactive advice to farmers on crop and varietal choice.

ii) Rapid and low cost soil testing technologies based on nanotechnology. This will enable the application of need based macro- and micro- nutrients. Factor productivity in relation to fertilizer application is low now and this enhances the cost of production. The average fertilizer response of foodgrain output to NPK utilization works out to 7.8 kg grain per kg of NPK. This is a very low return.

2.4.5.6 Unless factor productivity is increased, small farm agriculture will become un-remunerative. This is one of the causes for a high percentage of farmers wanting to quit farming. We must recognize the need for increasing the productivity and profitability of small and marginal farms, in order to eliminate endemic and hidden hunger in the families such farmers. The following specific recommendations are made in this regard:

- Step-up public investment in irrigation and rural infrastructure and provide other forms of State support including credit and post-harvest storage and processing

- Provide credit on reasonable terms; accept NCF recommendation of 4 per cent interest rate on agriculture loans. Target credit to the marginal, small, and medium farmers and adopt an integrated credit cycle approach.

- Strengthen the S&T and R&D systems in agriculture to generate and disseminate small farmer friendly technologies, including with respect to seeds, other inputs, water harvesting and machinery, using the KVKs, VKCs etc…

- Ensure the availability of quality inputs at reasonable prices, by putting in place an appropriate regulating system and strengthening extension.

- Expand the MSP system, based on the cost of production including reasonable rate of return on investment and ensuring a prompt and open-ended purchase for all major crops.

- Cover small farmers adequately through effective crop insurance schemes using the revenue village as the unit.

- Encourage research on technology for dry-land farming and make these technologies available to small and marginal farmers. **The recently established National Rain fed Authority can have as its sole mandate the launching of a second green revolution in dry farming areas beginning with pulses and oilseeds.**

- Promote water security through sustainable water use and rainwater harvesting.

2.4.6 Designing and introducing a Food Guarantee Act

2.4.6.1 We have over a century of experience in organizing relief work, under the provisions of the Famine Code in the colonial period, and Food for Work programmes in the post-independence period. It is clear that our agriculture has reached a stage when farmers will grow more only if we can consume more. **A National Food Guarantee Act**, combining the features of the Food for Work and Employment Guarantee Programmes, will represent a win-win situation both for producers and consumers. Following up on the NREGA and recognising that the right to food and the right to livelihood are intimately related, we need to move towards a comprehensive "Food Guarantee Act".

2.4.6.2 **A National Food Guarantee Act** should lead to a decentralized network of grain storage structures and thereby help to prevent panic purchase of foodgrains during periods of drought or flood. They will also help to prevent distress sales by producers at the time of harvest. In addition, it will help to enlarge the composition of the food security basket.

2.4.6.3 Brazil, Kenya and a few other countries have announced, "Zero Hunger" programmes. **India can take the lead to give meaning and content to the zero hunger concept, by developing a National Food Guarantee Act.**

2.4.6.4 The major features of a National Food Guarantee Act were discussed at a Consultation held at the M S Swaminathan Research Foundation (MSSRF), Chennai, on 19 June 2005. The participants made the following suggestions:

- The main aim of the proposed legislation should be to integrate the features of Employment Guarantee Acts (National and Maharashtra) and Food for Work Programmes, in order to ensure that every child, woman and man has physical, economic, social and environmental access to balanced diet, clean drinking water and primary health care. This is fundamental to providing every individual in the country an opportunity for a healthy and productive life. Rural and urban populations as well as migratory labour families will have to be covered. Social inclusion should be the bottom line.
- The National Food Guarantee Act should be gender sensitive. The concept of "work" should be enlarged to cover also skilled work related to human and social development, such as, for example, establishing and running crèches, balwadis, preparing noon meals, etc.
- Payment of a part of the wage in the form of foodgrains has the double advantage of helping farmers in the area of marketing, and consumers in the form of obtaining their basic caloric requirements in the form of good quality foodgrains at a reasonable price. This will also help to enlarge the composition of the food security basket.
- Food guarantee can become a reality only if there is an implementation mechanism characterized by low transaction cost, transparency and freedom from corruption. The Gram Panchayats / elected local bodies may be able to provide such a mechanism. The Gram Panchayat / Local Body can form in the respective villages a Consortium of Agencies like SHGs, Mahila Mandals, Farmers' Clubs etc, to provide oversight to the implementation of the integrated food for work and employment guarantee approach to the

elimination of hunger and poverty. **The Panchayat can thus provide a platform for partnership at the grass root level.** However Panchayats will need the necessary legal, financial and technical empowerment. There are a large number of tasks, which are assigned by Constitution Amendment 73 to Panchayats, but they have no capacity to discharge these responsibilities since they have not been legally or financially empowered to do so. Capacity building of women and men Panchayat members in undertaking such tasks has to proceed concurrently with financial empowerment.

- Information empowerment on entitlements is vital for success. Household entitlement cards can be distributed and full use could be made of Mission 2007: Every Village a Knowledge Centre Programme. The Right to Information Act will also facilitate the process of empowering the rural poor (often illiterate) in understanding their entitlements under various pro-poor schemes of Central and State Governments.
- Training and capacity building of all concerned with the implementation of the programme is extremely important. Suitable institutions will have to be identified for imparting training to administrators, Panchayat leaders, SHGs and others who will be involved in implementing the Food Guarantee Act.
- The Act should provide scope for including feasible land reform measures like providing dalits and the poor with space for a homestead garden where the needed vegetables and fruits can be grown. SHGs can also be given space on lease in common property land for raising nutrition gardens and fodder for farm animals.
- Integration with primary health care is exceedingly important. For example, de-worming should be made compulsory atleast once in two months. Multiple fortified salts could be used in noon meal programmes in order to attack the problem of hidden hunger caused by micro nutrient malnutrition.
- The Act could stimulate a movement for storing grain and water everywhere through community food and water banks. A national network of community food banks could be established.

- Nutrition and education are fundamental to enabling every individual to experience a productive and healthy life. Therefore the enactment of a Food Guarantee Act will be the best method of ensuring that we are able to accomplish the UN Millennium Development Goals.
- Thanks to the extensive work done both within the country and outside on issues relating to "Right to Food", there is considerable legal and technical expertise available for preparing a framework for Food Guarantee. We should therefore proceed with this initiative.
- It will be appropriate to operationalise the Food Guarantee Act on August 15, 2007, which marks the 60th anniversary of India's independence.

2.4.6.5 The twin advantages of this approach will be higher food production induced by enhanced consumption and the achievement of the UN MDG relating to hunger and poverty.

2.5 Road Map for Eliminating Hunger

2.5.1 In a country with a high prevalence of poverty and malnutrition, the Government of India should always retain a commanding position in the management of the food security system. This will call for a grain purchase policy, which takes into account the changes in the cost of production, (such as a rise in diesel price), subsequent to the announcement of a Minimum Support Price (MSP). Traders will give a price above MSP when they expect that prices will shoot up with in a few months. As Prof Amartya Sen has often stressed, we should not forget the lessons of the Bengal Famine of 1942-43, where millions died out of starvation not because there was no food in the market, but because the surplus food stocks were in the hands of private merchants. **Building a sustainable food security system will require attention to both the availability of sufficient stocks and who controls them**. The global wheat stocks are down this year and the political leadership of the country should decide how to ensure the food security of 1.1 billion children, women and men in an era where much of the foodgrain stocks will be controlled by national and international grain traders and cartels. National Food Sovereignty should not be lost.

2.5.2 **While import of wheat, pulses, sugar and oilseeds may be necessary during 2006 in order to prevent an undue rise in prices, we should avoid the danger of making this a habit.** Our food budget should be managed with home grown food since agriculture is the backbone of our rural livelihood security system. **What is important is to recognize that imports of pulses and oilseeds serve as indicators of our failure to launch a green revolution in dry farming areas, in spite of having the technologies and resources to do so.** Imports of crops of importance to the income security of farm families in rainfed areas imply generating more unemployment and misery in such areas. Import/ export of pulses, oilseeds and wheat should be resorted to only when absolutely necessary.

2.5.3 Water is a critically important resource for agriculture. Increasing privatization of our food and water security systems has important implications for the food, income and work security of small and marginal farmers and agricultural labor. The WTO agreement entered into at Marrakesh in 1994 resulted in an unequal trade bargain. **The growing privatization of food and water security systems is already leading to an unequal social bargain.** We will never be able to achieve the UN Millennium Development Goal in the area of hunger and poverty elimination, if we do not insulate the farmer-consumers from unfair trade and social bargains.

2.5.4 If we are to achieve a second green revolution covering rain fed areas, **the first important requisite is opportunity for assured and remunerative marketing for dry land farm products like pulses, oilseeds, millets, vegetables, fruits, milk and meat. The decision to purchase and include ragi, bajra, jowar and other millets in PDS should be a permanent one.** This will help to enhance nutrition security on the one hand, and the productivity and economic sustainability of improved dry land agriculture, on the other. There is a large untapped reservoir of dry land farming technologies and we can see a drastic rise in the productivity and production of crops in these areas if farm families are supported by credit, insurance, a fair price and assured market for their produce

2.5.5 The six-point action plan outlined in this chapter is based on the considerations set out above. The plan recognizes that the problem of food security is both multidimensional and cuts across the rural-urban divide. Since urban food insecurity and deprivation are closely related to rural deprivation, a comprehensive rather than a sectoral approach is required. The six points in brief are:

- Reorganise the delivery of nutrition support programmes on a life-cycle basis with the participation of Panchayats and local bodies.
- Eliminate micronutrient deficiency induced hidden hunger through an integrated food cum fortification approach.
- Promote the establishment of Community Food and Water Banks operated by Women Self-help Groups, based on the principle '**Store Grain and Water everywhere'**.
- Help small and marginal farmers to improve the productivity, quality and profitability of farm enterprises and organize a Rural Non-Farm Livelihood Initiative.
- Introduce support systems to SHGs to make them economically and organizationally sustainable. Establish for this purpose SHG Capacity Building and Mentoring Centres and focus on developing Micro-Credit Banks into Sustainable Livelihood Banks.
- Formulate a **National Food Guarantee Act** continuing the useful features of the Food for Work and Employment Guarantee programmes and introduce it on 15 August, 2007, which marks the 60th anniversary of our independence. The Food Guarantee Act will be a powerful tool in achieving the goal of a hunger-free India. By increasing demand for foodgrains as a result of increased consumption by the poor, the economic conditions essential for further agricultural progress can be created.

2.5.6 Organisation is the greatest human invention of all time. Organization is the social technology through which human beings accomplish together far more than can be accomplished individually. This is why we have placed great emphasis both on PRIs and SHGs for overcoming the chronic problems of hunger and low productivity.

2.6 Assuring Income Security to Farmers through Minimum Support Price, and Food Security for the Nation through a Universal PDS

2.6.1 We have proposed a comprehensive and integrated Food and Nutrition Security System, which if accepted and implemented, will help to make hunger history. An important requisite for achieving these goals is the development of an income and work security system for small and marginal farmers and landless rural manual labour.

2.6.2 There is ample evidence in the country to show that our farm families will produce not only more foodgrains, but also horticultural and animal husbandry products provided they have opportunities for assured and remunerative marketing. Progress in the production of milk and poultry products was triggered by access to remunerative prices and markets. We therefore suggest the following operational procedure:

- Announce the MSP for a wide range of crops of importance to PDS before sowing, taking into account the recommendations of CACP.

- Fix the procurement price at the time of harvest, taking into account the prevailing market price. The procurement price will take into account the cost escalation in inputs like diesel, since the announcement of MSP.

- Since Government purchases are for ensuring a hunger-free India, issue a Smart Card or coupon which will entitle those farmers who sell their produce to PDS, purchase inputs like seeds, fertilizers, veterinary pharmaceuticals etc., at concessional prices (such as ten percent less than the market price). **This will be an appropriate recognition of the contributions of farm families who have decided to participate in the National Movement for Making Hunger History**

2.6.3 **Through the above 3-pronged strategy, both, national food security and sovereignty, as well as freedom to farmers to get the best possible price, can be achieved.** Large companies which wish to purchase essential commodities at a little

higher price than that offered by Government, in the expectation of making large projects later, can also be kept under check. We request that the above 3 principles may be considered and adopted in an appropriate manner as soon as possible

2.6.4 For ensuring food security, we should move immediately to a Universal PDS as elaborated in section 2.4.1

2.7 National Food Security and Sovereignty Board

2.7.1 Keeping inflation under check by making essential commodities available in adequate quantities and at affordable prices must be **a national** resolve rather then just the commitment of a few political parties. Food is the first among the hierarchical needs of a human being. Therefore, eradicating hunger arising from deprivation must be a national commitment and an All Party endeavor. Given the necessary fusion of political will and action, professional skill and peoples' participation, we can make speedy progress in achieving Gandhiji's goal of ensuring that the God of Bread resides in every home and hut in our country. We suggest that for providing political commitment and oversight to the "Make Hunger History Movement", **a National Food Security and Sovereignty Board** may be set up with the following composition:

- Prime Minister – Chairperson
- Union Minister for Food and Agriculture
- Union Ministers of Finance, Rural Development, Water Resources, Panchayati Raj, Commerce and Environment (other Ministers could be invited in accordance with the agenda)
- Leaders of all national political parties
- Chief Ministries of a few States representing both food deficit and food surplus States
- An eminent professional in the area of Food Security – Member Secretary

2.7.2 With the approval of the Chairperson, other Ministers from Central and State Governments and appropriate Secretaries to Government could be invited to participate in the meetings of the Board, based on agenda items

2.7.3 Such a National Food Security Board can help to keep sustainable food security and sovereignty as a **National Common Minimum Programme** (in the same manner that UN MDGs represent a global common minimum programme for Human Security).

2.7.4 While the principal terms of reference to the National Food Security and Sovereignty Board should relate to the operation of MSP and PDS and the maintenance of a food security reserve, it should also review from time to time the progress being made in achieving a 4% growth rate in foodgrain production and 8% growth rate in horticulture, animal husbandry and inland and marine fisheries. Emphasis should be on food security with home-grown food, for the reasons explained earlier. Also, the Board should provide oversight to issues such as the diversion of prime farmland for non-farm purposes, and supply augmentation and demand management with reference to irrigation water.

2.7.5 The Board may also review periodically the progress being made in ensuring adequate availability of cereals and other components for a balanced diet through the following action points suggested by NCF in its Third Report (December, 2005):

- Soil Health Enhancement
- Water harvesting, aquifer recharge, conservation and efficient use of irrigation water for achieving more income per drop of water
- Credit and insurance
- Technology (production and post-harvest), and inputs for Mixed Farming Systems (i.e., crop – livestock integrated fish production systems).
- Assured and remunerative marketing

2.7.6 India is likely to have the world's largest population by 2040 or even earlier. We also have the world's largest farm animal population, which need feed, fodder and water. The human and animal population supporting capacity has already been exceeded in many fragile ecosystems. **It will therefore be appropriate for the National Food Security cum Sovereignty Board to foster the concept that children should be born**

for happiness and not just for existence, a concept propounded by the French Mathematician Marquis de Condorcet in 1895.

2.7.7 Also, as suggested in the earlier reports of NCF, there is need for nutritional support to families affected by HIV/AIDS, Tuberculosis, Malaria and Leprosy. Mere drug-based approaches are not adequate for the poor. Therefore a food cum drug based approach should be the approach of the National Rural Health Mission

2.8 Hunger Elimination: Achieving the UN Millennium Development Goals

2.8.1 An analysis by the Union Planning Commission has indicated that we are falling behind in achieving the proportionate targets set for 2015 under the UN MDGs. In particular, we should redouble our efforts to achieve Goal No.1 relating to hunger and poverty. Many of the goals will need integrated attention. For example, MDG 3 deals with gender equity and women's empowerment. This is vital for achieving the goal of MDG 1. **Hence, a Gender Audit Procedure should be incorporated in all programmes and policies**

2.8.2 The following are some of the steps needed:

i) Agriculture plays multiple roles and is the guardian and backbone of the food, livelihood and ecological security systems. There is need for greater emphasis on integrated on-farm and non-farm livelihood opportunities, so that work and income security gets enhanced. Market driven Non-farm livelihood opportunities in rural areas are essential for achieving MDG I. **A Livelihood Impact Analysis Methodology** should be developed for adoption in our development and trade policies and programmes. Importing cheap and subsidized food from industrialized nations, rather than concentrating on helping small farm families to increase productivity and profitability may lead to greater unemployment and rural distress. **The option of food imports has to be weighed against the collapse of livelihoods of millions of small cultivators and peasants.** We should take the leadership in developing a **Livelihood Security Box** in the World Trade Agreement in relation to agriculture.

ii) Enhancement of small farm productivity holds the key to the elimination of hunger and poverty in rural areas. **Sustainable enhancement in small farm productivity and profitability should be on the top of the agenda for the 11th Plan. If agriculture goes wrong, nothing else will have a chance to go right.** Protecting and improving the production systems of farmers with small holdings should hence be accorded high priority.

iii) **There has to be a shift in emphasis from food security at an aggregate national level to nutritional security at the level of every individual. Hidden hunger** caused by the deficiency of iron, iodine, zinc and vitamin A in the diet, is widespread. As discussed earlier, a **Food cum fortification approach** will be necessary to eradicate hidden hunger related to micronutrient deficiencies. This will call for reviving dying crops and dying wisdom. The food security basket should be enlarged by including a wide range of millets, grain legumes, tubers and leafy vegetables like *Amaranthus* in the diet. Public distribution and school feeding programmes should include nutritious millets.

iv) An unacceptably high proportion of new born children are characterized by low birth weight (LBW) due to maternal and foetal under nutrition and malnutrition. Such children are handicapped even at birth in their ability to realize their innate genetic potential for mental and physical development. A **Lifecycle approach** should be adopted in nutrition support programmes, with priority going to pregnant women and infants. It is also necessary to emphasise the importance of providing support services to farm women, like crèches and daycare centres.

v) There is rightly much emphasis on mapping the 'Hunger Hot Spots' of India. Equal importance should be given to mapping the '**Agricultural Bright Spots'**, which show how to replace poverty with prosperity through agricultural progress. The factors which resulted in agricultural bright spots should be highlighted, so that the message "**we can make hunger history**" can be spread. The need for **a symphony approach** resulting in symbiotic partnerships among farm families, policy makers,

academia, agricultural experts, business and industry, and mass media, cannot be over-emphasised. Assistance should be provided for the growth and spread of **Rural Prosperity Symphonies**.

2.8.3 The economic, social and political aspects of hunger and poverty are not being recognized adequately; as a result social unrest, ethnic conflicts and resentment leading to violence are increasing. Keeping agriculture at the top of the global and national developmental agenda should be a priority item in our action plans relating to MDG 1. The global trade agenda should also be pro-small farmer. Adjustment of a mix of farm enterprises to maximize economic/market opportunity, as well as the promotion of integrated crop-livestock farming systems are important for the economic sustainability of farming. Agricultural and Rural Universities should undertake **Rural Systems Research** (RSR), designed to generate concurrent attention to on-farm and non-farm livelihoods in a holistic manner. An effective production system requires substantial knowledge of factors both within and external to the farm. This is where the mobilization of modern communication and information technologies assumes significance.

2.8.4 A self-propelling and self-replicating model of food security is the need of the hour. Through Community Food Banks, we can launch a "**Farmers' Movement for Sustainable Food Security**". This will help to promote a farmer participatory approach to building a sustainable national food security system, based on community level Gene, Seed, Water and Grain Banks. This will help to link conservation, cultivation, consumption and commerce in a mutually reinforcing manner.

2.8.5 Our response to emergencies should be designed in a manner that every calamity becomes an opportunity to strengthen the coping capacity of local communities to meet such calamities better in the future. Life saving crops like tubers should be promoted and crop live saving techniques introduced. In Tsunami affected areas, **Coastal Bioshields** consisting of mangroves, casuarinas, salicornia and other halophytic plants, should be encouraged. Emergencies are likely to increase in the future, as a result of climate change, and there has to be concerted efforts in avoidance, adaptation and mitigation strategies.

2.8.6 Biosecurity and food safety are gaining in importance. Government of India should help State Governments to increase their competence and capability in these areas. Capacity building is also important in the safe and responsible use of biotechnology as well as in the areas of organic farming, conservation agriculture and precision farming. Support to **Conservation farming** is needed, on the lines of the support being extended to their farmers by industrialized countries under the Green Box provisions of WTO.

2.8.7 **The social engineering aspects** of integrated natural resources management, integrated pest management (IPM), integrated nutrient management, etc, need to be emphasized. A purely technocratic approach will not help. Education and social mobilization are equally important. Water harvesting, aquifer recharge, and economic and efficient use of water should become everybody's business. Scaling up is needed in the case of successful projects. This is where the active involvement of PRIs will be of great help.

2.8.8 Seemingly impossible tasks can be achieved by mobilizing the power of partnerships. South-South collaboration is extremely important in this respect. India should become the hub of a **Knowledge Coalition for Sustainable Agriculture and Food Security** bringing together CGIAR, FAO, IBRD, IMF, UNDP, WHO, WTO, UNICEF, UNESCO, UPOV, WIPO and all other relevant organizations.

2.8.9 There is no time to relax and Government of India should become the main actor in bringing about convergence and synergy in the area of elimination of chronic and hidden hunger. There should also be a distinction between projects and policy, since bad policy will make even good projects fail. A critical review of earlier programmes will show what is working and what is not working and why. We should also help to resolve conflicts and contradictions among international organisations, as in the areas of Farmers' Rights and UPOV, and GMOs and WTO.

2.8.10 The UN MDGs represent a global Common Minimum Programme in the area of sustainable human well-being and security. We should therefore not fall behind in achieving these very modest but important goals.

Table 1: Calorie Intake (Kcal Per Day)

S. No.	States	1-3 year	4-6 year	7-9 year	10-12 year	10-12 year	13-15 year	13-15 year	16-17 year
		Boys & Girls	Boys & Girls	Boys & Girls	Boys	Girls	Boys	Girls	Boys
1	Andhra Pradesh	751	1153	1357	1666	1675	1897	1936	2381
2	Gujarat	651	1030	1365	1796	1710	2375	1987	2776
3	Karnataka	732	1034	1285	1599	1591	1872	1817	2051
4	Kerala	756	1065	1191	1361	1355	1614	1468	1891
5	Maharashtra	698	1060	1260	1437	1401	1694	1576	1997
6	Orissa	657	938	1220	1332	1336	1685	1564	1872
7	Tamil Nadu	690	972	1124	1260	1234	1611	1479	1938
8	West Bengal	690	998	1197	1419	1360	1814	1581	2053
9	Madhya Pradesh	805	1109	1292	1497	1483	1706	1586	1843
	RDA	**1240**	**1690**	**1950**	**2190**	**1970**	**2450**	**2060**	**2640**

S. No.	States		>=18 year	>=18 year	>=18 year	>=18 year	>=18 year	>=18 year
		16-17 year	Males	Males	F - NPNL	F - NPNL	F - Pregnant	F - Lactating
		Girls	S Workers	M Workers	S Workers	M Workers	S Workers	S Workers
1	Andhra Pradesh	1920	2075	2548	1925	2185	2096	2205
2	Gujarat	2347	2969	3087	2228	2332	2147	2557
3	Karnataka	1962	2272	2361	2057	2074	2228	2153
4	Kerala	1624	2100	2182	1755	1517	1671	1901
5	Maharashtra	1591	1856	1982	1586	1696	1778	1725
6	Orissa	1823	2033	2195	1824	1941	1870	1956
7	Tamil Nadu	1610	2088	2350	1729	1760	1758	1887
8	West Bengal	1825	2039	2355	1779	1947	1524	1925
9	Madhya Pradesh	1688	1972	2087	1773	1903	1951	1864
	RDA	**2060**	**2425**	**2875**	**1875**	**2225**	**2175**	**2425**

Source: NNMB Technical Report No. 21 - "Diet & Nutritional Status of Rural Population"
Note: *NPNL - Non-pregnant & Non-lactating, S Workers - Sedentary Workers; M Workers - Moderate Workers

Annexure 2.1

Table 2: Districts with Daily average Intake of Energy < RDA =2425 Kcal/cu/day

State	Assam	Bihar	Haryana	HP	Punjab	Rajasthan
Total No. of Districts	**22**	**50**	**16**	**10**	**12**	**31**
1	Sonitpur*	Jahanabad*	Gurgaon*	Hamipur*	Sangrur*	Dungarpur*
2	Goalpara*	Purnea*	Hisar*	Una*	Jalandhar*	Rajsamand*
3	Darrang*	Saran*	Yamuna-nagar*	Shimla*	Ferozpur*	Jaisalmer*
4	Bongaigaon*	Ranchi	Bhiwani*	Kinnaur*	Bhatinda	Banswara
5	Karimganj*	Gaya	Mahendragarh*	Bilaspur*	Faridkot	Kota
6	Kamrup*	Lohardagga	Rohtak	Solan	Kapurthala	Chittorgarh
7	Dhemaji*	Katihar	Faridabad		Hoshiarpur	Sirohi
8	Nagaon*	Bhabhua	Sonipat		Ludhiana	Udaipur
9	Barpeta*	Bokaro	Kaithal		Gurdaspur	Jaipur
10	Dibrugarh*	Gumla	Jind			Jalore
11	Lakhimpur*	Sitamarhi				Jhalawar
12	Hailakandi*	Begusarai				Jhunjhunu
13	Jorhat*	Nalanda				Nagaur
14	Sibsagar*	Gopalganj				Jodhpur
15	Golaghat*	Madhepura				Ajmer
16	Tinsukia*	Sahibganj				Alwar
17	Cachar	Jamuahi				Hanumangarh
18	Dhubri	Khagaria				Sikar
19	Marigaon	Nawada				Dholpur
20	Kokrajhar	Singhbhum (W)				
21		Hazaribagh				
22		Godda				
23		Chatra				
24		Aurangabad				
25		Munger				
26		Banka				
27		Bhagalpur				
28		Muzaffarpur				
		Deoghar				

* less than 90% of RDA

Source: India Nutrition Profile, 1998, Department of Women and Child Development

Annexure 2.1

Table 3 : Districts with Daily Average Intake of Cereals < RDA =460 g/cu/day

State	Assam	Bihar	Haryana	HP	Punjab	Rajasthan
Total No. of Districts	22	50	16	10	12	31
1	Darrang*	Banka	Hisar*	Hamipur*	Jalandhar*	Rajsamand*
2	Goalpara*	Katihar	Bhiwani*	Shimla*	Ferozpur*	Hanumangarh*
3	Bongaigaon*	Samastipur	Yamuna-nagar*	Bilaspur*	Kapurthala*	Jhunjhunu*
4	Sonitpur*	Ranchi	Gurgaon*	Una*	Sangrur*	Sirohi*
5	Karimganj*		Mahendragarh*	Kinnaur	Bhatinda*	Dungarpur*
6	Barpeta*		Rohtak*		Faridkot	Jaisalmer
7	Kamrup*		Kaithal		Gurdaspur	Kota
8	Sibsagar		Sonipat		Amritsar	Ganganagar
9	Dhemaji		Jind			Nagaur
10	Hailakandi		Karnal			Jalore
11	Nagaon		Faridabad			Alwar
12	Dibrugarh		Ambala			Udaipur
13	Jorhat					
14	Lakhimpur					

* less than 90% of RDA

Source: India Nutrition Profile, 1998, Department of Women and Child Development

Annexure 2.1

Table 4: Districts with Daily Average Intake of Pulses < RDA =40 g/cu/day

State	Assam	Bihar	Haryana	HP	Punjab	Rajasthan
Total No. of Districts	**22**	**50**	**16**	**10**	**12**	**31**
1	Goalpara*	Giridih*	Rohtak*	Kangra*	Ludhiana*	Jaipur*
2	Karimganj*	Lohardagga*	Kurukshetra*	Shimla*	Rupnagar*	Jaisalmer*
3	Bongaigaon*	Supual*	Rewari*	Mandi*	Hoshiarpur*	Tonk*
4	Dibrugarh*	Bhabhua*	Jind*		Sangrur*	Bundi*
5	Golaghat*	Saran*	Ambala*		Jalandhar*	Sikar*
6	Hailakandi*	Jamuahi*	Mahendragarh*		Faridkot*	Barmer*
7	Sonitpur*	Singhbhum (E)*	Faridabad*		Gurdaspur*	Bharatpur*
8	Dhemaji*	Ranchi*	Panipat*		Bhatinda*	Bhilwara*
9	Jorhat*	Garwah*	Sonipat*		Ferozpur*	Ajmer*
10	Darrang*	Nalanda*	Gurgaon*			Chittorgarh*
11	Dhubri*	Hazaribagh*	Bhiwani*			Dholpur*
12	Lakhimpur*	Banka*	Sirsa*			Jalore*
13	Kamrup*	Chatra*	Yamuna-nagar*			Nagaur*
14	North Cachar*	Saharsa*	Kaithal*			Jhunjhunu*
15	Kokrajhar*	Rohtas*	Karnal*			Kota*
16	Nagaon*	Dhanbad*	Hisar			Rajsamand*
17	Tinsukia*	Bokaro*				Baran*
18	Cachar*	Bhojpur*				Pali*
19	Marigaon	Gumla*				Dausa*
20		Purnea*				Alwar*
21		Begusarai*				Dungarpur*
22		Godda*				Sawai-madhopur*
23		Gaya*				Jodhpur*
24		Buxar*				Sirohi
25		Deoghar*				Hanumangarh
26		Katihar*				Jhalawar
27		Nawada*				
28		Aurangabad*				
29		Darbhanga				
30		Gopalganj				
31		Champaran (W)				
32		Champaran (E)				
33		Jahanabad				
34		Sitamarhi				
35		Samastipur				

* less than 90% of RDA

Source: India Nutrition Profile, 1998, Department of Women and Child Development

Annexure 2.2[1]

MSP and the Cost of Production

An examination of the projections of cost of cultivation for 12 foodgrain crops[2] given by the Commission for Agricultural Costs and Prices (CACP) for the crop season 2005-06 with the MSP prevailing in 2004-05 clearly shows that C2 cost (cost of production per quintal) is not covered by the MSP in most States for the 12 crops. The data for paddy and wheat is given in Tables below. The data shows that only in four of the 12 major States producing paddy in the country, C2 is lower than the MSP and in the case of wheat it is lower than MSP in all the seven producing States except Madhya Pradesh.

Table No.1: Projected Cost of production - Paddy crop (Rs./Qtl) 2005-2006

S.No.	States	A2+FL/Qtl	C2/Qtl	MSP (2004-05)/Qtl	Return/Qtl. Over A2+FL	Return/Qtl over C2
1	AP	399	578	560	161	-18
2	Assam	436	564	560	124	-4
3	Bihar	365	512	560	195	48
4	Haryana	478	685	560	82	-125
5	Karnataka	456	602	560	104	-42
6	Kerala	633	765	560	-73	-205
7	MP	495	682	560	65	-122
8	Orissa	426	558	560	134	2
9	Punjab	324	481	560	236	79
10	Tamil Nadu	426	620	560	134	-60
11	Uttar Pradesh	371	511	560	189	49
12	West Bengal	445	573	560	115	-13

Table No.2: Projected Cost of production - Wheat crop (Rs./Qtl) 2005-2006

S.No.	States	A2+FL/Qtl	C2/Qtl	MSP (2004-05)/Qtl	Return/Qtl over A2+FL	Return/Qtl over C2
1	Bihar	442	612	640	198	-28
2	Gujarat	468	617	640	172	-23
3	Haryana	338	516	640	302	-124
4	MP	431	656	640	209	16
5	Punjab	319	516	640	321	-124
6	Rajasthan	376	525	640	264	-115
7	Uttar Pradesh	359	528	640	281	-112

Source: Department of Agriculture and Co-operation, Ministry of Agriculture, GOI-"Reports of The Commission for Agricultural Costs and Prices"- 2005-2006

[1] Based on paper prepared by Dr. S. Vepa, MSSRF, 2006

[2] Paddy, wheat, jowar, bajra, maize, ragi, arhar, moong, urad, barley, gram and lentil

CHAPTER 3

ECONOMIC ACCESS TO FOOD –

IMPROVING LIVELIHOOD OPPORTUNITIES AND INCOMES

3.1 Introduction

3.1.1 The rapid growth of population in India, particularly in the second half of the twentieth century posed threat to national food security. The threat reached dangerous proportion in the mid sixties when grain shipments from abroad were eagerly awaited for feeding the population. The situation was untenable and eventually led to launching of the Green Revolution, achievement of self sufficiency in food grains and a growing stock of surplus food grains by the mid seventies. Happily such a threat does not exist any more. Food security has been attained at macro level in the country. However, there was another problem; while large quantities of food grains had accumulated in public stocks, nearly one fifth of our population was underfed according to minimum calorific requirement for a healthy and active life. Nearly 46% of all Indian children under five years age were malnourished[1]. This was in stark contrast to the fact that the country had exported food grain with large subsidies. While national level food security [availability of food at macro level] is achieved, at the household level there are serious problems and the situation is quite alarming. It would be recalled that a contrasting problem for a long time was the rising financial and other costs to the State in terms of storage, interest charges, maintenance, quality and value deterioration etc. of the rising food grain stocks and the existence of hunger and malnourishment of the people at the same time.

3.1.2 **Food security at the household level is primarily determined by availability of food and the ability of the household to access food. It is intrinsically linked with the source of livelihood and the nature of the public distribution system that is prevalent. The poor have to either be able to grow enough food or must have enough money to be able to buy food. The former would depend on the quality and quantum of land available to the poor and the infrastructure, credit, market intelligence and linkages etc., while the later, in a**

[1] United Nation's Human Development Report [2003]

situation where the poor have little or no land, is linked with the availability of livelihood opportunities and the pubic distribution system.

3.1.3 Historically, poor households in India relied on traditional, family and community-based mechanisms of social protection to cope with deprivation. The traditional social security system in India was built into family, caste and socio-religious traditions under which food security to a certain extent was provided to the very poor, the service providers etc by the landlords and richer people and also the institutional feeding in Temples/Gurudwaras from the incomes including offerings etc. The kin networking was strong and the disadvantaged members of the community, the physically/mentally handicapped, widows etc were generally seen as the concern of the entire community. The process of change has eroded many of these features of our traditional social practices. **Rising population, the emergence of a labour surplus economy and commercialization of agriculture have all contributed towards weakening of the social support systems. At the same time, the modern mechanism of social protection has left many gaps. The social oriented policies of the State are not adequate. Further, the risks/vulnerabilities and aspirations have increased many folds adding to the distress in rural areas.** A very fundamental cause of India's poverty particularly in the rural areas is the less than satisfactory performance of the agriculture sector.

3.1.4 The National Sample Survey data on income generated by farmer households during 2002-2003[2] shows that on average a farmer household on all India basis, earns Rs. 2115 per month of which [Rs. 969 per month i.e. 46% of total income] from cultivation, followed by wages [Rs. 819 per month i.e. 39%] non farm business [236 per month i.e. 11%] and animals [Rs. 91 per month i.e. 4%]. The above monthly income estimates exclude income from rent, interest, dividend etc. The State wise disaggregated data shows considerable variations in per family income as well as the components of the income. The highest per month farmer household income was in Jammu & Kashmir [Rs.5488] followed by Punjab [Rs. 4960], Kerala [Rs. 4004], Assam [Rs. 3161] and Haryana [Rs. 2882]. The lowest income was in Orissa [Rs. 1062] followed by Madhya Pradesh [Rs. 1430], Rajasthan [Rs. 1498], Chhattisgarh [Rs. 1618], Uttar Pradesh [Rs. 1633] and Bihar [Rs. 1634]. In five States the income

[2] NSS Report No: 497: Income Expenditure and Production Assets of Farmer Households 2003

from wages exceeded income from cultivation. These states were Rajasthan [62%], Orissa and Tamil Nadu [53-54%], Kerala [50%] and West Bengal [43%]. The proportionate income from animals was highest in Gujarat [[17%], Bihar [15%] and Maharashtra [6%]. The proportionate income from non farm was highest in Kerala and West Bengal [18%], Rajasthan [14%] and U.P and Bihar [11%]. The State wise break up of monthly incomes in given as Appendix- I

3.2 Income from Farming

3.2.1 The major source of income in farmer's households is income from farming which to a large extent depends on the size of land holding, productivity level and surplus between the cost of cultivation and price of the output. These are discussed in the following paragraphs.

Distributions of Land

3.2.2 Land holdings inequality reflected in land ownership and the technical progress biased against labour had compounded the problem. **In 1991-92, the share of the bottom half of the rural households in the total land ownership was only 3.33% and the top 10% was as high as 54.08%.** The extremely skewed distribution of land owned by rural household under various classes of farmers [according to land holding criteria] is shown at **Table 1.**

Table 1: Distribution of Land

Land Holding	% Of households	% Of land hold
Land less	11.24	-
Sub-margin holdings [0.01-0.99 acres]	40.11	3.80
Marginal holdings [1.00-2.49 acres]	20.52	13.13
Small holdings [2.50—4.99 acres]	13.42	18.59
Medium holdings [5-14.99 acres]	12.09	37.81
Large holdings [15 acre +above]	2.62	26.67
	100.00	100.00

Source: Some Aspects of Household Ownership Landholdings-1991-92. NSS Report-399

3.2.3 It is doubtful that the major part of the 85.29% of the rural households who are either landless [11.24%] or are sub-marginal, marginal and small farmers

[74.05%] could grow enough food to provide nutritional security to themselves and their families keeping in view the productivity standards and the fact that nearly 60% of the land is unirrigated. The NSS Report referred to at paragraph 3.1.4 shows that on average the total monthly income of farmers households for land holding upto 2 hectare was lower than the total consumption expenditure indicating the non viable status of these farmer households. The details are as under **[Table 2]:**

Table 2: Average Monthly Income from Different Sources, Consumption Expenditure and Net Investment in Productive Assets Per Farmer Household [2002-03]

Size of land possessed [hectare]	Income from Wages [Rs.]	Income from Farm [Rs.]	Net Receipt from Farming of Animals [Rs.]	Net Receipt from Non-Farm Business [Rs.]	Total of Col.2 to Col. 5 [Rs.]	Net Investment [Rs.]	Total Consumption Expenditure [Rs.]
<0.01	1075	11	64	230	1380	40	2297
0.01 to 0.04	973	296	94	270	1633	37	2390
0.41 to 1.00	720	784	112	193	1809	96	2672
1.01 to 2.00	635	1578	102	178	2493	151	3148
2.01 to 4.00	637	2685	57	210	3589	387	3685

Though the above are all India averages, it would appear that most of the farmer households with land upto 1 hectare and many farmers households with land between 1 hectare and 2 hectare may not be earning enough to meet the family consumption expenses.

3.2.4 **Since nearly 75% of the rural households are sub-marginal, marginal or small farmers improving the small farm productivity and profitability as a single development strategy could make the greatest contribution to improve the nutritional security at the household level.** Besides the general steps for raising the productivity and incomes of the farmers [discussed later in the chapter] the specific steps which focus on benefiting small and marginal farmers could be, increased investment in human resources, adequate and timely availability of quality inputs including credit, a fine tuned insurance system to cover production risks, an effective and efficient extension system, arrangements for custom hiring of agricultural machinery and development of low cost machinery for use by these farmers. There is also urgency in completing the unfinished agenda of land reforms; distribution of

ceiling surplus land, attention to common property and wasteland resources and consolidation of holdings etc. However, these would require a strong political will and determination.

3.2.5 The sub marginal/marginal/small farmers face problems in accessing inputs, use of machinery and also lack the power of scale in marketing their produce. The need is to develop and popularize various organisational structures, formal and informal on a win-win basis for all concerned. In the Fourth Report of the National Commission on Farmers, 'Serving Farmers and Saving Farming-Jai Kisan: A Draft National Policy for Farmers' some of the methods for providing power of scale to farmers have been discussed. Such methods could include elements of Cooperative Farming, Group Farming by Self Help Groups [informal structure], Small Holder's Estates and Contract Farming etc. taking care that the models so developed are farmer centric and sustainable.

3.2.6 The tenancy laws could also have important bearing on the total income of the landless marginal/small farmers who have a high stake in the operations of the land lease market in their area. However, the laws relating to tenancy differ in the States. Kerala and Jammu & Kashmir have completely banned leasing out the agricultural land, while in Telangana in A.P, Karnataka, H.P, M.P, and U.P leading out of agricultural land is allowed only in case of certain disabled persons like the widows, minors, personnel of the armed forces etc. Punjab, Gujarat, Maharashtra, Assam and Haryana have not banned leasing of agricultural land but the tenant acquires a right to purchase the leased in land within a specified period of tenancy. In A.P [other than Telangana], Orissa, Rajasthan, West Bengal and Tamil Nadu there are no restrictions on leasing of agricultural land excepting that in West Bengal only the share croppers lease are allowed. In the tribal areas of A.P, Orissa, M.P and Maharashtra only competent authority could permit transfer of land. **However, the various loopholes and difficulties in actual implementation of these provisions has meant that leasing of agricultural land continues to be done [around 10.36 million hectare was covered by lease arrangements in 1991-92 which formed nearly 8.2% of the total cultivated area] but in most places in a concealed manner and generally on a year to year oral lease basis with all its attendant evils, which could be more exploitative to the landless, marginal and small**

farmers. The increasing cost of cultivation, falling returns, low overall surplus, non availability of irrigation and problems in accessing institutional credit are some of the factors leading to leasing out land by small/marginal farmers.

3.2.7 The tenancy laws have to be such as to encourage all sections of rural population to participate in the land lease market depending upon their resources, availability of off farm/non farm employment opportunities, the wages rate, cropping pattern and income possibilities from use of land in agricultural and activities allied to agriculture. **However, there should be no fear of loss of leased out land to others**. In areas where agriculture is well developed, wages are high and non-farm employment opportunities broad based, it may be an attractive alternative for small/marginal farmers to lease out their land and take up wage employment/start an independent tiny/micro enterprise if the law assures them that they would not be deprived of their land. On the other hand, in States where agriculture is relatively backward, wages low and alternative employment opportunities limited, the small/marginal farmers could lease in land from medium and big farmers who may like to migrate to urban areas for non-land based employment/business opportunities. Thus, a well thought out land lease policy which could protect the rights of farmers leasing out land, could benefit the farmers in increasing the size of their operational holdings for securing scale economies or alternatively encourage marginal/ sub marginal farmers to exit farming and try to earn their income from wages/business etc. while at the same time getting rent for their leased out land. In certain States, the fall out of the existing restrictive tenancy laws is that many of the farmers opt to keep land follow in the event of their moving to the towns/cities for employment/business. This not only adversely affects production but also leads to deterioration of the quality of land. This phenomena is more widespread in UP, Karnataka, Kerala, HP, Jammu & Kashmir, AP where leasing of land is either completely banned or is allowed only in the case of certain disabled categories like widows, minor, armed forces personnel etc. **A more rational and liberal tenancy system could make a substantial favourable impact on the livelihood pattern of the rural households.**

3.2.8 The landless households in rural areas may be provided with some land which would give them space for at least kitchen gardening and animal rearing to

enable them to enhance their household income and improve nutrition security to some extent.

Productivity of Agriculture

3.2.9 Apart from the size of holding, the productivity levels primarily determine the income of the farmers. Unfortunately, the per unit area productivity of Indian agriculture is much lower as compared to other major crop producing countries **[Table 3].** There are also wide gaps in the yield among and within States.

Table 3: Comparative Yield of Select Crops in Various Countries [1959][Kg/ha]

Country	Crop				
	Paddy	**Wheat**	**Maize**	**Groundnut**	**Sugarcane**
India	2929	2583	1667	913	68,012
China	6321	3969	4880	2799	85,294
Japan	6414	-	-	2336	-
USA	6622	2872	8398	3038	80,787
Indonesia	4261	-	2646	1523	-
Canada	-	2591	7974	-	-
Vietnam	3845	2711	4313	1336	65,689

Source: Agriculture At a Glance [2002] Ministry of Agriculture]

3.2.10 Higher growth in productivity **in agriculture would require substantial increase in public investment in agriculture related infrastructure particularly in irrigation and also in drainage, land development, water conservation, research development and road connectivity etc.** The most disquieting feature of Indian agriculture is the decline in real investment in irrigation in recent years. Management of public sector investment in irrigation, power, roads etc needs improvement. The capital formation in agriculture which was 1.6% of the GDP in 1993-94 had declined to 1.3% of the GDP by 2000-01. Similarly the share of agriculture and allied sector in the total gross capital formation declined from 14.3% in 1970-71 to 7.1% in 2000-01. This trend needs to be reserved. Public sector investments are specially needed in the poorer, low rainfall areas of the country, which must now play a larger role in achieving rapid agriculture growth. These areas do not attract much private investment, which generally prefer irrigated and developed areas. It is expected that the increased public sector investment in such areas would also attract private on farm investments and also in due course increased investments in agro-based industries. The Bharat Nirman Programme and its implementation is expected to improve the

rural infrastructure including creation of additional irrigation, rural roads, improved telephone connectivity and power.

3.2.11 Soil health and seeds need urgent attention. A national network of advanced soil testing laboratories with facilities for detection of micronutrient deficiencies could be extremely important. "**As a single agronomic intervention application of needed nutrients to the soil could have the greatest impact on increasing yields with a very favourable cost benefit ratio"**. The KVKs could have a key role in the above development, information dissemination to farmers and in creating a low cost trained manpower in agriculture in rural areas. However, for the above purposes, the KVKs will have to strengthened, restructured [where necessary] and the staff trained adequately. Effective linkages between the KVKs and the local department of agriculture also need to be established and strengthened. Seed availability and seed replacement rates need attention. There is not only mismatch between seed availability and demand of seeds of different varieties, there is also a serious problem about the assurance of quality and prices of particularly the genetically modified seeds.

3.2.12 **Investment in watershed development and the water saving technologies in the rainfed areas could help in improving the incomes of the rural households considerably. Access to even limited irrigation [small water ponds filled up by rain water] could overcome drought conditions during critical growth periods, which could substantially increase production and incomes.**

3.2.13 **Agricultural research which could help the farmers to diversify into higher value products and developing technologies which could reduce the impact of long dry period on crops and enable them to have a diversified income flow by mix of crops, horticulture, tree crops and animal husbandry could help in stablising their incomes.** The research which focuses on crops that are high in nutrients and crucial to the well being of the poor could be of particular benefit to them. The agriculture research has to become both farmer and market oriented. With privatization of research in other countries the farmers have to pay a high price for its usage. **The need is to increase investment in local research and make the research institutions accountable.**

3.2.14 The increasing complexities of production and marketing requires information dissemination and training in use of modern technologies. The weakening of the extension services in the public sector and negligible progress of private extension support, inspite of Government efforts in this direction has created a vaccume. **The farmers often rely on input dealers for advice which is based more often than not on 'business considerations' and rarely on knowledge. Extension system needs a relook with the objective of developing both top down and bottom up flow of information between farmers, extension workers and researchers and development/dissemination of locations specific farm technologies.**

Profitability in Agriculture – Income of the Farmer

3.2.15 The economic access to food for the farm households ultimately to a large extent depends on the Farm Business Income [FBI], i.e., the difference between the value of output produced and costs actually paid out. In the State of the Indian Farmer: A Millennium Study-Cost of Cultivation and Farm Income-Dr. Abhijit Sen, it was observed that per hectare real FBI had increased in every State during the 1980s, but in most States peaked in mid 1990s. In Karnataka, Maharashtra, Orissa, Bihar and Gujarat, real FBI per hectare was lower at the end of the 1990s decade than at the beginning. The all India rate of growth of real FBI per hectare decelerated sharply from 3.21 per year during the 1980s to 1.02 p.c. per year during the 1990s. Keeping in view that the number of cultivators during 1990s grew at 1.44% p.a. and the cropped area by only 0.45% p.a. in the same period, means that the real FBI on All India basis during the 1990s remained almost static [growth rate of about 0.03 p.c. per annum]. **The study further reveals that only in Andhra Pradesh, Gujarat, Haryana, Madhya Pradesh, Rajasthan, Punjab and West Bengal the actual average land holding was bigger than the minimum required to keep the farm family above the official poverty line; it would appear that a very large number of farmers households are unable to generate adequate income from their farms.**

3.2.16 During the nineties the profitability in agriculture declined by 14.2% mainly due to stagnancy in yield growth and increase in prices of inputs outpacing the

increase in prices of output[3]. The margin deteriorated particularly for cotton, almost all coarse cereals and oilseeds. Even if we look at the latest cost of cultivation for major food grain crops for 2005-06 [CACP data] and compare it with MSP prevailing in 2004-05, it would appear that the C2[4] costs were not covered even by MSP in many States. It would be extremely unlikely that in long run farmers would continue to cultivate those crops where the C2 costs are not recovered. Some details are given below:

Name of the Crop	**States where the C2 cost projection by CACP for 2005-06 were not covered by MSP of 2004-05**
Paddy	A.P, Assam, Haryana, Karnataka, Kerala, M.P, Tamil Nadu & West Bengal
Jowar	A.P, Karnataka, M.P, Maharashtra & Tamil Nadu
Bajra	Gujarat, Haryana, U.P, Maharashtra
Maize	A.P, H.P, Karnataka, M.P, Rajasthan & U.P
Ragi	Karnataka, Tamil Nadu
Tur [Arhar]	A.P, Gujarat, Karnataka & Orissa
Moong	A.P, Maharashatra, Orissa & Rajasthan
Urd	M.P, Maharashtra, Orissa, Rajasthan & Tamil Nadu
Gram	Haryana, Rajasthan
Barley	Rajasthan

The above data is quite indicative of deterioration in farm incomes mainly due to increasing costs and near stagnation of yields, poor output prices and lack of support in marketing.

3.2.17 Besides other factors, the deceleration in rates of input use growth has also contributed towards deceleration in yield growth though the potential for yield growth

[3] The details are as under:

Period	Prices Paid for Intermediates	Output Prices
1990-91	104.2	112.3
2000-01	223.0	24.8
% change	114.4	100.2

1990-91 & 2000-01

Source: State of Indian Farmer: A Millennium Study- An Overview- Dr. Y.K. Alagh

[4] C2 includes all expenses in cash and kind incurred by the farmer, interest on the value of owned capital assets excluding land, rental value of owned land [net of land revenue], rent paid for leased in land and imputed value of family labour.

with dissemination and application of known technologies is not yet exhausted. With limitations in increase in prices of output and overcrowding of subsidies, the farm incomes could be enhanced by improving productivity, more efficient use of nutrients, timeliness and qualitative improvement in availability of inputs, better extension, advice and research support, availability of information/knowledge, training, market reforms, improvement in post harvest operations, value addition and providing power of scale to the small/marginal farmers in accessing inputs and marketing of their produce etc. Improvement in risk mitigation systems and support in time of natural disasters are needed. An efficient marketing system with farmer's organisations as important players could significantly add to farmer's income from his produce. As a matter of fact farmer's organisations are needed at various levels of the value chain. The small and marginal farmers suffer loss of income due to distress sale immediately after harvest and are also on receiving end against the Commission agents/traders etc. The APMCs have not given adequate attention to grading, development of village haats and ensuring an efficient business like operations at the market yards [various aspects relating to Marketing Reforms have been discussed in detail in the Third Report of the National Commission on Farmers]. The Minimum Support Prices [MSP] should be protected across the country and the Market Intervention Scheme [MIS] used effectively in the case of commodities which are sensitive in different regions/areas. The banks need to liberally provide pledge loans. However, as there are not many accredited godowns, the bankers may have to rely on storage of produce with the farmers. A system where two separate limits are fixed for Kisan Credit Card holders i.e., one for inputs and a higher limit against produce when the production risks are over would enable the farmers to avoid selling immediately after harvest and thereby get a better price for his produce. **Further, it is very important to provide safety nets to protect the interests of the crops, people and regions which are likely to be affected in the process of globalization.** Bridging the yield gaps between different regions and between the demonstration farms and farmer's fields require no technology revolution but wide spread adoption of improved practices and timely availability of quality inputs. The WTO provisions need not be cited as a reason for not doing the above. These measures could be introduced in a WTO compatible manner.

3.2.18 The strategies for increasing the productivity and incomes of the farmers discussed in the earlier paragraphs would also improve the ability of the small and marginal farmers to produce larger crops, earn more and improve their access to food to a certain extent. In addition, they will require to augment their incomes from animal husbandry and wages both in farm and non-farm sector etc. Multi stream of incomes is essential for them for spreading the risks, having a more regular and continuous income flow and increasing the total incomes. **However, in the case of landless and sub marginal farmers, reliance may have to be mainly on activities allied to agriculture and non farm and farm employment which would be discussed in the following paragraphs. The landless require either asset or skill and the social security support for their nutritional security.**

3.3 Income from Animal Husbandry

3.3.1 Nearly 4% of the farmer household income on All India basis is from livestock. However, in some of the States like Gujarat, Bihar, Maharashtra, Punjab etc. the share of income from animals is higher. The important fact is that the livestock sector is of special importance to small/marginal farmers as it helps to spread the risks and provide a more even stream of income to eliminate seasonable hunger. These activities typically give higher returns per unit of land and are also labour intensive and hence more suited for these farmers. Incidentally, the ownership of livestock is much more egalitarian than the ownership of land in India. The resource poor families own a majority of cattle, buffalo, sheep and goats. Development of animal husbandry could play an important role in augmenting the incomes of small/ marginal /sub marginal farmers. They form the core of the milk production sector. Taken together the small and marginal farmers accounted for 71% of the in-milk bovine stock in 2002-03. The marginal farmers who had only 20% of the in-milk bovine stock in 1970-71 increased it to 31% in 1981-82, to 44% in 1990-91 and to 52% in 2002-03. The major constraints experienced by these dairy farmers relate to fodder, feed and animal health care facilities. As stated in the Fourth Report of the National Commission on Farmers, there is a need for establishing Livestock Feed and Fodder Corporations to assist Self Help Groups to produce good quality animal feeds. Such corporations could be developed into facilitating bodies for providing seeds and planting material of improved varieties to the Self Helps Groups

etc for local level production. The productivity of our livestock is low and could be easily improved through better nutrition and animal healthcare. Agri-clinics operated by young veterinary and farm science graduates could be extremely helpful to enhance the incomes of the dairy farmers through higher productivity. However, till the private system establishes itself the need is to tone up the working of the extension services from the Government. There is also a need for conserving indigenous breeds of cattle while promoting appropriate cross breeds in our conditions. The cooperatives could play an important role in the development of the dairy sector as shown by our experience particularly in Gujarat and Maharashtra. The sector needs a focused attention particularly in dry and rainfed regions where there is all the more need to add to the incomes of the farmers. The promotion of the livestock sector would also help in improving the nutritional value of the food basket of our population. The lessons of the poultry sector, where the research, management, extension and marketing capabilities of the private sector has helped the development of the sector need to be studied and replicated in the dairy sector.

3.3.2 Keeping in view the importance of the livestock sector in rural incomes, it needs much more attention. However, while contribution of the sector is around 25% of the agricultural GDP, the allocations of plan funds is less than 16% of the total funds allocated to the agriculture sector. The animal power is used for nearly 60% of the cultivated area, bullock cart continues to be an important means of transportation in rural areas and the total value of meat is over Rs.40,000 crore and it provides employment to a very large population but these aspects are generally neglected. The meat sector, particularly the male buffalo calves, goats and sheep have tremendous potential for increasing rural incomes/employment and even exports provided we take up systematic rearing of these animals and create a large number of village abattoirs which are properly linked to the modern integrated abattoirs. Institutional credit could play a significant role in these developments. At present, bulk of the income in case of meat and particularly buffalo meat is cornered by the contractors/agents/middlemen. Establishment of village abattoirs and orderly development of the meat sector could enhance the incomes of the landless/sub-marginal and other farmers who could rear these animals. Similarly improvement in the quality of bullock carts would not only make these more efficient, add to the incomes of bullock cart owners but also reduce wear and tear of the roads.

3.4 Income from Wages

3.4.1 As stated earlier [paragraph 4.1.4] according to the NSS estimates [2002-03] on an all India basis, wages formed 39% of the monthly income of the farmer households. Further, in Rajasthan, Tamil Nadu, Orissa and Kerala, the wages formed 50% or more of the monthly income. A major connected issue is the low wage rates in rural India, though rising, these are still far too low especially in the context of irregularity in getting wage employment and also the rising expectations. A very large percentage of our population has no marketable skills and either no or little formal education. Currently only 5% of the country's labour force in the age group of 20-24 years category have undergone formal vocational training, compared to 28% in Mexico, 60 to 80% in most industrialized countries and 96% in Korea. A strategy to improve employment prospects in future will have to be to ensure that all the new entrants to the labour market are equipped with knowledge and skill for high productivity and high quality employment. There are nearly 300 million illiterate adults in India. The literacy rate among males is nearly 50% higher than the females and is about 50% higher in urban areas than the rural areas. Out of approximately 200 million children in the age group of 6-14 years, only 120 million were in school. Further, less than 7% of the children ever pass the 10^{th} standard public examination. Another connected issue is school drop-outs. According to India Vision 2020 [Planning Commission document] unless something is done to drastically reduce drop-out rates by the year 2016, there will be approximately 500 million people in the country with less than five years schooling and another 300 million that will not have completed high school. Very low investments in human capital means extremely low quality, unskilled, low wage rate employment prospects. Our educational system particularly for the rural areas and the vocational education system needs change in respect of location [rural rather than urban for more enrollment from rural areas], strengthening the general education component in vocational training and closer involvement of the private sector in curriculum development. The skill development has to be not only in traditional areas but in many new activities and vocations where a large number of skilled persons are needed. The private sectors including trusts/NGOs etc also need to be strongly supported for establishing vocational training centres. The Government could announce a large number of scholarships, say, a

million each year to rural students particularly from BPL and landless families for pursuing market oriented vocational education.

3.4.2 With the existing situation, the National Rural Employment Guarantee Programme [NREGP] is an important and significant step. Such a programme is strongly justified to provide additional employment opportunities to those segments of the population who had not benefited at all or benefited not adequately from the economic opportunities generated by overall growth of the economy. These are mostly people in areas which lay behind in economic growth and people who have little or no productive assets, depend mostly on wage employment for their subsistence and do not get enough of it.[5] It is not intended to discuss the NREGP here but it is hoped that this would be continued for some years and help in building rural assets which would increase sustainable income generating opportunities in the rural areas and the programme would be implemented efficiently duly favouring the rural women, the tribals and the other distressed/handicapped population. The ultimate mission has however to be to train/retrain and improve the human capital from unskilled to skilled population to participate more vigorously in the process of development and growth.

3.4.3 Structural change in work force is taking place in India though slowly. A comparison of 1999-2000 estimates of the National Sample Survey's [NSS] 55th Round regarding employment with those of 1961 brings out this shift [**Table 4**].

Table 4: Structural Change in Workforce in India, 1961-2000

Sector livestock	**Percentage of Workforce**	
	1961	**1999-2000**
A: Agriculture, forestry and fishing	75.9	59.9
B: Break up into major sectors		
[i] Crop Production	73.4	54.4
[ii] Livestock	2.0	4.1
[iii] Logging, forestry and fisheries	0.5	0.5
[iv] Agricultural Services	0.0	0.9
	75.9	59.9

Source: Census of India, 1961, NSSO, 2000 - quoted in the State of the Indian Farmer - A millennium Study –An Overview-Shri Y.K. Alagh

[5] Shri A. Vaidyanathan- Employment Guarantee and Decentralisation-Economic & Political Weekly April 16-25, 2005.

3.4.4 In rural areas, 7.26 crore people are employed in the non-farm sector as compared to 23.21 crore in agriculture [NSS date 1999-2000] forming about 24% of the total employment. However, the employment growth in the rural areas is continuously decelerating as shown in **Table 5**.

Table 5: All India Employment Growth Rates in Rural Areas

	1972-73 to 1983	**1980-81 to 1993-94**	**1993-94 to 1999-00**
Agriculture	1.59	1.38	0.20
Non-Farm	4.54	3.37	2.34
Total	2.12	1.77	0.68

Source: Draft paper: Generating productive Employment in India's Rural Non-Farm Sector- A Perspective- Shiela Bhalla

The **Table 5** clearly highlights one of the most important issues bothering the country. The rural employment growth rate has come down to 0.68% during 1993-94 to 1999 from 2.12% in 1972-73 to 1983 which is much lower than the growth rate of labour force[6]. [The growth rate of employment between 1993 -94 to 1999 was less than one third of the growth rate achieved in 1972-73 to 1983]. Compounding the problem is the fact that in 2002 there were already about 3.5 crore unemployeds in India, approximately three-fourth of these unemployeds were in the rural area. [India Vision 2020-Planning Commission]

Employment in Agriculture Sector

3.4.5 Bulk of the employment in the rural areas is in the agriculture sector and a large part of the rural incomes from wages [39% of the total income of the farmer household referred in para 3.1.4] is also likely to be in respect of agriculture related work. However, the employment growth rate in agriculture has been declining **[Table 4]**. The estimated labour days per net sown hectare [NSS estimates], increased from 290 days in 1983 to 317 days in 1987-88 to 345 days in 1993-94 to 361 in 1999-00. However, the growth in labour day per gross cultivated area [hectare] increased from 231 in 1983 to 248 in 1987-88 in 264 in 1993-94 and only to 266 in 1999-00.

[6] The Indian Vision 2020-Planning Commission, states that the growth rate of labour force was expected to be about 2% till 2020. Dr. C. Rangarajan in his V.V. Giri Memorial Lecture [2005] had stated that the rate of growth of labour force during 1993-94 to 1999-2000 had fallen to 1.05% against 2.05% in 1983 to 1993-94.

Thus, while the growth rate [compound] was 1.3% p.a. in during 1983-94 it fell down to mere 0.2% between 1993-94-1999-00. **With slowing down in the growth of cultivated area, [the net sown areas had negative growth at 0.2% p.a. during 1993-00], the slow down in labour day per hectare during 1993-94 to 1999-00 meant near stagnation of employment growth in agriculture.**

3.4.6 As expected there are very large variations in labour use in agricultural operations in different States. Among States, the highest labour days per hectare [net area sown] in 1999-00 were in Bihar [871] followed by A.P [493], West Bengal [447], U.P [440], Tamil Nadu [419] and Orissa [410]. The lowest labour days per hectare were in Kerala [143] followed by Haryana [175], Punjab [182] and Rajasthan [197]. **Looking at crop wise labour used, it appears that in North/Western States, labour use per hectare had declined in the 1990s for almost all crops, and for wheat in almost all States. However, for other States and crops trends are mixed[7].**

3.4.7 In the early stages of 'green revolution', land augmenting changes, led by irrigation expansion and use of HYV led to an increase in labour demand. Later, the institutional factors contributed towards the tendency on the part of land owners to adopt labour saving technologies. Rising wages, unwillingness of labour to abide by traditional labour norms, sociological changes [increase in education, unwillingness of different groups to participate in agriculture, withdrawal of women and children from workforce, male workers preferring migrating to towns for work rather than undertake agriculture labour] and availability of institutional credit for tractors/other machinery etc. has led to greater use of labour saving devices. **The above developments coupled with slow down in capital formation in agriculture, decline in agricultural growth itself and switch over to crops and practices requiring less labour led to deceleration in growth of labour employment in this sector.**

3.4.8 The growth in employment in agriculture is related to growth in intensity of cultivation, growth rate of area under labour intensive crops, level of agricultural wages, institutional and socio-economic factors. The policies which could give the

[7] Trends in Rural Employment in India with Special Reference to Agriculture Employment –Ravi S. Srivastava.

rural poor greater control over land, augment productivity of small farms, increase area under labour intensive crops [oil seeds, spices, fruits, vegetables etc.] and increase productivity [increased intensity of cropping and yields] would help in increasing the growth of agricultural employment. The need is to follow these policies during the coming years. Further the Special Group of the Planning Commission [2002] had felt that programmes focusing on horticulture, regeneration of degraded forests, waste land development, watershed development, bamboo development and medicinal plants could generate more than 3 million persons days of employment and therefore were important from the view point of employment generation. The potential for growth of employment in crop sector was considered limited; it was estimated that the switch over from cereals to oil seeds/pulses could generate 0.47 million annual man days work.

3.5 Employment in Rural Non-Farm Sector

3.5.1 On All India basis nearly 11% of the income of the farmer households [NSS Report 497 referred at paragraph 4.1.4] came from the non-farm sector. In Kerala and the West Bengal the income from non-farm was highest at 18% followed by Rajasthan at 14%. Households in the regions with low agriculture productivity or unfavorable land man ratio could add to their income by development of rural non-farm sector. A high growth in the farm sector also creates larger demand for non-farm products and services and "pulls" labour into it [per farmer household income from non-farm is highest in Punjab at Rs. 440 per month after Kerala and J & K]. Similarly, limited opportunities for agricultural development and high pressure of population on land [per farmer household monthly income in Kerala with acute pressure on land at Rs.717 from non-farm business was highest in the country] could 'push' labour into the rural non-farm sector. As already shown at Table 4, the growth rate of employment in rural non-farm sector has been consistently higher than the entire period of 1972-73 to 1999-2000. During 1993-94, the employment growth rate in rural non-farm sector at 2.34% per annum was nearly 12 times the growth rate in the farm sector at 0.20% per annum. Rural non-farm sector could hold the key to increasing employment opportunities in rural India.

3.5.2 The disaggregated data regarding growth of employment in different sub-sectors in non-agricultural employment in rural areas is shown at [**Table 6**] for the last about thirty years to assess the trends of growth.

Table 6: Annual Employment Growth Rate-Sub-Sectors under Non-Agriculture in Rural Areas

Sector	1972-73 to 1983	1980-81 to 1993-94	1993-94 to 1999-00
Mining & Quarrying	5.13	4.32	-2.88
Manufacturing	4.38	2.34	1.57
Electricity etc	9.00	5.00	-6.35
Construction	3.99	5.19	6.95
Trade etc	5.34	3.62	3.74
Transport	7.05	5.09	7.35
Services	3.82	3.38	-0.80

Source: Shiela Bhalla's Draft Paper: Generating Productive Employment in India's Rural Non Farm Sector- A Perspective [2005]

Among the sub-sectors, noticeable growth has been primarily in transport, construction, trade and manufacturing while there was negative growth rate during 1993-94 and 1999-00 in mining, electricity and services.

3.5.3 The State-wise data shows that there was overall negative annual growth of rural employment during 1993-94 to 1999-2000 in Goa [-2.90], Himachal Pradesh [-0.13], Tamil Nadu [-1.42], Tripura [-0.67] and Arunachal Pradesh [-2.09]. In following States, the growth rate was positive but below the national level of 0.68%. Andhra Pradesh [0.24], Karnataka [0.17], Maharashtra [0.37], Rajasthan [0.51], West Bengal [0.43] and Meghalaya [0.31]. The negative or extremely low growth rate of employment in some of the larger States like Tamil Nadu, Himachal Pradesh, Andhra Pradesh, Karnataka, Maharashtra, Rajasthan and West Bengal is very disturbing. Incidentally, Maharashtra, Andhra Pradesh and Karnataka which had registered very low rural employment growth during 1993-94 to 1999-2000 had also certain Hot Spots where many farmers have committed suicides during the last five years.

3.5.4 Another important aspect is that almost all the employment growth, in the last few years, took place in the unorganized non-farm sector. Between 1993-94 and 1999-2000 the growth of employment is agriculture was only about 0.2% whereas the

growth in the non-agriculture sector was 0.59% in the orgainsed sector and 3.15% in the unorganized sector.

3.5.5 **Dr. Sheila Bhalla in her paper on Generating Employment in India's Rural Non-Farm Sector- A Perspective has stressed three points for growth of the non-farm sector besides the development of a prosperous agriculture sector**. She has observed: "[a] The foundation for accelerated employment and labour productivity growth in the non-farm sector, is infrastructure investment. For the non-farm sector, **the key components are a reliable electricity supply, all weather roads and access to a landline telephone facility.** A regular bus service is an important additionality [b] For non-farm sector activities, access to **affordable credit is crucial**. It should be available for medium scale as well as tiny and small scale units and for expansion of existing units as well as for start up of new units. Programmes providing credit needs to pay special attention to productivity raising investments; for example, the motorization of previously manual labour operations in carpenter's shop, the electrification of small retail shop, investment in pucca structure of repair shops; motorization of human and/or animal powered transport equipment and so on [c] **The non-farm development thrust should be directed to particular sector and sub-sectors where demand for the product or services is growing namely: (i) trade, (ii) restaurants and hotels, (iii) transport, (iv) construction, (v) repairs and (vi) certain services.** Artisan activities and very small scale manufacturing, in general produce goods which, either because of high costs or poor quality or both cannot compete in the market. There are of course, many exceptions, but they need to be identified and promoted with caution."

3.5.6 As regards the manufacturing activities the draft paper referred to above suggests the following:

(i) Isolated, rural tiny units are a poor bet. For some closely related activities, the development of clusters may be the answer. But these must not be located in the middle of nowhere. Instead locate clusters in or near large market towns, on the peripheries of cities and along major highways or railway lines. **There are nearly 6000 block headquarters as also about 7415 APMCs. Many of these centres as well as many existing industrial clusters present favourable location for focused**

development and could be the starting point for concentrated action and investments.

(ii) Pessimism about the prospects of locating large scale, orgainsed sector units in rural areas may be misplaced. In recent years roughly one million jobs have been created in the orgainsed manufacturing in rural areas despite the job losses recorded in urban orgainsed sector.

(iii) **Proactively encourage development of ancillary units by supporting such ventures and possibly by offering tax breaks to large units which sponsor the development of small units on a contractual basis.**

(iv) **Promote field-to-market logistical and processing chains for perishable products of agriculture and allied activities.** These could be run by cooperatives/producer's associations or by private enterprises, but the regulation of large private enterprises entering into contractual relationship with small producers is essential. Cold storages and chilling plants may be located in large villages with reliable electricity supplies but most processing, collection or marketing centres need to be in larger market towns and cities.

3.5.7 The generally held belief among the economists is that rapid growth of rural non-farm employment would largely depend on a higher growth rate of agriculture and large public investment in rural infrastructure. A very slow rate of growth of agriculture [2% from, 1996-97 to 2001-02 and only 1.1% for the first three years of the Xth Five Year Plan] and decline in profitability in agriculture noticed during the nineties are likely to limit the purchasing power in the hands of the rural population as also surplus for investments, both of which are not conducive to the growth of the rural non-farm sector.

3.5.8 In the Fourth Report of the National Commission on Farmers a suggestion has been made to integrate all programmes for generating off and non-farm employment into one initiative like China's Town and Village Enterprise [TVE] Programme and launch a Rural Non-Farm Initiative particularly for families without land or other productive assets. The need is for a counterpart to the National Rural Employment Guarantee Programme [NREGP] in the skilled employment sector. The initiatives like the Small Farmers Agribusiness Consortium [SFAC], Agri-clinics and

Agri-business Centres, Food Parks etc could be strengthened and made more effective. The Rural Non-Farm Livelihood Initiative [RNFLI] could have as its core the KVIC and the restructured and strengthened SFAC and bring all rural non-farm employment programmes together, in order to generate convergence and synergy among them. A Consortium approach may be considered for the purpose involving the Central and the State Governments, Academia, NGOs, public and private sector industry, banks and financial institutions etc. The programme may have to be market driven and at a massive scale to have impact across the country.

3.5.9 Though the rural non-farm sector is providing almost all the new employment opportunities in the rural area, there is no specific ministry/department to focus exclusively on this sector. The Ministry of Rural Development has been running various self employment and wage employment programmes like the Pradhan Mantri Rozgar Yojna, Swarn Jyanti Rozgar Yojana, etc. while the Small Scale Industries and the KVIC etc are looked after by the Ministry of Small Scale Industries and Agro and Rural Industries. In addition there is also the Ministry of Food Processing Industries. Keeping in view the importance of the rural non-farm sector and the need for undivided focus, it may be useful to consider some reorganization and consolidation of all programmes concerning rural insustrialisation in one Ministry/Department.

3.6 Agro-Processing

3.6.1 **Development of agro-processing is important to increase farmer's income and also to create employment. It would however, be necessary to introduce reforms in the agriculture sector to facilitate greater private corporate sector investments in agro-processing not only in new units but also in modernizing the established units**. The processing industry requires adequate and continuous availability of raw material for processing. Direct purchase from the growers is not possible under the existing APMC Act in many of the States and hence it has to be either routed through the APMC or the concerned State Govt. have to specifically permit the same. Further, there are many other barriers to interstate trade and commerce which come in the way of development of food processing industry. Some of these relate to poor road infrastructure, detention of vehicles, interstate and national permits and other barriers in trucking operations. There are check posts for Regional Transport Offices and Police Check-Posts [for checking documents,

driving and traffic safety etc.], Goods related Check-Posts [for taxes, octroi, sales tax, entry permit, tolls etc.] and others [checking by Flying Squads, Movement of Essential Commodities etc.]. The delays caused by these check-posts are substantial and involve payment of bribes etc. The paper work involved in trucking operations is complex, time consuming and leads to disputes etc. Simplification of the rules/procedures and limiting the check-posts only for matters relating to national security could greatly benefit movement of goods and lead to reduction of transport costs and time.

3.6.2 Further, the traditional varieties may not be suitable for processing because the requirements of food processing are different from food for direct consumption. This necessitates research back up for development of suitable varieties. There could be other cases where suitable varieties are available and the processor may want the farmers to grow the same under supervision and a specific agreement. In the case of perishable commodities, in particular, the processing industry would like contract farming arrangements or some other institutional arrangement so that adequate quantities of appropriate raw material is available in an area preferably at a predetermined prices from where it could be transported to the factory without loss of time and quality. Though various models of 'contract farming' have been tried in India, the success has been rather limited. The need is to develop comprehensive, clean, equitable and farmer centric model agreement which could not be abused against the farmers. Special care is required regarding clauses dealing with quality standards, withdrawal conditions, pricing standards, paying arrangements, acts of God clauses and the arbitration mechanism. Till such a code of conduct is introduced and the farmers are empowered by formation of groups/cooperatives to deal with the agribusiness unit on their behalf, one has to be rather cautious about these arrangements.

3.6.3 The food processing sector is dominated by small-scale producers including traditional village industries. However, the link up of small units with the large units including MNCs has not developed adequately. A system where initial processing could be decentralized in the rural areas in small units [creating employment and reducing transport costs] and the final processing, quality control, packaging and marketing under brand name could be done in a centralized manner

[by a farmer's organisation or other business unit] has not developed. One reason for this is the lack of assured electric power in the rural area and also the high cost of power to the industry. Poor road connectivity is another constraint in developing decentralized food processing units in the rural areas. There is need for policy environment to support the above developments.

3.6.4 There is also a need to rationalise the tax structure for food processing industry and value addition. The agriculture sector is exempt from all taxes [like excise, income tax etc] but there are inter-State differences in agriculture cess, sales tax, mandi tax, octroi, inter-state transfer regulations etc. At the point of conversion i.e., value addition, excise, income tax and other taxes are levied. The packaging material used is also subject to taxation. All these taxes add to the costs which make processed food quite costly limiting its demand/market. The world demand of processed food is increasing. The need is to develop a competitive food processing sector. Though it may not be easy to build up a large export component in processed food, at least all attempts are needed to ensure that our growing market for processed food is not completely lost to imports.

3.6.5 Quality standards in food processing sector are extremely important for the market particularly the export market to bring our food products at par conforming to international safety and quality standards, it would be essential to set up a network of quality testing/certification laboratories across the country and also build the awareness level of our farmers, processors and traders regarding codex requirements in respect of food hygiene, food additives, pesticides residue, contaminants, labeling, presentations and methods of analysis and sampling. All products meant for sale have to be packed and labeled as per codex requirements.

3.7 The General Employment Strategy for India

3.7.1 Dr. C. Rangarajan in his V.V. Memorial Lecture [2005] has indicated that the overall employment strategy in India must seek to achieve two things. First, create productive employment opportunities to absorb the annual addition of 8 million or more labour force and second to improve the 'quality' of employment in several sectors such that real wages rise through improved productivity. According to him the four components of the employment strategy should be:

i) Accelerating the rate of growth of the economy;

ii) Special emphasis on relatively more labour intensive sectors and inducing a faster growth of these sectors

iii) Improving the labour skill endowment in general, paying particular attention to identifying specific skill gaps and taking effective steps to fill them; and

iv) Improving the functioning of the labour markets through such modification as may be necessary without eroding the core labour standards.

3.8 Conclusion

3.8.1 There is a general feeling of being 'left behind' in large parts of rural India. The widening disparity in per capita income between farm and other than farm sector, the very slow rate of growth in agriculture, the declining profitability, extremely weak social security arrangements, weakening family and community based mechanism of social protection, lack of employment opportunities etc., and the rising aspirations are building up social unrest which if not arrested could lead to threats to internal peace and security. Economic growth which bypasses a large population is joyless growth and not sustainable in the long run. Equity considerations can not be ignored for too long. Faster growth in agriculture with improvement in welfare of the rural population is important. The need is not only to register increase in agriculture production in million tons but actual improvement in rural incomes. The promises that a 9 or 10% growth rate for a decade would solve employment problem may be mathematically correct but may leave many serious problems in its trail if we do not build an effective social security net and take appropriate policy steps to improve the income of the assetless or those with very limited assets. The need is to ensure a faster and more inclusive growth as indicated in the draft approach paper to the XIth Five Year Plan. It is not too late to mount a major offensive against the deepening crises in rural areas. However, let us not forget, the time for action is also fast running out.

Appendix - I

Break-up of average monthly income (excl. rent, interest, dividend etc.) per farmer household by source in each of the major States during the agricultural year 2002-03.

States	Average monthly income (Rs.) per family household from				
	Wages	**Cultivation**	**Farming of animals**	**Non-farm business**	**Total**
Andhra Pradesh	643	743	93	155	1634
Assam	973	1792	141	255	3161
Bihar	497	846	265	202	1810
Chhattisgarh	709	811	-3	101	1618
Gujarat	925	1164	455	140	2684
Haryana	1268	1494	-236	356	2882
Jammu and Kashmir	2060	2426	382	620	5488
Jharkhand	924	852	86	207	2069
Karnataka	1051	1266	131	168	2616
Kerala	2013	1120	154	717	4004
Madhya Pradesh	560	996	-227	101	1430
Maharashtra	799	1263	144	257	2463
Orissa	573	336	16	137	1062
Punjab	1462	2822	236	440	4960
Rajasthan	931	359	5	203	1498
Tamil Nadu	1105	659	110	198	2072
Uttar Pradesh	559	836	53	185	1633
West Bengal	887	737	77	378	2079
All India	**819**	**969**	**91**	**236**	**2115**

CHAPTER 4

ATTRACTING AND RETAINING YOUTH IN FARMING: UNCOMMON OPPORTUNITIES

4.1 Introduction

4.1.1 Agriculture continues to be central to the livelihood security of a majority of the people of India. As poverty is more extensive in rural areas and is concentrated in the small, marginal and landless farming households, which account for nearly 60 per cent of the country's population, efforts towards its alleviation must have in place an explicit agricultural growth strategy aimed towards **remunerative employment and sustained income growth**. With the persisting serious yield and productivity gaps on one hand, and the centrality of high competitiveness on the other, our agricultural development must become increasingly knowledge-intensive and efficient. For this, the youth, especially the agricultural graduates, practising science- and knowledge-based agriculture, should constitute the torch-bearers of agricultural transformation in the globalised world. But, the agricultural graduates and other educated youth, although unemployed, are rarely taking to farming as a profession and it is difficult to retain even a small number of them in rural areas.

4.1.2 The worsening cost-risk-return structure of farming, the low and stagnating income of farmers and the huge and widening income divide between farmers and non-farmers are the main deterrents. So much so, as per the 59th Round of NSSO, 40 per cent of the farmers wish to quit farming. This is a serious concern and must be addressed urgently. **The youth can be attracted to and retained in farming only if farming becomes economically rewarding and intellectually satisfying, and only when the rural settings encompass the barest minimum necessary energy, infrastructural, educational and primary health care facilities**. In this context, the Provision of Urban Amenities in Rural Areas or **PURA** programme proposed by the President of India becomes important. Moreover, the process must be accompanied with suitable policies

and access to appropriate technology, services, institutional support including credit, and markets and remunerative prices.

4.2 Youth in India

Number, Literacy and Employment Status

4.2.1 Ours is a land of the youth. The National Youth Policy 2003 defines the youth in the age group of 13 to 35 years, but classifies them in two sub-groups viz. 13-19 years (adolescent age group) and 20 to 35 years. In 1997, the number of youth was about 380 million, 37% of the total population, and is anticipated to increase to about 510 million in 2016, about 40% of the total population. Nearly two-thirds of these will be rural youth. The availability of such a huge highly active human resource offers unique opportunities for achieving equally huge socio-economic transformation. But, this will call for commensurate training, skill and knowledge development opportunities, technological excellence and enabling mechanisms.

4.2.2 By the year 2016, about 246 million youth will be female and 264 million will be male. The gender divide is particularly sharp in literacy rate. Against 25% illiterate males, 46% of the female are illiterate (11^{th} Plan Approach Paper, 2006). **As a whole, India is home to one-third of the world's illiterate youth (UNESCO, 2004), and more than 60% of these are female.** Consequently, and also due to other reasons, more women than men work in low-status jobs. Thus, the differences in educational status and economic empowerment will have to be narrowed and eliminated as we move towards more inclusive growth. With the increasing feminization of agriculture, women contribute more than 50% of the agricultural workforce, particularly in hill areas. Considering the prevailing gender inequality, special effort must be made to empower women technologically for increasing their work efficiency, reducing drudgery and increasing income. **Women's education and training, thus, should receive greater emphasis.**

4.2.3 **With about 13% of its youth unemployed, India has the largest number of unemployed youth in the world**. The figures vary from State to State, being as high

as 35% in Kerala. There has been increasing concern among policy makers that the frustration that accompanies long-term unemployment among groups of young people feeds political and ideological unrest and violence. It has also been argued that unemployed and idle youth, who have emerged in society as part of a large "demographic bulge" may question the authority of government and endanger its stability. The upsurge in naxalite movements and terrorism in recent years may partly be ascribed to the increasing high unemployment. These "left out" human resources should be empowered to employ themselves in farming and allied activities, thus mainstreamed in the nation building process.

4.2.4 India's labour force generally remains low-skilled and illiterate – on an average the labour force has 4 years of education; more than 42% has no education and only 6% has tertiary (college) education (**Table 1**). Women have education attributes that are significantly worse – the vast majority have no education and only 4% have college education. **The high illiteracy and unemployment or underemployment rates are closely linked with the high incidence of poverty and hunger in the country**. Currently, about 80 million youth, age group 15 to 24, live on less than one dollar a day, and about 200 million young people live on less than two dollars a day accounting for about 35 per cent of the world's youth in these categories. Likewise, nearly 45 million or 28% of the world's 160 million undernourished youths have their homes in India (Curtain, 2004).

Table 1: Levels of Education of the Labour Force (1999/2000)

	Average years of education	**No education [%]**	**Tertiary Education [%]**
All	3.9	42.4	6.3
Male	4.6	33	7.3
Female	1.9	68.3	3.7

Source: Ghose (2004)

4.2.5 As regards the sectorwise distribution of the labour force, about 56% is engaged in agriculture, down from 65% in the early 1990s. It is important to note that although the share of agriculture in total GDP has dropped to about 20%, its share in employment is still very high, emphasizing the social value of the sector and its

importance for livelihood security of the average citizen – the **social inclusion** dimension.

4.2.6 Of the remaining labour force, about 13% are engaged in manufacturing and the balance are employed in the service sector which has grown from 25% to 32% of total employment over the past two decades. The organized sector provides about 8% of the total jobs and the remaining 92% is provided by the informal or unorganized sector. It is estimated that the country's labour force is currently growing by 7.5 to 8 million persons per year. But, sadly enough, **only about 6% of India's workforce has received formal training in vocational skills, compared with 60% or more in developed and most rapidly developing countries.**

4.2.7 Even though the economy has been growing at 6 to 8 per cent per annum during the past few years, there has been limited impact on job creation in the rural economy. The process of growth in the future thus must pay attention not only to the GDP growth rate, but also to growth pattern of employment. The employment growth rate in the rural areas is continuously decelerating, dropping from 2.12 percent during the decade ending 1983 to 0.68 percent during 1993/94 to 1999/2000 (Sheela Bhalla, paper prepared for NCF, 2005). The fall was much steeper in the agricultural sector as compared to that in the non-farm sector. A reduction in proportion of the population employed in the primary sector is a natural and inevitable trend that is spurred by rising expectations and changing attitudes as much as due to rising levels of farm mechanization. However, this does not mean that the potential for employment in the agriculture sector is being fully exploited. **Strategic initiatives to modernize and diversify Indian agriculture, both horizontally and vertically, particularly in the areas of post-harvest management and farm-level processing and value addition, can generate quality employment opportunities for a very large number of rural people.** The livestock, horticulture and fisheries sub-sectors are growing at about 3 to 5 per cent per annum, against growth rates of 0 to 1.0 per cent in crops, thus offer greater employment opportunities.

4.2.8 The State-wise data show that there was overall negative annual growth of rural employment during 1993-94 to 1999-2000 in Goa, Himachal Pradesh, Tamil Nadu, Tripura and Arunachal Pradesh. In Andhra Pradesh, Karnataka, Maharashtra, Rajasthan, West Bengal and Meghalaya the growth rate was positive but below the national level of 0.68%. The negative or extremely low growth rate of employment in some of the larger States like Tamil Nadu, Himachal Pradesh, Andhra Pradesh, Karnataka, Maharashtra, Rajasthan and West Bengal is very disturbing. Incidentally, Maharashtra, Andhra Pradesh and Karnataka which had registered very low rural employment growth during 1993-94 to 1999-2000 are also States where many farmers have committed suicides during the last five years, and the tragedy continues.

4.2.9 One of the main considerations of the youth in adopting farming as the means of his/her livelihood security is its economic viability. At the national level, the average monthly income of farmer household is Rs. 2115, with considerable inter-state variation, ranging from around Rs. 5,000 in Jammu and Kashmir and Punjab, around Rs. 4,000 in Kerala, Rs. 3200 in Assam, between Rs. 3000 and 2000 in most States and between Rs. 2000 and 1000 in Bihar, Andhra Pradesh, Uttar Pradesh, Chhattisgarh, Rajasthan, Madhya Pradesh and Orissa, in that order being only Rs. 1062 – the lowest in Orissa (NSS, 2002/03). On an average, nationally, cultivation, wages, non-farming business and animal farming, respectively, contributed 46, 39, 11 and 4 percent of the total monthly income. **The scope of livestock for increasing farmers' income and employment is generally highly under-exploited. Agricultural and non–agricultural employments must complement each other**. For an agricultural graduate to return to village, he/she should have diversified opportunities for income generation. Therefore, we suggest an integrated Rural Livelihood Initiative.

Educational and Training Institutions

4.2.10 **Agriculture, Veterinary, Animal Sciences and Fishery Universities:** The National Agricultural Education System, one of the largest in the world, comprises 39 State Agricultural Universities (SAUs), 5 Deemed Universities (DUs), 1 Central Agricultural University (CAU), 3 Central Universities with Agricultural Faculty, 207

Agricultural Colleges and 50 Private Agricultural Colleges. The SAUs include 2 Veterinary and Animal Science Universities, 2 Animal Science and Fisheries Universities and 1 Horticulture and Forestry University. In addition, one Indian Institute of Technology and 16 State General Universities offer degrees in Agriculture and Allied Disciplines. The System imparts Bachelor's level education in 11 broad disciplines which include Agriculture, Horticulture, Fishery, Forestry, Home Science, Sericulture, Dairy Technology, Agricultural Engineering, Food Science Technology, Agri-Business (including Marketing), Banking and Cooperation, Master of Science (M.Sc.) degree in as many as 95 specialized disciplines of Agriculture and Allied Subjects and Doctor of Philosophy (Ph.D) degree in 80 agricultural disciplines.

4.2.11 While the agricultural education grid of the nation has produced a large number of talented graduates and post-graduates, **over 40 per cent of the farm graduates are unemployed.** The mismatch between employment and education may be assumed partly to the following weaknesses in the education system:

- Lack of desired responsiveness to the changing scenario and temporal needs, especially in the Home Science
- Lack of competence, confidence and entrepreneurial ability
- Paucity of required upgradation, competence and skill development opportunities
- Inflexible, mismatch between theory and practice leading to the lack of risk bearing capacity and confidence
- Lack of adequate updating and modernisation of curricula and resources.
- Recalcitrancy to broaden the base of education for agriculture.

4.2.12 Skill development is important especially for the knowledge-based precision agriculture. Strengthening education and skill building need the attention of both the Government as well as the private sector in association with the academia. **Isolation of education (even training) from the ground realities is the basic flaw of the Indian system.** A serious mismatch is observed between the needs of the modern agriculture and the availability of skilled manpower. In spite of surplus graduates in general agriculture, deficits were witnessed in post-harvest management, agroprocessing, value

addition, packaging, marketing, veterinary care, integrated management of pests and diseases, handling of bioagents and application of quality standards. If Indian agriculture has to grow at around 4 per cent per annum, it will be necessary for the education and training system to produce at least 100,000 technically-skilled people every year. Notwithstanding the need for an analytical analysis and estimation of number, quality and discipline-wise requirement of trained and educated agricultural experts and preparing the necessary roadmap to achieve the target, **it is estimated that the country would need an incremental requirement of about 1.5 million skilled technicians by 2015**. As we move up the technology ladder and begin to produce modern products in greater volumes and provide efficient services, particularly in the fast expanding private sector, qualitative growth in skilled manpower is essential.

4.2.13 Towards women's technological empowerment, Home Science education needs to be totally reorganized. The training during the first 3 years can deal with general topics in science and nutrition. But the final year should provide a number of options such as management of biodiversity and biotechnology, Horticulture, seed technology, food technology, renewable energy management, information technology and GIs mapping. **Home Science Colleges should be named and structured as Colleges of Agricultural Technology and Nutrition for Women** so as to reflect the technological and skill empowerment of women in market-driven technological enterprises and sustainable management of natural resources, and not just home occupation. Since, issues relating to nutrition security and post-harvest technology are equally important for men, some of the **Home Science Colleges can be developed in Colleges of Human Sciences**.

4.2.14 **ICAR Institutes*:*** The Indian Council of Agricultural Research (ICAR) is the apex organisation for conducting and coordinating agricultural research, education and extension. It comprises 4 National Institutes, 45 Central Institutes, 31 National Research Centres, 12 Project Directorates, 5 Bureaus and 91 All India Coordinated Research Projects, besides nearly 500 KVKs. With more than 20,000 scientists working for the system, the Council is one of the largest agricultural research systems in the world. Alleviating hunger, providing employment and increasing farm income through the development of new technologies, their effective transfer and the generation of

appropriate human resources are the major mandates of the Council. Each ICAR institute has a strong component of training for generating adequately trained boys and girls to strengthen agrarian economy in the country. The effort has succeeded to a considerable extent, but, in recent years, employability of the educated agricultural human resources has declined rather sharply.

4.2.15 **Krishi Vigyan Kendras (KVKs):** Krishi Vigyan Kendras (KVKs), numbering nearly 500, each district likely to have at least one KVK, constitute one of the most eminent institutional networks to impart technical literacy by using the pedagogic methodology of learning by-doing. Presently, KVKs are functioning almost independently with overall direction and supervision of the ICAR/or State Agricultural Universities. Their coordination with State Government is not up to satisfaction. It is essential to restructure the KVKs so that their activities are integrated with those of other relevant institutions for more effective agriculture extension and human resource development efforts. It is understood that ICAR is considering Report of a Committee set up for this purpose. In view of the resources, expertise and infrastructure facilities available with KVKs, it is necessary for them to take higher responsibility in providing better quality services to the farmers both at the production and post-harvest phases of farming.

4.2.16 With the onset of an era of low external input sustainable agriculture (LEISA) imparting new skills and information empowerment has become vital. Organic farming and ever-green revolution are also more knowledge intensive than chemical farming. The KVKs should thus become the hubs of the agriculture led transformation of Indian economy. They should train large number of **Soil Health Practitioners** in villages and should provide services to safeguard soil, plant and animal health and irrigation water quality. They should provide training in precision farming methods leading to land and water-saving farming practices. They should develop expertise in post-harvest technology, particularly in perishable commodities like vegetables, fruits, flowers and animal products. Accordingly, as suggested in the First Report of NCF, **the Krishi Vigyan Kendras should be renamed and restructured as Krishi Vigyan and Udyog Kendras.**

4.2.17 Young graduates and entrepreneurs can be trained by KVKs to set up their self-employment ventures and enterprises for providing quality service to farmers with superior technology. In collaboration with the restructured and reinvigorated Small Farmers Agri-business Consortium (SFAC), KVKs can prepare model project reports for such ventures to take up entrepreneurial activities. They should generate awareness about issues relating to bio-conservation, bio-security, safe application of biotechnology and the rights enjoyed by farmers under law. They may also impart training on issues relating to credit, insurance and other related areas. Depending on location, some KVKs may specialize in specific areas like agroprocessing and post harvest management of specific commodities, organic farming, medicinal and aromatic plants, and rural infrastructure for better learning. They should be connected to Village Knowledge Centres (VKC) or *Gyan Chaupals* and actively promote gene, biosafety, quality and food safety literacy of the farmers and other stakeholders. Finally, KVKs should function as a resource center for Agriculture Technology Management Agency (ATMA) and other such agencies, and work in congruence with them.

4.2.18 **CSIR Institutes Related to Agriculture and Food:** More than a dozen Institutes of the Council of Scientific and Industrial Research (CSIR), such as, Centre for Cellular and Molecular Biology, Hyderabad, Central Food Technological Research Institute, Mysore, Central Institute of Medicinal & Aromatic Plants, Lucknow, Institute of Microbial Technolgy, Chandigarh, National Botanical Research Institute, Lucknow, Central Leather Research Institute, Chennai are conducting quality technology generation and transfer programmes related to agriculture, food and rural development.

4.2.19 The ICAR, Ministry of Agriculture, Ministry of Rural Development and Ministry of Food should be closely linked with these Institutes and laboratories which have tremendous impact on training, attracting and retaining youth in farming and other rural enterprises. For instance, the Central Food Technological Research Institute (CFTRI) offers an extensive range of programmes of academic as well as industrial importance that attract participants from many regions of the world. The International Food Technology Training Centre (IFTTC) and the International School of Milling

Technology have trained a large number of national and international young scientists, several of them being self-employed entrepreneurs. The Institute also runs continuing education programmes. Its Industry-Oriented Short Courses offer national as well as international level short-term courses (of 1-3 weeks duration) on a continuing basis for technical staff from food and allied industries, academic centres and R&D units, to keep them updated on the current and emerging trends in specialized as well as general areas of food technology. Eighteen of these courses are of particular interest to farm graduates and Farming Youth. These courses also provide a forum for the R&D scientists to interact and build synergy with the industry.

4.2.20 **Jamsedji Tata National Virtual Academy for Rural Prosperity**: The Jamsedji Tata National Virtual Academy (NVA) of the M.S. Swaminathan Research Foundation has taken key steps of training grassroot workers to use ICTs for agriculture and rural development. The NVA aims to convey such knowledge directly to villages thereby empowering rural and tribal families to achieve a better control of their own development and to build skills and capacities relevant to enhancing opportunities for sustainable livelihoods. These trained persons will constitute the "**core competence of rural India**" and serve as agents of change in rural India. The Academy is emphasizing pedagogic methodology of learning by doing to bring about a learning revolution in villages. NVA Fellows represent a wide range of competencies and expertise – agriculture, education, micro-finance, environment, health, marketing, disaster management and numerous other fields. Some have, with tremendous grit and determination, raised themselves out of dire poverty or difficult life circumstances to undergo training and acquire skills for self-employment, which they have in turn shared for the benefit of their community. The aim of NVA is to enroll one million Fellows (about one woman and one man for every village) by the year 2010. They will become the torchbearers of the **Rural Knowledge Revolution**.

Farm Graduate and Post Graduate Outputs and Employment Status:

4.2.21 India annually produces nearly over 22,000 Agricultural Graduates and Post Graduates. One-fourth of these are women. About 40% of the Graduates remain

unemployed or highly underemployed or misemployed**.** Often, they hail from rural areas belonging to poor to average farming families. However, this is not true uniformally throughout the country. For instance, one-fourth to one-third of the horticultural graduates from the Karnataka Agricultural University get employment, mostly in banks and private sectors, and most of the remaining two-thirds proceed for higher studies. However, this is not the case for a large number of graduates coming out from private agricultural colleges in the North. For instance, in Haryana, there is hardly any opening for farm graduates in the public sector, about 5 percent are getting absorbed in private sector, about 10-15 percent are proceeding to do M. Sc. Ag, about 8-10 percent are diversifying for MBA and other professional Master degrees and remaining about 70 percent are unemployed. A good number of the unemployed end up doing M.Sc. Ag without adding to their employability.

4.2.22 Employment potential of the various fields of graduation differs significantly. Currently, the potential is: **Good** in: Veterinary, Dairy Technology, Food Technology and Fisheries; **Intermediate** in: Agricultural and Engineering and Horticulture and Forestry; and **Poor** in: Agriculture and Home Science.

4.2.23 The World Science Report (UNESCO, 1993) had revealed that during the 1980s, total number of agricultural and veterinary graduates in India had registered a growth rate of 4.1 percent and 3.4 percent, respectively. Availability of scientists in agricultural research and education was 0.028 per 1000 population against 0.1 per 1000 population for the world as a whole. A survey (1994) of supply-demand scenario of trained manpower in agriculture by 2005 had projected a shortage of trained manpower by 113,000. The M.S. Swaminathan Committee on Education for Agriculture, ICAR, 1998, had observed that (i) There is need for at least one farm graduate for each Gram Panchayat and Nagar Palika, projecting the requirement of 0.7 million farm graduates, (ii) There is an urgent need for increasing the number of Veterinary Graduates, (iii) There are serious regional disparities in the availability of farm graduates, and (iv) Private sector is emerging as a big employer in agriculture and allied fields, including R&D, farm production, seed development and multiplication, agro-processing, post-harvest

technology, dairy production and processing, poultry, meat and meat products, food-processing, biotech products, health products and extension services.

4.2.24 As per available estimates of Applied Manpower Research Institute (AMRI 2000), upto the year 2000 the country produced about 166,200 graduates in agriculture and allied areas, 78,200 post graduates and 11,400 doctorates. The employment pattern of agricultural graduates during this period has been to the tune of 50 per cent in public sector, 20 per cent in private sector, 12 per cent in research and academics, 6 per cent in financial institutions including NGOs, only 2 per cent self- employed and the remaining 10 percent in other spheres. The AMRI analysis had revealed that 43 per cent of agricultural graduates and 23 per cent of the post-graduates were unemployed. Due to economic shifts and changes in growth pattern, the employment situation has worsen. The temporary positions of Research Associates and Research Fellows in time bound short term projects add to the gravity of the problem and the uncertain prospects of regular employment of thousands of such graduates and mostly post-graduates is indeed pathetic. The paradox of co-existence of the huge unmet demand on one hand, and the huge "idle" supply (unemployed graduates) on the other, is a matter of great concern and calls for urgent and priority redressal of the mismatch.

4.2.25 Regional imbalances in agricultural growth are increasing. North East India is a case in point. The Swaminathan Committee on Agricultural Research (Planning Commission, 2004) has recommended the creation of a sub-cadre in the Agricultural Research Service (ARS) of ICAR for the North East. This will help a large number of young women and men farm graduates to render life-long service to their respective States in this natural and human resources rich region.

4.3.0 Pre-requisites for Attracting and Retaining Youth in Farming

Rural Infrastructure

4.3.1 Fortunately, several significant initiatives have been taken by the Government in recent years to improve the situation on the infrastructural and other related fronts. Some of the important initiatives are: Bharat Nirman, National Rural Employment

Guarantee Programme, Sarva Shikcha Abhiyan, National Rural Health Mission, Enhancement of Agricultural Credit and Lowering of Interest Rate, National Horticulture Mission, National Rainfed Area Authority, National Fisheries Development Board, Changes in the APMC Act (to make it farmer-friendly), Warehouse Receipt Act (making warehouse receipts a negotiable instrument, thereby helping to prevent distress sales), and Knowledge Connectivity through the e-governance and Every Village a Knowledge Centre/ *Gyan Chaupal* programmes. The time is therefore opportune for the graduates to avail of the above initiatives and return to rural areas for helping to revitalize our agricultural progress by making agrarian prosperity the bottom line of government investment and agricultural and rural development policies leading to increased employment opportunities for farm graduates.

4.3.2 **Bharat Nirman**: Bharat Nirman is a time-bound programme to foster job-led economic growth in villages and to bring about a shift from unskilled to skilled work in the case of women and men without assets like land, livestock or fish pond. Improved communication (roads and telephones) and provision of electricity will help to open up new opportunities in the rural manufacturing and trade sectors. Ten million hectare additional agricultural land will be brought under irrigation, thus greatly enhancing agricultural productivity and sustainability and farmers' income. Bharat Nirman's thrust on knowledge connectivity through *Gyan Chaupal* or Village Knowledge Centre will bring unprecedented knowledge-driven socio-economic transformation in our villages, particularly in the removal of many intermediaries causing the market and income slippage.

4.3.3 **PURA (Providing Urban amenities in Rural Areas):** PURA is an example for creating rural wealth and prosperity. Knowledge powered rural development is an essential need for transforming India into a knowledge power and high bandwidth rural connectivity is the minimum requirement to take education, health care and economic activities to the rural areas. Knowledge society leading to knowledge super power can prosper and survive only in the environment of economic security and internal security. Physical connectivity by providing roads, electronic connectivity by providing reliable communication network and knowledge connectivity by establishing professional

institutions and vocational training centers will have to be done in an integrated way so that economic connectivity will emanate, as exemplified by the Byrraju PURA (Andhra Pradesh), Periyar PURA (Tamil Nadu), Loni PURA (Maharashtra) and Chitrakoot PURA (Madhya Pradesh) **the Hon'ble President had observed, "The operational PURA system has increased the literacy rate, brought down the infant mortality rate, created employment opportunities for the people, increased the per capita income of the villagers and brought the smiles in the faces of villagers in that PURA cluster. In all these three PURAs, employment generation was the focus using technology experiences from the colleges and educational institutions and through assessment of markets, which can absorb the products and services."** The experience is being replicated at a faster rate and would prove instrumental in attracting and retaining the youth in farming.

4.3.4 **Sarva Shiksha Abhiyan (SSA):** Education is the most critical element in empowering people with skills and knowledge and giving them access to productive employment in the future. A major step was taken by the Government of India in 2004-05 to ensure effective funding of elementary education by the levy of 2% Education Cess earmarked for the Sarva Shiksha Abhiyan. The Mid Day Meal Scheme, Integrated Child Development Scheme and Early Childhood Education should be integrated with SSA and education should universalized upto High School or Class X. Agriculture should be made a compulsory subject upto High School. Specific educational curricula focusing on the needs of rural youth can enthuse them towards agriculture and enhance their skills.

4.3.5 **Government Programme on Youth for Leadership in Farming (GPYLF):** The ICAR should hold hands of selected rural school children at secondary level who have an aptitude and means to adopt farming as their profession. To begin with, depending on size of the State, about 50 to 150 boys and girls should be identified from each State to participate in one-week programme at an ICAR Institute or SAU or a Farm School in the region. The young minds should feel the thrill and excitement of science-based agriculture and critical appreciation of scientific principles. It should also aim at active participation in the learning process through experimentation and putting into practice the knowledge acquired in the classroom. The efforts should motivate young

people to take to agriculture as a profession. This will expose the young-ones to the multi-functionality of agriculture and the thrill of making a good living in a healthy and vibrant green environment. The interested ones should be supported to undertake repeat visits to sustain and further intensify their confidence in knowledge-led agriculture.

4.3.6 **National Rural Health Mission:** A seven year National Rural Health Mission (NRHM) has recently been launched to address infirmities and problems across rural primary health care. The Mission would converge the public health approach into primary health care and aims to empower and support Panchayati Raj institutions to manage, administer and be accountable for health services at community levels. It aims at effective integration of health concerns with determinants of health like safe drinking water, sanitation and nutrition through integrated District Plans for Health and aims to introduce effective risk proofing mechanisms and social health insurance and take advantage of local health traditions. **A Nutrition-cum-Drug Based Approach** to support rural families affected by HIV/AIDS, tuberculosis, malaria and leprosy is needed to assist in recovery and restoration to a productive life. The "sick" farmer is not able to undertake his farming duties. Therefore, is Approach should become an integral part of the National Rural Health Mission.

4.3.7 **National Horticulture Mission:** The Government has accorded high priority to horticulture by having launched the National Horticulture Mission (NHM). The Department of Agriculture and Cooperation has allocated Rs 1951 crore to NHM for the Annual Plan 2006-07 out of the total allocation of Rs. 4800 crore to Agriculture as a whole. While this huge 41 percent of the total outlay allocated to NHM underscores the pivotal role that the horticulture sub-sector is expected to play in the national economy, we hope that, unlike its forerunner project "Horticulture Technology Mission", the benefits of NHM will reach the small and marginal farmers as well as to landless agricultural workers.

Non-Farm Employment

4.3.8 NSSO data 1999-2000 had revealed that in rural areas, of the employed 305 million people, 232 million people or 76% were employed in agriculture as compared to

73 million or 24% in non-farm sector. **The employment elasticity of labour in the agriculture sector is now very low. Almost all the rural employment growth in the last few years took place in the unorganized Non-Farm sector - between 1993/94 and 1999/2000 almost 12 times of that of Agriculture.** The opportunity in the Non-Farm sector must be captured so as to improve the income and livelihood security of the rural people and also to provide stimulus to agricultural growth, thus attracting more and more youth to take to farming and related businesses in villages and rural townships, **integrating the on-farm and non-farm employment.**

4.3.9 Thus, there has to be a two-pronged strategy for attracting and retaining educated youth in farming. Farm graduates who own land should be encouraged to take to farming as a profession. **Farm Schools** on the lines recommended by NCF in its First Report, could be established in the fields of such farm graduates who are operating agricultural enterprises efficiently. Secondly, farm graduates who do not own land can be assisted to provide demand driven services through Agri-clinics, Agri-business centres, Food Parks, etc. There should be Capacity Building and Mentoring Centres to assist farm graduates to set up Agri-Clinics and Agri-Business Centres. To the extent possible, groups of 3-4 Graduates can be formed for running these enterprises. For providing Mentoring and Hand-holding Services, professors and scientists as well as NGOs could be enlisted. Arrangements should also be made for the farm graduates to undergo apprenticeship in suitable Companies. Concurrent attention should be given to on-farm and non-farm employment so as to optimise their synergism.

4.3.10 A study commissioned by the NCF had revealed that three pillars are important for creating non-farm employment opportunities. Firstly, the foundation for accelerated employment and labour productivity growth in the non-farm sector is infrastructure investment. For the non-farm sector, the key components are reliable electricity supply, all weather roads and access to landline telephone facility. Secondly, access to affordable and timely credit is crucial. It should be available for medium scale as well as tiny and small-scale units and for expansion of existing units as well as for start up of new units. Credit should be provided by formal sources which should pay special attention to productivity raising investments, for example, the motorization of previously

manual labour operations in carpenter's shop. Thirdly, the non-farm development thrust should be directed to particular sector and sub-sectors where demand for the product or services is growing, namely, trade, transport, construction, repairs and certain services.

4.3.11 The food-processing sector is dominated by small-scale producers including traditional village industries, although some very large companies have lately entered this sector. However, the link up of small units with the large units has not developed adequately. A system should be developed where initial processing could be decentralized in the rural areas in small units [creating employment and reducing transport costs] and the final processing, quality control, packaging and marketing under brand name could be done in a centralized manner [by a farmer's organisation or other business unit] near or in a city in an integrated manner. In order to bring our food products at par conforming to international safety and quality standards, it would be essential to set up a **network of quality testing/certification laboratories across the country and also build the awareness level of our farmers on food safety, quality and trade.** Thousands of suitably trained human resources are required towards this movement.

Mechanisms and Institutions for Non-Farm Employment

4.3.12 A series of institutional, structural and strategic arrangements have been made and proposed from time to time to provide non-farm employment. These include: Khadi and Village Industries Commission (KVIC); National Rural Employment Guarantee Programme (NREGP); Agri Export Zones (AEZs); Technology Parks such as Biotech Parks, Food Parks, Textile Parks; Small Farmers' Agri-business Consortium (SFAC); and Food, Fodder, Feed, Seed and Gene Banks.

4.3.13 **Khadi Village Industries Commission:** KVIC, with its 30 State khadi and village industries boards, over 3,500 institutions, over 29000 cooperative societies, 14200 sales outlets and its Boards assisting over 5 lakh artisans and having reached 2.35 lakh villages, is perhaps the largest retailing system in the country. But, its potential in the marketing system has not been fully exploited. To bridge this gap, a good number of

corporate houses have entered the retailing sector. KVIC should modernize and strengthen itself to energize the rural marketing system. SFAC, started by Dr. Man Mohan Singh, the then Finance Minister in 1992; which is yet to prove its utility of enabling small farmers to take to market driven agri-business, should join hands with KVIC in the process of setting up technical back-up units interface (TBU/Interface) with several institutes in the country to provide thrust to entrepreneurship programmes supported by strong science and technology research inputs for production activities utilizing local resources and local skills of the people. This modernized huge network should be able to provide quality employment to thousands of Farm and other Graduates in the rural areas and provide the missing market infrastructure to directly link farmers with the market.

4.3.14 **National Rural Employment Guarantee Programme (NREGP):** Work, water and power are the triple needs of rural India for accelerating economic development. NREGP will particularly promote inclusiveness and help in building rural assets particularly in these areas which would increase sustainable income generating opportunities in the rural areas and the programme should favour the unemployed youth, rural women, the tribals and the other distressed people. The ultimate aim of NREGP must be to train/retrain and improve the human capital from unskilled to skilled so as to enhance employability of rural people who could more effectively and sustainably contribute to the rural reconstruction process.

4.3.15 **Agri Export Zones:** The 60 AEZs already notified by the Government in 20 States also provide unique opportunities for self-employment of educated youth who could deliver an appropriately priced and attractively packaged quality product in the international market. APEDA supplements, within its schemes and provisions, efforts of State Governments for facilitating such exports. The products covered are mostly horticultural – fruits, vegetables, potatoes, flowers, medicinal and aromatic plants. Basmati rice, quality wheat in Madhya Pradesh, sesame seeds, vanilla, seed spices, lentil, gram and Darjeeling tea are also included. Performance of the AEZs has, however, been uneven. A peer evaluation has been conducted to assess the strengths and weaknesses and to suggest remedial measures. Action plan to give impetus to the scheme is being

framed. This initiative should be linked with related KVIC Programmes and activities to leverage employment of farm graduates and other educated youth. Some of the non-performing AEZs could be converted into Rural Economic Zones (REZs) with a broader objective of attracting the private sector to develop rural infrastructure, efficient and reliable inputs supply and rendering effective extension services geared for competitive and enhanced agricultural production and distribution. The Government should provide necessary fiscal and other concessions to the private sector, as being currently done for the AEZs. The move will create a good number of both on-farm and non-farm jobs. If successful, the model should be widely adopted. The recent initiatives of some of the leading corporate houses, the moves on farmer-friendly contract farming, NREGP and **Rural Business Hubs** should converge within the **Rural Economic Zones** through the **Pan- Ministerial** arrangement proposed by NCF.

4.3.16 **Technology Parks:** In order to provide end-to-end connectivity and to ensure backward-forward linkages among various components of production-processing-marketing chains, Technology Parks – Biotech Parks, Food Parks, Textile Parks etc are being rapidly established. As far as possible, these parks may not be located in large cities but should be strategically established in smaller or satellite towns contiguous to rural areas with effective transport, communication and market linkages. A good example is the Womens' Biotechnology Park functioning in Siruseri village near Chennai. These parks should work on the lines of IT Parks so as to attract farm graduates and other Graduates with experience in Agri-Business and entrepreneurial development. The parks must become hubs of outsourcing of products of international quality, such as designer hybrid seeds, vitrocultured material, bio-pesticides, bio-fertilisers, etc. which will be particularly conducive to the expansion of organic farming. With the termination of the textile quota regime in textile importing countries, textile parks in India have huge opportunities to expand textile and garment export and thus generate sufficient additional employment. **Such parks will exert a "pull" for provision of quality raw materials and promote congruence between off-farm and non-farm employment**.

4.3.17 **Food, Water, Fodder and Feed Banks:** Food Banks or Community Grain Banks are an important component of food security package. These are congruent to the

Public Distribution System (PDS) to enhance access to food on part of the poor as well as to widen the food security base by including wide range of millets, grain legumes and tubers. Likewise, Community Water Banks, consisting of augmented supplies, demand management through the principle of "more crop per drop", and harnessing new technologies for enhanced water use efficiency, should be established. As detailed in NCF Second Report, about 1200 Fodder and Feed Banks should be established at strategic sites, with priority in rainfed arid and semi-arid zones. These Banks should be created at Panchayat Samiti level and managed preferably with the help of SHGs and Small Farmer Estates involving also farm graduates and other youth.

4.3.18 **Seed Banks:** Seed Banks, particularly established and managed by farm graduates, could be a full time quality Non-Farm employment avenue. The Seed Banks are important especially for ensuring contingency crop production in the event of droughts and floods and other natural disasters as well as for ensuring timely planting. Seed villages for different crops, strategically located throughout the country, with at least one Seed Bank located in each large village are cluster of small villages, will ensure better income not only from seed production but also from enhanced and sustained production.

4.3.19 **Gene Banks:** Under the National Protection of Plant Varieties and Farmers' Rights Act, the farmers and other rural communities should collect, conserve, document and utilize the indigenous genetic resources and establish Community Gene Banks. These Banks should be operated by farm graduates and other enlightened youth and should be linked with the National Gene Fund and National Biodiversity Fund. The efforts of the grassroot people in conserving the genetic resources should be duly rewarded under the Farmers' Rights. State Farms could be used for developing **Living Heritage Gene Banks** of the Germplasm of local breeds of cattle, sheep, poultry, etc. and, wherever possible, they should be handed over to farm graduates or farmers' organisations or NGOs for management on scientific lines and should be monitored by a committee consisting of local farmers' representatives, scientists and NGOs.

Synergy Among Employment Programmes: Pan Ministry of Agriculture- Ministry of Rural Development Initiative

4.3.20 All programmes for generating off-and non-farm employment should be integrated into one initiative like China's Town and Village Enterprise [TVE] Programme, and a **Rural Non-Farm Initiative** should be launched particularly for families without land or other productive assets. The need is for a counterpart to the National Rural Employment Guarantee Programme [NREGP] in the skilled employment sector. The initiatives like SFAC, Agri-clinics and Agri-business Centres, Food Parks etc could be strengthened and made more effective. The Rural Non-Farm Livelihood Initiative [RNFLI] could have as its core the KVIC and the restructured and strengthened SFAC and bring all rural non-farm employment programmes together, in order to generate convergence and synergy among them. A Consortium approach may be considered for the purpose involving the Central and the State Governments, Academia, NGOs, public and private sector industry, banks and financial institutions etc. The programme may have to be market driven and at a massive scale to have impact across the country. In order to achieve desired synergy among various Ministries presently dealing with Non-Farm Employment, it may be useful to consider some **reorganization and consolidation of all programmes concerning agriculture-led rural industrialization preferably in a Pan Ministry of Agriculture-Ministry of Rural Development Mode.**

4.3.21 The process of preparation of the Eleventh Five Year Plan has started. In the Eleventh Plan there is need for an integrated strategy of providing the services needed by farm families and for making our agriculture knowledge intensive. The strategy developed for this purpose should include providing space for self-employed farm graduates in undertaking enterprises and agri-services which will help them to earn their living. At the moment Government is running parallel services which are mostly free and therefore opportunities for earning by farm graduates are very limited. Therefore while designing the new strategy for the scientific transformation of crop and animal husbandry, fishery, agro-forestry and agri-business, there is need for integrated planning and action so that the different actors (Government, industry and farm graduates) all have

well defined spaces. There must be synergy and convergence in the different initiatives. In fact, increasingly the Government should play the role of a facilitator and withdraw from directly running agri-services particularly in those areas where successful SMEs run by rural youth have come up. Service cooperatives should play a proactive role in the REZs.

4.4.0 Generic Opportunities

Home Market

4.4.1 Nearly 94 per cent (in value terms) of our total agricultural produce is distributed and consumed domestically, and with a 1.1 billion population, we have a huge home market. NCF had recommended in its Third Report the establishment of an **Indian Trade Organisation (ITO),** which will safeguard the interests of farm and fisher families by providing a **Livelihood Security Box** to ensure fair trade. It should be emphasised that there is no level playing field between the capital, subsidy and technology driven mass production agriculture of the industrialised countries, and the '**production by masses'** agriculture of India characterised by weak support services, heavy debt and 'resource and technology poverty'. Reiterating that 65% of consumers in India are also producers, majority of them marginal farmers, we must jealously protect the interests of the majority producers-consumers instead the interests of traders-importers. The steps recommended by NCF for promoting an Indian Single Market need to be examined and implemented. The livelihood entitlements notwithstanding priority should be given to infrastructure development and services support for achieving sustained livelihood security. Moreover, nothing should be done which will destroy job opportunities in rural India.

Export Market

4.4.2 In relation to commodities that are exported, it will be essential to conform to WTO regulations. At present, such commodities constitute about 7 per cent of total agricultural production in the country. Quality and trade literacy programmes have to be launched across the country. Farmers' Associations and SHGs should be helped to export on competitive terms by spreading awareness of the opportunities available for external

agricultural trade. In such cases, cost, quality and reliability of supply will determine long-term trade relationships. The agri export zones should be further strengthened and should become places where farmers will get the best possible price for their produce.

4.4.3 **Horticulture:** Registering a steady growth of about 4 per cent annually, horticulture is hoped to enhance returns to the farmers, generate rural employment, increase farm exports and expand agro-industrial base. Despite the satisfactory growth, India's share in the world export of horticulture commodities and products is only 1 per cent. As mentioned earlier, the AEZs, most of which are structured around horticultural crops, including the fast growing floriculture industry, must convert this challenge into a great opportunity. Organic horticulture holds great promise for pushing up exports and farmers' income. The highly diverse agro-ecological settings in the country, matched with equally diverse and rich germplasm and aromatic plants offer unlimited opportunities for niche production, such as seabuckthorn in Ladakh (leh berry), value addition and distribution (domestic and export) of veritable horticulture species, providing new opportunities for youth employment. Several of the KVKs should be designated and restructured as **Udyan aur Udyog Vigyan Kendras** to generate desired human resources and technology transfer, emphasising backward-forward linkages. In the context of very many technologies developed for a diverse range of horticulture crops, it is essential to focus on a few priority technologies and species whilst addressing establishment of primary processing centres. Establishing primary processing centres at the selected rural centres of select fruit and vegetable crops for production in sizeable quantity would serve to protect the crop from perishability and reduction in bulk, and will promote easy transportation, storage and trade including value addition, and finally greater return to the farmer. Post-harvest losses in horticultural crops are estimated at Rs. 50,000 crore annually – a huge loss. The NHM thus must concentrate on prevention of post-harvest losses, processing and value addition, and quality, biosafety and trade literacy must be actively promoted throughout the production-distribution-consumption chain. The scope of employment generation for farm graduates and other Graduates is high mainly in the upstream areas, namely, basic processing, minimal processing and extended storage and processing.

4.4.4 **Medicinal and Aromatic Plants:** Medicinal and aromatic plants provide a window of opportunity to farm graduates and other youth to be employed in concurrent strengthening of health, food, nutrition, and livelihood security of farm families. India, as one of the biodiversity rich countries with a rich heritage of traditional medicine, whose demand in developed countries is expanding exponentially, has the potential to be a leading player in this sector. But the resources are not being judiciously harnessed. Global market of MAPs is estimated at about US$ 100 billion. India's share in this market is hardly 3 per cent. China's annual export of MAPs is valued at nearly US$ 50 billion. In order to harness this huge potential, investment must be made to ensure safety and efficacy of products, standardization of products and suitable regulation, proper pricing for harvested and cultivated produce, and to promote a market oriented cultivation for the home and external markets. Documenting and recognition of traditional knowledge on medicinal plants, and setting up a single window information portal are the areas needing immediate attention. In addition to the AEZ on MAP, community-based herbal gardens and enterprises and **Herbal Biovalleys** on the model of the Silicon Valley may be nurtured for providing the infrastructure needed for the conservation and sustainable use and export of medicinal plants. Organic and Contract Farming are particularly suitable for MAPs, especially in hill States, and deserve necessary technological institutional and marketing support.

4.4.5 **Biological Software for Sustainable Agriculture - Biopesticides:** Biopesticies industry is yet another highly underutilized employment opportunity for educated youth. About 700 products of different microbials are currently available worldwide. In India the utilization of microbials in pest management is in a take off stage with the commercial registration and availability of at least 16 bacterial preparations, 38 fungal formulations and about 45 insect viruses' formulations. A study carried out by the National Centre for Integrated Pest Management in 2004 has shown a wide gap between the demand and supply position of these microbials. The entire chain from production, marketing, quality control to utilization needs to be established and vitalized to ensure that the farmers have an easy, timely and cost-effective access to quality biopesticides. At present, biopesticides represent approximately 4.5 % of the world insecticide sales. The

growth rate of biopesticides over the next ten years has been forecast at 10-15 % per annum in contrast to 2 % for the chemical pesticides. The targeted growth rate can be achieved only if the serious constraints in the widespread adoption of biopesticides are overcome. Biopesticide registration procedure must be simplified. Trained personnel and well-equipped laboratory should comprise a network of accredited Referral Laboratories. Unemployed agricultural graduates can be trained in production, marketing and use of biopesticides and empowered to establish and operate **Bioclinics**, where biopesticides as well as biofertilzers could be produced and marketed. NABARD and other nationalized banks should support this initiative to establish viable small-scale cottage industries in rural area sector with technical support and provision of nucleus cultures of effective strains from SAUs and ICAR Institutes. Krishi Vigyan Kendras can function as hubs to network the rural producers in each district. Biopesticides have a crucial role to play also in organic cultivation. Due to the very nature of biopesticides, being live products, there are risks at different links of the production-utilisation chain, which should be covered through suitable insurance provisions. All the entrepreneurs / agricultural graduates engaged in biopesticide production should be given marketing help, sales and other tax waivers, and various target oriented incentives.

4.4.6 **Biofertilizers:** Biofertilizers, live formulations of agriculturally beneficial microorganisms, which on application to seed, root or soil can mobilize the availability of nutrients by their biological activity and help to improve the soil health, increase TFP, microbial life and soil stability, are other group of highly under-exploited biological software. India is one of the important producers of biofertilizers, annually producing 12,664 tonnes. Maharashtra, Karnataka, Tamil Nadu, Madhya Pradesh and Gujarat accounted for 30, 22, 21, 11 and 6 per cent of the national production, respectively. Several of the States, such as Punjab, Haryana, Himachal Pradesh, Assam, Bihar, Uttaranchal had negligible or nil production. Ironically, hill States, viz. Himachal and Uttaranchal, which have declared themselves as organic states, have zero production of biofertilizers. On the other hand, the country has enough scientific excellence, rich germplasm, and protocols for bulk productions. Realizing that TFP growth is declining as the soil carbon content is depleting fast, enhanced use of biofertilizers should be promoted to improve soil carbon, nutrient utilization efficiency, soil structure and product

quality. Integrated use of compound biofertilizers in combination with chemical fertilizers and other organic manures should be popularized as per the need of the cropping system prevalent in a given agroclimatic zone. In order to further enhance the effectiveness of biofertilizer use, there is a need to shift from carrier based inoculants to liquid inoculants as they have high cell count, longer shelf life and minimum contamination. Further, formulations should be developed which could be stored at room temperature for 1-2 years and quality of the product must be protected by opting for BIS standards and employing technically skilled personnel. All the suggestions made above for marketing, training, awareness raising, certification and institutional support for strengthening the biopesticides industry are equally applicable to the biofertilizer industry, and should be implemented.

4.4.7 **Vaccines and Diagnositcs:** Vaccines and sero-diagnostics provide yet other exciting avenue for self or salaried employment in the fast expanding livestock industry. In order to avail this opportunity, the following aspects must be kept in mind:

- The consistent production of high quality, safe, potent and efficacious vaccines requires quality assurance procedures to **ensure the uniformity and consistency of the production process**;
- **Vaccine quality, safety, potency and efficacy must be ensured** by consistency in the production process; Control procedures selected should be those that best fit the conditions under which vaccines are produced and should comply with good manufacturing practices; and
- Worldwide harmonization of standards for veterinary biologicals will be of help to chief veterinary officers who must follow the instructions given in the OIE International Animal Health Code, as they apply to all biological products for use in international trade; **worldwide harmonization of registration rules should be ensured** to simplify and facilitate international marketing of the products.

4.4.8 **Fisheries:** The fish industry is also expanding fast and may prove economically rewarding to young fishers. As recommended in the NCF's Second Report,

the **National Fisheries Development Board (NFDB)** will be a professional body and function on the lines of the National Dairy Development Board (NDDB) for assisting fisher families to enhance the productivity, profitability and sustainability of both inland and marine fisheries. The Board is supposed to give highest priority to infrastructure for post harvest handling, quality, processing and promotion of sanitary and phytosanitary measures towards increasing hygienic production and trade of fish. In particular, in order to enhance the market value of Indian fishes, production and marketing of special organic fish products and air-breathing fishes as health food should be given high priority. Recognising that fish production has been growing at relatively high rate of 4-5% per year, the strengthening of processing, value addition and export of fish and fish products will provide new employment opportunities particularly in coastal zones. However, with the rapid growth of aquaculture, this trend will be equally visible in inland fish production throughout the country. For instance, the large water-logged areas in Haryana could be most profitably utilized for scientific fish production, offering not only judicious use of unexplored resources but also significantly adding to the States' income as well as to the income of the fish farmers and other associated persons in the industry.

4.5.0 New Technologies

4.5.1 Access to market and innovative technologies will not only be intellectually stimulating but also a major motivating force for the young graduates to harness new technologies. The rural women and men must be self-employed with new skills and powers, such as biotechnology, information and communication technology, space technology and renewable energy technology. On the lines of ICT revolution in which India is the main outsourcing country in the world, the developments in the cutting-edge agricultural technologies could similarly be used by the huge trained manpower in India to provide need-based products, such as high quality hybrid seeds, vitro plants, vaccines, diagnostics, biofertilisers, biopesticides, etc. Necessary infrastructure and technology transfer mechanisms to establish integrated production-processing-marketing system will be essential for harnessing these opportunities. In every village at least one woman and one man should be trained to be **Farm Science Manager** so that army of grassroot enlightened and committed people could launch an eco-technology revolution – marrying

traditional wisdom and frontier science and technology, leading to an evergreen revolution.

Information and Communication Technology (ICT) - *Gyan Chaupals*

4.5.2 Ecologically sound and economically rewarding agriculture is knowledge intensive. Fortunately, based on the recommendations of the NCF, as contained in its First Report, the Government has already taken steps to establish knowledge connectivity through the e-governance and to develop **Every Village a Knowledge Centre**. For this, the Government is committed to provide a slew of measures so that rural user can access information of value and transact business. This will include connecting block headquarters with fibre optic network, using wireless technology to achieve last mile connectivity and operating information kiosks through a partnership of citizens, Panchayats, civil society organizations, the private sector and Government.

4.5.3 Effective implementation of the Every Village Knowledge Centre Movement and management of *Gyan Chaupals* will empower rural men and women by promoting and enhancing literacy and awareness at grassroots level especially on new and appropriate farming systems and season specific technologies, prices and marketing of inputs and agricultural produce and products and on disaster management and mitigation. New ICT technologies, such as e-agriculture, whereby agricultural information can be presented in multimedia formats to improve knowledge sharing in local cultural context, should be promoted.

4.5.4 Moreover, ICT systems must strengthen research-extension-education-farmer-market linkages through public private partnerships including the synergies with KVKs (KVUKs), ATMAs, SHGs, SFEs etc. With a greater emphasis on facilitating transparent and timely adoption of various regulatory standards and guidelines to enhance access to quality inputs and markets, the public sector extension and ICT system should play a leading role in the **Agricultural Renewal Movement**. The NCF recommendations on Community Radio for enhancing the access to the unreached and to harness “air waves or frequencies which are not private properties”- a sort of revolutionary development in the ICT sector, shall certainly attract farm graduates to these connectivities which will

instantly link them with the world and directly enhance their competitiveness in the domestic and international markets.

Biotechnology

4.5.5 Biotechnology is a revolutionary and high pace technology with unprecedented opportunity. But, its progress in India has not been satisfactory. So far the country grows only one commercial biotech crop product, namely, Bt. Hybrid Cotton, that too the technology was imported from a foreign multinational. Moreover, a part of the Bt Hybrid Variety seed distributed by some companies to the cotton farmers is " illegal." However, when quality authentic seed was used, the technology has certainly demonstrated its impact in significantly enhancing yield and fiber quality and in reducing environmental pollution and crop maturity duration, even though the seed was highly priced and the bio-safety measures adopted by the farmers have often been unsatisfactory. Bt. Detection Kits are available and should be used judiciously and transparently to confirm truthfulness of the seed and to build up quality control and faith of the farmers in the technology.

4.5.6 The biotech revolution is primarily propelled by the private sector. As per our needs, prospects and capacity, India should adopt an appropriate policy on biotechnology which must map out ways to benefit all stakeholders, especially small farmers, and minimize potential negative effects. The potential of biotechnology should be approached with a balanced perspective by integrating it with national development priorities, private sector interests, market possibilities, potential for adoption by farmers, public perceptions of safety, and consumers' views. An autonomous **National Biotechnology Regulatory Authority**, on the lines recommended by the Swaminathan Committee in 2004, should be established. The National Commission on Farmers, based on consultations with farmers and farmers' organisations, September 2005, suggested that the **National Policy on Biotechnology** must address the following issues: (i) value, usefulness and appropriateness of biotechnologies, (ii) risk and biosafety aspects and their management, (iii) equity and ethical dimensions, overall awareness and promotion of pro-poor features of biotechnologies, gene literacy, (iv) control of and access to

biotechnologies, the role of public and private sectors, harmonization of various regulatory provisions, and (v) investment in research and other institutional supports and partnerships for transparent and balanced harnessing of biotechnologies. It had emphasised that **Pro-poor features of biotechnology should be judiciously harnessed to attack directly the issues of food insecurity, malnutrition, and poverty**. These recommendations and the draft Policy should be firmed up and announced without any further delay. The safe and responsible use of the tools of genomics and genetic engineering will help to launch the country on the path of an ever-green revolution. The organic agricultural movement has also accepted Marker Assisted Selection as an important research tool.

Renewable Energy: Fuel Security

4.5.7 The spiralling high prices of petroleum and other fossil fuels have severely stressed the country's economy. Development and judicious use of renewable energy should thus be an extremely high priority for the nation. India's need for energy is projected to triple over the next 20 years. Energy that is now a severe drain on the growth of the local economy can be converted into an engine for economic growth by an alternative approach. Farmers and rural people have extremely poor access to regular energy supplies, which has been adversely effecting both agricultural production and on-farm agro-processing. Renewable energy technologies relevant for application in rural areas are Biogas Plants, Solar Photovoltic Technology, Biomass Gasification, Mini Hydro Power and Biofuel Technologies. In particular, If the country makes a strong commitment to the development of bio-mass power and bio-fuels, it can act as a powerful stimulus to rural job creation and prosperity, while radically reducing India's dependence on imported fuels. Farm graduates can lead the national bio-energy drive and help transform their own fate as well as the agrarian and overall energy economy of the country.

4.5.8 India also has the capacity to generate bio-fuels in massive quantities based on Curcas (*Jatropha curcas*). The cost of production is competitive with other fuel oils. Cultivation of 10 million hectares of this crop, often utilizing wasteland, could produce 12 million tons of bio-fuel annually, while generating year-round employment for 7.5 to

10 million people. Only proven genetically superior high oil-yielding clones should, however, be commercially popularized, otherwise the outcome will be unsatisfactory as already seen in some of the States.

4.5.9 Ethanol, which can be produced from maize, tapioca, sugarcane, sugar beet, sweet sorghum and other crops, is another bio-fuel with enormous potential. It can be mixed as a pollution-free blend with petrol and diesel. Ehanol-petrol fuel blends are utilized in more than 20 countries including Brazil, Canada, Sweden and USA. USA consumes 4 billion litres of ethanol as motor fuel per annum. Brazil consumes more than 16 billion litres of ethanol annually and meets 41% of demand for transport fuel from this source. Between 1979 and 1992, an ethanol fuel strategy enabled Brazil to reduce reliance on imported oil by 70 per cent.

4.5.10 India presently consumes approximately 40 million tons of diesel fuel and 6 million tons of petrol per annum. Assuming a 10% blend of ethanol with petrol and diesel, the total requirement of ethanol would be 4.6 million tons per annum. With engine adjustments, much higher ethanol blends can be utilized, creating a potential demand for more than 10 million tons of ethanol per annum. India's sugar economy has been fluctuating between surpluses and deficits. The strategy for sugarcane production for sugar and ethanol production should be worked out on economic considerations keeping in mind income of the farmers and consumers' need and economic access to sugar. Sugarbeet (tropical varieties) and sweet sorghum may offer better alternatives, which should be examined scientifically and economically and a national programme of biofuels should be developed. Likewise, maize holds promise for ethanol production in Punjab. A systems' approach is necessary for ensuring synergies among the various components of national biodiesel programme to delineate farming areas of crops used in ethanol and other biofuels. ICAR, CSIR and SAUs should jointly undertake to work on developing suitable processes for the purpose.

4.5.11 As suggested by NCF, the Planning Commission is proposing to establish an Integrated Rural Energy Programme (IREP) in the Eleventh Plan. An outlay of Rs. 1.2 crore per year per district would be provided for the implementation of the Programme,

total outlay being of the order of Rs. 4000 crore. The funds are proposed to be mobilized from the State Plans, as well as from NABARD, RBI and the communities and their beneficiaries. A major human resource development component would be included in the programme benefiting all stakeholders – from farmers upward. It is projected that as a result all India's villages will be energized during the next ten years.

Space Technology - GIS and Precision Farming

4.5.12 Space technologies, particularly Remote Sensing (RS), Geographical Information System (GIS), Global Position System (GPS), etc. are being used for forest cover monitoring, biodiversity mapping, regulating pollution, land and water resources management, pest forecasting, developing decision-support systems and disaster management. These developments will go a long way in **estimating gaps between current production and agroecological potential by systems' modeling and in generating and transferring technologies to promote precision agriculture, leading to efficient use of resources and inputs for attaining sustainability and enhanced productivity**. Monitoring of the Himalayan eco-system will greatly help in monitoring climate change and its management. But, are these technologies being adequately used in the country?

4.5.13 Using the various technologies and tools, emphasis should be placed on precision agriculture leading to the development of agricultural management system that takes care of within-field site-specific variability. It is the only viable alternative to optimize input and maximize output – a necessity for increasing India's agricultural competitiveness in the globalised and liberalized world. Adequate financial and human resources should be provided to develop necessary hardware and software. These should be made available to each KVK and ATMA center. The Farm graduates and other educated youth should find these developments particularly stimulatory to attract them to science-led precision farming. Synergistic interventions of scientists, field functionaries and farmers are called for. A National Institute for Space Applications and Precision Farming should be set-up jointly by ISRO and ICAR to provide the necessary technological leadership to assist the States and decentralized institutions in different

agro-ecological zones of the country to apply the new techniques towards precision agriculture and resource conservation and use.

4.6.0 Opportunities in Major Agro Ecological Zones

Hill Areas

4.6.1 Mountain and Hill ecosystems cover nearly 50% of the total national geographic area and occur in almost all the agro-ecological zones of the country. The Himalayas, extending 2,500 km in length and 250 to 400 km in breadth, the tallest water tower of our planet, occupy about 80% of the mountain and hill area of the country. This ecosystem is the richest repository of biological and agrobiological diversity, and the snow and glacier fields act as reservoirs for terrestrial and aquatic species and snow micro-organisms. Pashmina goats, yak, aromatic rices, landraces of sorghum, veritable fruits and vegetables, multicob maize, saffron, orchids, bamboos, cold water fishes and the like constitute unique germplasm treasures of the hills and mountains. Several rare genes have been used from Himalayas and Western and Eastern Ghats for enriching our major crop species.

4.6.2 **Organic Farming:** Some of the hill States have declared themselves as organic States. The world trade in organic agricultural products is currently of the tune of about US$ 40 billion and has been growing at an annual rate of 15% in the recent years. India's share in the global trade is, however, only 0.3%, but has the potential to be raised to 20%. Several national and international enterprises, business houses and investors are attracted to organic farming, besides individual organic farmers and organic farmers' associations. Organic farming is ideally suited to hill agriculture, especially for MAP and horticultural species and to jhuming. Around 50 tonnes of different varieties of organic spices were produced annually under the auspices of the Spices Board which has formulated well-developed protocols for organic production of spice crops, their certification system and market links. To begin with, the hill States should concentrate on production of organic spices (ginger, turmeric, black pepper, large cardamom) and different medicinal and aromatic plants. Assuming that a market growth of organic spices in Europe, US and Japan is approximately 10% per annum, export of organic spices will

get a significant production boost in the coming years. Same is the case of organic tea, where international demand is very high and smallholders' organic tea gardens promise high socio-economic returns. About 25,000 model **Organic Villages** or contract farms of the strategic commodities should be developed in the hills during the next five years, and local farm graduates and other youth should be assisted to lead this movement.

4.6.3 Although the GOI has already taken steps to have indigenous certification system to help small and marginal growers and to issue valid organic certificates through certifying agencies accredited by APEDA / Coffee Board / Tea Board / Spices Board, the situation is far from satisfactory. **A focused national movement on organic agriculture with a credible certification of the process and produce, coupled with quality and trade awareness and literacy is a *sine qua non* for mainstreaming and integrating organic farming in the national agricultural economy**. In many countries, certification is covered by legislation, and commercial use of the word organic, outside of the certification framework, is illegal. It must be emphasized that establishing and running credible organic farming systems is much more complex and demanding than the usual inorganic-based agriculture. But, it is do-able and should be done for harnessing the unique opportunities in India and abroad. The **National Programme for Organic Production (NPOP)** has already developed internationally agreed standards for products and labelling. The Hill States should not only be linked with the NPOP, but should be given priority because of the obvious comparative advantages.

4.6.4 Debate on institutional back up support for organic farming to succeed in the hills or in other agro-eco systems should be widened and intensified. R& D institutions are still very weak and States will need to work out policies providing enabling environment for promoting organic farming. Also, organic agriculture research and technology generation is changing the whole concept of innovators. The **International Federation of Organic Agriculture Movement (IFOAM)** has defined organic agriculture as "all agricultural systems that promote the environmentally, socially and economically sound production of food and fibres". It does not permit use of any chemical agents or transgenic crops in the schedule of organic farming. Therefore, much of the Green Revolution technology protocols, methodologies and perspective, which are

based on seed-agrochemicals-irrigation synergy, are of little relevance to organic agriculture. However, the concept of Evergreen Revolution, which necessarily involves pathways which do not adversely affect soil health, water quality, biodiversity, atmosphere and renewable energy sources, is compatible with organic farming concept where the emphasis is on precaution and responsibility and not on risk assessment and management (Kesavan and Swaminathan, Current Science, July 2006). Since organic agriculture is about following ecological principles in farming and its technological options are sensitive to ecological conditions of a farm, a farmer –scientist partnership is a must to undertake on-farm technology development and refinement.

4.6.5 For farm graduates, the following opportunities in organic farming exist:

- Organic farming – a value addition *viz*. Tarai Organic Farmers Amity is exporting organic Basmati Rice and is pursuing organic essential oils agribusiness
- Organic Enterprises
- Consultancy Services
- Supply chains management
- Trading linkages, both in the home and external markets
- NGOs – service provider
- Jobs with organic agencies/Consultancy services
- Own agribusiness/retail stores/trade.

Organic farming requires greater scientific inputs than chemical farming. This area of research hence needs high-level multidisciplinary attention. Internationally recognized food safety analysis and certification procedures are also needed at affordable cost. Further, organic farming zones could be created particularly in medicinal plants, fruits and vegetables, spices, tea, aromatic high quality rice, cotton and other crops which are likely to be in demand in national and international markets.

4.6.6 In order to realise the self-employment and entrepreneurship opportunities in organic farming, adequate training and retraining opportunities for graduates should be established. Courses on organic agriculture and agribusiness both for degrees and

diplomas should be included in academic programmes of the State Agricultural Universities and other Universities/institutions. Most importantly, appropriate policy and financial support for investment in organic farming would be essential for encouraging the young graduates to take to organic farming. The Graduates could particularly be helped in preparing and using **Organic Farming Tool Kits** based on IFOAM principles, which will prove extremely helpful in inspiring international confidence in the quality of organic processed foods and other products from India.

4.6.7 **Mini Hydro Energy**: The mountain topography and the water richness manifested through various waterfalls and fast flowing streams and riverlets provide unique opportunities for harnessing this renewable, low cost and clean source of electricity. A small plant of about 10 KW, costing between Rs. 10 lakh and 15 lakh could be most appropriate for electrification of an average size village. Recently, some leading private sector agencies have shown interest in harnessing the water energy by developing hydro energy plants. The mini or micro units could be linked with the macro units constituting a power grid. As energy is often a limiting factor for establishing and operating energy-based rural and agro based industries, local availability of assured and cost effective energy will greatly contribute to rural industrialization and create large number of jobs. The Central Government as well as State Governments and beneficiaries should provide necessary financial and services inputs for the establishment and operation of micro hydro energy networks.

4.6.8 **Mega-Biodiversity Areas:** The rich natural resource endowments of the hills and mountains include the bulk of the country's forest resources/reserves, timber and non-timber forest products, besides possessing rich reservoirs of medicinal and aromatic plants and tremendous opportunities for various kinds of tourism, including agro-ecotourism. Due to the high pace of deforestation and other development pressures, the biological treasures of hill and mountains are eroding fast. Several of the species have entered the Red Data Book. These must be saved on highest priority through an integrated germplasm conservation approach. All concerned institutions and universities and college students in the region should be mobilized for the purpose, in collaboration with local communities. Necessary training, logistic support and conservation facilities,

including in situ conservation, should be provided. Although commercialization of forest products can help mountain communities achieve sustainable livelihoods, sustainable use of these bio resources should be ensured through appropriate institutional support and awareness raising. Panchayati Raj Institutions should be suitably strengthened to mobilize local communities to lead the conservation and utilization. Gene sanctuaries for selected species, using IK, TK and scientific knowledge, should be established and judiciously managed in a participatory mode. The local communities should be a partner in the conservation process and duly compensated as per the PPVFR Act. New crops from the Himalayan wild biodiversity constitute the greatest strength of the medicinal plants farming sector, and their end-to-end development should be institutionalised. Biovalleys should be organised in the Himalayas and in Western and Eastern Ghats to enable the local population to **convert biodiversity into bio-wealth**.

4.6.9 **Biovalleys**: The Silicon Valley of USA is well-known for the heavy concentration of the forward-edge companies in digital technology. What USA has done in Information Technology through the Silicon Valley, we should do in Biotechnology through Biovalleys. Biovalleys are areas rich in biodiversity and where the necessary infrastructure and venture capital funds will be provided for assisting young entrepreneurs and Women Self Help Groups to initiate enterprises designed to convert biodiversity into bio-wealth in an environmentally sustainable manner. Enterprises in the Biovalley will include the production of herbal products, health foods, biopesticides, veterinary pharmaceuticals, etc. The enterprises chosen should have market linkages. The following Biovalleys may be organized during the 11th Plan period:

a) Himalayan Biovalley: Suitable areas in Western, Central and Eastern Himalayas may be identified for this purpose.
b) Western Ghats Biovalley: This may cover the Konkan area, Goa, Karnataka (Malnod area) and Kerala (Silent Valley – Wayanad area)
c) Eastern Ghats Biovalley: This may cover Orissa, Andhra Pradesh and Tamil Nadu.

Enterprises in Biovalleys may be organized by **Biovalley Cooperatives or Companies**. Government should provide the infrastructure under Bharat Nirman. The private sector through CII, FICCI, etc. should extend marketing support to the Biovalley enterprises

4.6.10 **Horticulture:** Horticulture is a very high priority in the mountain and hill ecosystem. Fruits like apple, pear, plums, peaches, oranges, cherry; new emerging fruits like passion and kiwi fruits in some States; and speciality species like seabuckthorn in cold arid zone, cardamom in Sikkim, organic tea in SFEs of Assam, ginger and turmeric in Meghalaya and Mizoram offer unique employment and economic opportunities. In some States, however, there is high concentration of one or two fruit crops, which may not be advisable in the long run. For instance, in the post WTO regime, import of apple from China, Australia and New Zealand is competing out the Himachal apple – the backbone of the State's agrarian economy. The very special niches for other lesser known but native/indigenous horticulture crops, if promoted, will provide exclusive comparative advantage over markets and ecological suitability. Based on market research and agro-ecological mapping and matching, through inter-State consultations, commercial production and distribution of selected priority species should be systematically undertaken by commodity-specific SHGs or SFEs or through contract farming. High value crops like saffron and *Kala Zeera*, with due R & D support, can prove much more remunerative. Considering profitability, low perishability and ecological compatibility, greater attention should be paid to the production and marketing of fruit nuts viz. walnut, pecan and hazelnut. Anthuriums and orchids, through group farming and marketing, could become major commercial enterprises in the Himalayas.

4.6.11 The Land Use Boards, NHM and NHB and the concerned States should play a proactive role in delineation of production regimes and promotion of marketing to create win-win situation for all the partners. The Agriculture and Horticulture Universities and Colleges and other concerned institutes in the hills should design course curricula to internalize the local realities and possibilities. Their vocational and agribusiness courses and programmes should have commodity-specific hands on training programmes to

enable their Graduates and other trained youth to take to entrepreneurial activities around the speciality commodity.

4.6.12 Creation of clientele clusters with integration of production-processing-marketing will be helpful in generating meaningful employment and retaining the hill youth in their villages linked with their lands and families rather than migrating to cities in large numbers. It is proposed to train 300,000 farmers and 500 trainers at various levels in specialized areas to promote production, processing and marketing of the priority species. Farm graduates could particularly be engaged in establishing and maintaining quality mother plant nurseries both for root stocks and desired scion materials**.** State Plans for flow of quality planting materials of apples and other priority crops should be number one priority of Himachal Pradesh and Uttaranchal. The National Horticulture Mission should, in close consultation with the stakeholders, allocate desired financial and technical supports to this most critical area. In a public-private partnership mode, Seed Villages, Horticulture and Plantation Crop Rural Nurseries, Seed and Planting Material Self Help Groups, especially Women Self Help Groups, should be organized and supported. At least 30,000 such units should be established. Their stocks should be inventorised and the list made available for general use. Incentives should be provided to the nursery growers atleast in the early stages. Individual institutions, Universities - public or private, and Government Departments should be responsible and duly empowered to timely supply breeder and mother planting materials and foundation seeds. Each State should develop annual plan for timely, quality, adequate and rationally priced production and distribution of seeds and other planting materials and should have a credible system of monitoring and correcting the unhindered flow of quality seed from the breeder/originator to the farmer.

4.6.13 **Ecotourism:** The landscape, water bodies, waterfalls, lakes, snow covered hills and unique flora and fauna should be harnessed to promote eco-tourism. Some of the unique livestock resources such as yak and local horses are of great tourist attraction and utility. Flower and fruit farms and arboretums conserving local wild flora are other tourist attractions. Necessary infrastructure facilities and logistics should be in place for

harnessing the opportunity. But, all care should be taken to avoid any damage to the environment.

4.6.14 **Farm Tourism**: Farm tourism can be promoted by farmers for generating additional income. This will on the one hand help address the lacuna of people in urban areas and especially the urban children not getting an opportunity of knowing what farming and farm life is all about – **Holidays on the Farm** could become a national movement. On the other hand, it will generate more employment on the farm and youth engaged in farming will gain pride in talking about their profession. Farm Tourism Hostels may be put up in suitable farms. There are a few farmers in our country who are already practicing and popularizing farm tourism (for example see *www.sagunabaug.com*). We need many more such initiatives across the country.

4.6.15 **Agroforestry**: In the North Eastern Region, agroforestry is a major source of livelihood and employment security. The indigenous tribes like Lepcha and Limbu used to collect large cardamom from natural forests, which were later on domesticated. Among three dozen shade tree species in large plantation areas, alder (*Alnus nepalensis*) is most abundant and preferred tree, which is a non-leguminous nitrogen fixing tree. Besides large cardamom, many food crops like maize, millet, potato, barley, chillies and colocasia are grown with alder. If a village with 100 families could set aside about 120 ha of land to grow alder trees, all families would be able to get sufficient fuelwood every year and at the same time raise crops under the alder in about 30 ha area every year. Cultivation of coffee, ginger, cardamom, turmeric and medicinal plants under the shade of naturally growing trees in Meghalaya is one of the best examples of successful combination of trees with annual crops. Many trees are lopped for their green fodder which is rich in crude protein and calcium, thus integrating the livestock sector. These are mostly grown on terraces which are widely spaced, thus causing least yield reduction of inter-crops. Different trees provide fodder at different times of the year sustaining the supply of fodder throughout the year. Department of Agriculture in Mizoram has developed its own contour trench-farming for jhum areas on hills where top portion is of undisturbed forest, middle portion is with horticultural crops and down the hill, terraced rice is cultivated with pineapple and grasses on contours, thus providing diverse options.

Many species of bamboo, palms and rattans are cultivated widely in north-eastern areas as mixed or boundary plantations. Pasture in forests is also a common practice. Sericulture based system must be a highly relevant and attractive system to the youth. Mulberry with frenchbean-groundnut followed by mustard is a profitable cropping system. With mulberry, guava/lemon/pear and pineapple in paired rows and grasses on the bunds is an ideal system for silk production and additional income from fruits and cattle rearing. Pedi-cum-sericulture is said to be more viable as the cash returns are more frequent. Agroforestry is an extremely important component of biomass generation and income gain throughout the country. A leguminous MPT, *Accacia nilotica*, is an excellent agroforestry species and should be promoted for soil protection and enrichment, charcoal making, fodder and wood.

4.6.16 In the North Western Himalayas, 60 to 70% requirement of the firewood is met from the arboreal components and several MPTs along the bunds of agricultural lands or scattered trees on the pasture lands are common agroforestry system. High rate of net primary productivity has been reported in agri-hortisilvicultural systems or agri-horticultural systems and the species number in these systems is as high as 15 tree species. Hedge-row intercropping is feasible and important on sloping hilly lands when prunned biomass during cropping season can be used for fodder and fuelwood. Kinnow based horti-silvi-agricultural system at Dhaulakuan is a model programme. To accommodate the demand for wood for packing of horticultural produce in the region, a horti-silvi-pastoral system has also been developed growing trees of Santa Rosa plum and field boundary were utilized for growing *Populus deltoids* with excellent economic returns. The strategy to develop Agroforestry systems in Western Himalayas should be based on the economy of fruits supplemented with cattle, keeping in view the soil conservation aspect. Therefore, fruit trees must be grown with forages, food crops, vegetables and MPTs on small watershed basis. The timber woodlots for supporting cottage industries may help to improve the socio-economic status of rural people. The establishment of Y.S. Parmar University of Horticulture and Forestry, Solan, Himachal Pradesh, is a laudable development to meet the training and research demands of the

State. However, the Business and Post-Harvest components of the University programme need to be strengthened. This experience should be replicated by other States.

Arid Zone: Convert Arid Land into Oasis

4.6.17 **Horticulture**: In Arid Zone also, Horticulture is the most important sector, alongwith Livestock to provide diverse employment and economic opportunities. Fruits like aonla, custard apple, pomegranate and citrus (kinnow, sweet orange), medicinal plants like isabgol and seed spices like cumin are the income leaders and export items from Rajasthan and Gujarat. The cold arid region is suitable for quality production of temperate and rare fruits such as seabuckthorn, exotic vegetables and vegetable seeds. Apricot is a commercial crop in Ladakh and sold as dried apricot. Kargil area is well known for dried apricot. Top working of seedling trees of apricot with improved cultivars amenable for drying has been standardized, thus helping in upgrading the quality of the produce and income from the existing orchards. Post-harvest technologies for drying through osmotic dehydration have also been developed. The youth should be trained and provided assistance for establishing small dehydration units which will provide additional employment as well as increase income of the growers - returns from osmotically dried apricot is about five times of that from traditionally dried fruit.

4.6.18 Farm graduates in cold arid areas have excellent opportunities for employment and income from vegetable and vegetable seed growing under **low cost polyhouses. The 'trench technology'** has also revolutionized off-season cultivation of vegetables and strawberry. Among spice crops, identification of high yielding genotypes *of Kala Zeera* and standardization of agro-techniques including propagation have helped its commercialization. Similarly, R&D efforts in standardising both production and post harvest technology in saffron have already started paying dividends by enhancing production and quality of saffron in J&K. Hand holding by SFAC and NABARD will go a long way in promoting gainful self-employment of graduates in production and marketing of the high value low volume commodities in J&K and help in bringing prosperity and peace in the valley. The AEZs in Rajasthan for seed spices are yet other employment channel.

4.6.19 **Livestock:** Livestock is the main source of livelihood in semi-arid zone. For instance, it provides income support to two-third of the population in arid Rajasthan and is the mainstay of desert people. Most importantly, **ownership of livestock in arid agro-ecosystem is positively egalitarian**. Livestock-based agro industries, producing and marketing milk and milk products, leather goods and other by-products, are main source of off-farm and non-farm employment. Drought-hardy breeds of cattle, sheep and goats are required to be integrated in farming systems of the region, looking into the aspects of breeding, feeding and management of livestock. Farming systems involving animals + grasses + crops + trees + shrubs + horticulture, may bring about perceptible change in the socio-economic status of the people. Off-farm employment and per capita income of the rural people can be considerably increased through appropriate farming systems involving livestock.

4.6.20 **The arid region constitutes 30 percent of total sheep, contributing around 40 per cent of total wool production of the country.** The sustainability of the sheep production, however, is facing challenges as the pasture and common grazing lands are shrinking everyday and there is increase in pressure on these lands. **Intense effort is required to develop research based, regionally relevant, ecofriendly and economically viable sheep rearing practices, meat and wool technologies that could be adopted in different arid settings of the country with varying scale of inputs and investments**. Socio-economic survey of sheep and goat breeders undertaken by ICAR's Central Sheep and Wool Research Institute, Avikanagar, has shown that average annual real income of sheep breeders has been increasing by 8 percent per annum. This magnitude of return should entice youth, especially Animal Husbandry Graduates, to take to sheep-husbandry, handling end-to-end management.

4.6.21 Arid agro ecosystem, with nearly 23 million goats, accounts for about 16 per cent of the country's goat population, against 12 per cent of the total geographic area, highlighting relatively higher concentration of goats in arid agro ecosystems. Goats in the cold arid contribute about 40 metric tonnes of Pashmina, the costliest animal fiber for garments. Goat meat has the advantage of being preferred by all the communities and the demand invariably exceeds the supply. The goat milk contributes more than 4 percent of

total milk produced in India, yet its greatly dietary value and superior milk products have not been recognised and exploited for export. The skins of Indian goats are considered to be of very high quality. **The poor man's cow, especially in arid zones and in isolated cold hilly regions, goats offer new nutrition, income and employment opportunities**. The SAUs in Rajasthan and the adjoining Gujarat and concerned ICAR Institutes in the region should establish model training, production, processing and product utilization centers on livestock, especially sheep and goat. Their academic programmes must have production-processing-business courses both theory and practical to generate need-based humanwares.

Semi-Arid Zone

4.6.22 **National Rainfed Area Authority (NRAA):** Yield, productivity and income gaps are particularly large in rainfed areas. Keeping this in mind as well as recognizing that rainfed areas have much higher concentration of poverty than the irrigated areas and their potential is highly under exploited, the NCF had recommended (Second Report) the establishment of a National Authority to holistically address the challenges of rainfed areas. Fortunately, the Government has now cleared the establishment of the National Rainfed Area Authority **(Box I)**.

4.6.23 **Preparing to Meet the Challenges of Climate Change:** Climate management could be another area where educated youth can perform a valuable role. **Climate Management Centres** may be promoted by the National Rainfed Area Authority, where young farm graduates will be engaged in preparing **computer simulation models** of different weather possibilities, particularly with reference to temperature and precipitation. Based on the simulation model, they can help in fostering anticipatory action both to mitigate the adverse impact of aberrant weather, and to take advantage of good monsoons. NRAA could promote village-level Climate Manager by giving them appropriate support.

4.6.24 The extremely low and uncertain income is the main cause of reluctance of the younger generation to enter rainfed farming. Therefore, the basic mandate of NRAA should be to help farm families to achieve income and work security by promoting

farming system approach to foster water harvesting, conservation and sustainable and equitable use of rainwater to provide income and livelihood security to rural communities through increasing sustainability and productivity of crops, livestock, forestry and fisheries. The NRAA should be a highly professional body to synergise ecology, economics and employment to meet its mandate. Management of food, feed, seed and water banks, risk management and promotion of conservation farming should be vital functions of the Authority. Increasing imports of oilseeds and pulses - the predominant rainfed crops (livelihood crops), amount to importing poverty and hunger for the rainfed people. The NRAA must develop and strive to implement rational policies on import,

Box I

National Rainfed Area Authority (NRAA)

The problems of rainfed agriculture have received the attention of the Government at the highest levels with Prime Minister announcing to the Nation in his Address on 15th August, 2005, "Large parts of our country are still dependent on rainfall and we will focus on removing the problems of farmers in dryland areas. We are considering setting up a 'National Rainfed Area Authority' for this purpose."

A series of high-level meetings, including the First and Second Meetings of the Agriculture Coordination Committee (ACC), Chaired by the Hon'ble Prime Minister, had deliberated upon the structure and function of the Authority. The Cabinet has now approved the Note for setting up the Authority.

The NRAA will be an experts body to provide the much needed knowledge inputs regarding systematic upgradation and management of country's dryland and rainfed agriculture. The Authority will be a Policy-making and monitoring body. Besides, it will bring about convergence and synergy among the numerous ongoing programmes and will advise, guide and monitor their implementation as its mandate will cover all aspects of sustainable and holistic development of rainfed areas, including appropriate farming and livelihood system approaches. It would also focus on issues pertaining to landless and marginal farmers as they constitute the large majority of inhabitants of rainfed areas. However, each participating Ministry will be responsible for implementation of its line programmes after clearance from NRAA, based on the common guidelines.

The NRAA will be a two-tier structure. The first tier is a Governing Body that will provide necessary leadership and appropriate coordination in implementation of programmes. The second tier would be the Executive Committee consisting of technical experts and representatives from stakeholder Ministries. The Agriculture Minister will be the Chairman of the Governing Board of NRAA and Minister for Rural Development its co-Chairman. Ministers in-charge of Water Resources, Environment & Forests and Member (Agriculture), Planning Commission alongwith Secretaries of Agriculture & Cooperation, DARE, Rural Development, Water Resources, Environment and Forests, Panchayati Raj, Chairman, NABARD and one farmer representative/organization (to be nominated by Ministry of Agriculture) would be the Members of the Board. The Chief Executive Officer would be the Member Secretary of the Governing Board. The NRAA would be serviced by Ministry of Agriculture.

unholy nexus of poverty, hunger and resource degradation. The NRAA should be structured somewhat like National Dairy Development Board with clear-cut functions in the areas of policy formulation, resource mobilization, employment generation,

coordination with all concerned Ministries, Centre – State linkages as well as with Bharat Nirman, NREGP, etc.

4.6.25 The main goal of NRAA should **be more crop and income per drop of water**. It should seek and promote effective indulgence of the youth in managing this most vital resource. Increasing supply through rainwater harvesting, recharge of the aquifer and water conservation should become mandatory. Demand management through improved irrigation practices and crop planning and care, should receive priority attention. The youth must be trained and empowered to lead this movement and should launch a water literacy campaign particularly for the sustainable use of ground water and conjunctive use of water. Seawater farming should be promoted in coastal areas. They may assist the Panchayats in launching water literacy and water quality management programmes and in promoting participatory irrigation and efficient water use management.

Irrigated Zone: Evergreen Revolution

4.6.26 The future of our agriculture and food security and even national sovereignty depends on our ability to increase productivity per units of arable land and irrigation water in perpetuity without associated ecological harm, a process known as "Evergreen Revolution". The national agricultural research, education and extension, development, marketing, pricing and institutional system must focus on the small farmers who are most concentrated in irrigated areas, and the holding fragmentation continuing unabated, and whose toil is the engine of nation's food security - ushering in **Small Farm Revolution**. Building on the gains of the Green Revolution and avoiding its pitfalls, we must move towards an Evergreen Revolution by concurrently resorting to a three-pronged strategy: (i) Protecting yield and productivity gains, (ii) Extending the gains to new areas, and (iii) Enhancing yield ceilings and achieving new productivity gains. Bridging yield gaps, minimizing post-harvest losses, augmenting value addition and improving productivity and farmers' income; and promoting eco-technologies, including conservation farming, rooted in the principles of ecology, economics, equity and employment are the major synergistic and converging pathways towards Evergreen Revolution. Integrated crop

care encompassing integrated pest management, integrated plant nutrient management and integrated natural resource management is the way to "**Green Agriculture**."

4.6.27 The farm graduates and other educated youth will be called upon to use the latest developments in biotechnology, ICT and other cutting edge technologies and synergistically link these technologies with conventional and traditional technologies and knowledge. The need for orienting training and tooling of our Graduates to get actively linked with the various steps and components in the research-education-extension-farm-market-business chain can hardly be overemphasised. They must become the service providers and mobilise the community to practice green agriculture with high pay off. The educationists, research and technology developers must ask themselves as to whether the Graduates and field workers are equipped enough to launch the Ever-green Revolution. If not, the human resource development progamme must be revamped, as discussed later.

Coastal Zone and Islands

4.6.28 More agro-based industries should be developed in coastal areas to create more employment through value addition to products based on coconut, oil palm, honey, cashewnut, rubber, fruit, fish and shrimp, milk, beverage, medicines, poultry, sea food and mangrove products. Large areas under coconut plantations are neglected and remain open for grazing. Through self-employment or leasing arrangements, the youth may convert these areas under multistoreyed cropping systems. The rural youth should be trained also to take to skilled planting of mangroves. All along the coast as well as in the Andaman and Nicobar Islands and Lakshadweep Group of Islands, agro-aqua farming systems will open up great opportunities for income and employment generation on a sustainable basis, provided they are based on sound ecological principles. **The tyranny of distances of islands could be somewhat economically moderated by promoting eco-tourism, conserving the genetic heritage and by establishing offshore quarantine.** The youth should be sensitised to help adopt proactive measures like the erection of mangrove and non-mangrove based bioshields in order to safeguard the lives and livelihoods of island populations in the event of sea level rise due to global warming.

To provide integrated training in all aspects of capture and culture, fisheries ranging from capture/culture to consumption, Fish for All Training Centres should be established.

7.0 Young People's Mission and Action: India A Major Agricultural Outsourcing Hub of the World

4.7.1 Ours is a "**rich country inhabitated by poor people**." The challenge before us is as to how to convert the rich human capital, natural recourses wealth, gene reservoirs and agro-ecological diversity into more jobs and income in perpetuity. As already experienced under the ICT revolution, the Evergreen Revolution can render India as a major agricultural outsourcing hub of the world, particularly for hybrid seeds, in vitro culture propagation material, biological softwares (biofertilisers and biopesticides), botanical medicinal and aromatic products, organic products, such as organic fruits and vegetables, organic wine and beer, eco-textiles and processed foods. Thus, today's **Agriculture must be seen also as an important source of quality employment and global outsourcing hub.** Excellent opportunities exist also for global outsourcing hub in the areas of plant and animal genomics and ICT, involving large number of village people linked through the *Gyan Chaupals*.

4.7.2 Young graduates should be duly trained for specialized production of the various products and dynamically linked with the world information on their agri-business. Appropriate Regulatory measures, particularly Sanitary and Phytosanitory measures, Food Safety Standards, IPR, Geographical Indicators, TRIPS, etc. should effectively be in place and fully functional. Selected SAUs and ICAR Institutes may establish Centres of Outsourcing Business in Agriculture. Some of the KVKs could take lead in specializing in specific commodities in one or the other of the areas mentioned above and develop the necessary expertise and infrastructure to ensure production and supply of quality standard products as per international standards. A campaign to promote gene literacy, bio-safety literacy, IPR literacy, etc. should be undertaken to sensitize all the partners in the production-distribution chain. As mentioned under the Section, "Organic Farming", internationally-recognised certification facilities must be provided before starting large-scale outsourcing of organic products.

4.7.3 With the above developments, Indian villages and even small farmers can be linked with the global markets and agri-business centers in USA, Japan, Europe, etc. In several of these domains, there are tremendous opportunities for farm graduates and other educated youth to be self-employed or regularly employed. For instance, in the seeds sector, the value of planted seed in the world has reached staggering proportions – an estimated US$55 billion annually. At the same time, the demands of biotechnology, communications, and intellectual property protection have created new challenges and opportunities. **This underlines the necessity for creation of world-class infrastructure for competitive quality production, accessing and assessing the global market through critical agri-business analysis, thus linking science, technology, industry and market**.

4.8.0 Institutional Structure

Small Farmers' Agri-business Consortium (SFAC)

4.8.1 The **Small Farmers' Agri-business Consortium** (SFAC) was started by the Prime Minister Dr. Manmohan Singh in 1992, when he was the Union Finance Minister of India, to enable small farmers to take to market-driven agribusiness. But, unfortunately, such an excellent programme never took-off though explicit budgetary provisions for the programme still exist. We need to have the situation critically assessed and render it effectively functional and professionally-managed so that the graduates and other educated young farmers could receive the guidance, training, tooling and initial hand-holding for establishing rural entrepreneurial activities to expand rural markets and direct access to market. The SFAC should work closely with selected KVICs, AEZs and Agri-business centers for their enhanced efficacy.

Agri-clinics

4.8.2 The Central Government has launched agri-clinic and agribusiness centres programmes to provide a single window access to multiple inputs, expert services and advice to farmers on cropping practices, technology dissemination, crop protection from pests and diseases, market trends and prices of various crops in the markets and also

clinic services for animal health etc. which would enhance productivity of crops and animals. Some of the programmes of the private sector, such as Haryali Bazar, also provide diesel/petrol pumps and banking facilities. However, before setting up agriclinics and agribusiness centres, interested agricultural graduates are supposed to be provided specialized trainings to inculcate in them required managerial and some technical skills for setting up and running the center/ venture. The training courses would be provided free of cost in various State Agricultural Universities and Departments and public sector institutes. Initiated by Small Farmers Agri-business Consortium (SFAC) and coordinated by National Institute of Agricultural Extension Management (MANAGE), the courses comprise entrepreneurship development, business management as well as skill improvement modules in the chosen areas of activity. There are several projects/ ventures in agriculture which can be taken up by any unemployed youth with some prior training from an appropriate institution.

4.8.3 While necessary support should be extended to farm graduates to establish and operate agri-clinics, including extension advisory activities, input dealership should primarily be given to agriculture graduates who besides ensuring timely distribution of quality inputs would also be proactively involved in rendering extension services to their clients. A single licensing system should be put in place. Those agri-clinics which do not have farm graduates on their establishment, should be obliged to hire agricultural graduates. As regards institutional support, quality credit packages and their delivery and comprehensive farm family insurance plans must be in place to strengthen the programme. **One Agricultural Supervisor (Agricultural Graduate) for every 2 Panchayats is recommended.**

Agri-business Centres

4.8.4 Agricultural, Veterinary, Fisheries, Rural and Women's Universities should restructure themselves to be able to help every scholar to become as entrepreneur so that they can organize Agriclinic and Agribusiness centers. The Universities should expand their current Placement Bureaus in order to provide a special **one-stop window** for generating awareness of self-employment opportunities. Job Fairs can also be organized.

Industry representatives feel that there is considerable unmet demand in relation to the range of services needed to farm families. There is therefore considerable scope for training farm graduates to provide demand driven services. Agricultural entrepreneurs are needed in large numbers for achieving successful farming systems diversification and value addition and for providing the right inputs at the right time and place. Mobile phones have made communication easy. Farmers will be willing to pay for value added services.

Harnessing Group Dynamism

4.8.5 The National Commission on Farmers (NCF) had recently organised a National Consultation on Attracting and Retaining Youth in Farming. Over 50 participants, including Vice Chancellors of selected Agricultural Universities, heads of private companies, senior representatives of the Govt. of India and ICAR, representatives of international organisations, executives of banks and 17 agricultural graduates both employed and unemployed, had participated in the Consultation. It was heartening to note that several of the farm graduates and other Graduates have joined hands and formed Groups and are operating and managing agriclinics and agri-businesses as well as are involved in precision agriculture including greenhouse production of high value crops/commodities and vitroplants, honey, mushroom and fingerlings. These Groups are particularly helpful in ensuring the supply of quality seed and other inputs and in undertaking integrated pest management, integrated nutrient supply, scientific water management and adoption of improved post-harvest technologies. Some of them are successful in forging backward linkages with latest technology and credit and forward linkages with processing and marketing organisations.

4.8.6 Some of the farm graduates are participating in contract farming. This is particularly encouraging as with their participation the interest of other partner farmers is expected to be safeguarded. Needless to mention, contract farming based on a well-defined Code of Conduct will be helpful to small producers in getting good quality input, a fair price as well as prompt payment for their produce**. A Code of Conduct for Contract Farming** will have to be developed for major groups of farm commodities like

vegetables, fruits, flowers, medicinal plants, tuber crops, pulses, oilseeds, sugarcane, cereals, cotton etc. Both production and marketing contracts are growing. Available evidence indicates that direct contract between the producer and purchaser is more advantageous to small farmers than indirect contract through intermediary agencies.

4.8.7 A **National Federation of Farmers** entering into contract cultivation will be useful to identify the best pro-farmer practices that will ensure a win-win situation for both producers and purchasers. As also emerged at the State-level Consultations, many prefer a tripartite contract involving the farmer or farmer group, the procurer and the concerned Government, the latter required primarily for dispute settlement, if any. Though various models of contract farming have been tried in India, the success has been rather limited. The need is to develop comprehensive, clean, equitable and farmer-centric model agreement which could not be abused against the farmer. Special care is required regarding clauses dealing with quality standards, withdrawal conditions, pricing standards, paying arrangements, acts of God clauses and the arbitration mechanism.

4.8.8 In its earlier reports, NCF has recommended the formation of **Small Holders' Cotton, Horticulture, Herbal, Poultry and Aquaculture Estates.** The aim is to promote group cooperation among farmers living in a village or watershed or the command area of an irrigation project in improving productivity, reducing the cost of production and entering into marketing contracts with textile mills, food processing industries, pharmaceutical companies, fish marketing agencies etc. Such Small Farmers' Estates can also manufacture products under brand names and enhance income security. Group insurance will then become feasible. Agri-clinics and Agribusiness Centres run by farm graduates could be linked to such Estates. Cooperatives, particularly service cooperatives, and SHGs are other group mechanisms which could provide power and economy of scale to small farmers and the youth in their production-distribution ventures. While the reforms are overdue in the cooperative sector, **the SHG could be upgraded to sustainable Livelihood Group through training and monitoring.**

4.9.0 Education and Training

Education for Agriculture: The Need of the New Millennium

4.9.1 Establishment of a large number of SAUs and the resulting human resources have played an important role in strengthening and spreading the Green Revolution since the 1960s. Now new demands are being put up on the system, which it must meet in order to remain responsive and relevant. Generally, the knowledge explosion in ICT, Biotechnology, Space Technology, nanotechnology, etc. and the fast changing international environment, particularly in the globalised and liberalized world, and trends and implications of increasing divides on the income, digital, gender and social fronts have not been internalized in curricula of most SAUs and colleges and the graduates are becoming increasingly removed from global realities. Basic and strategic research is drying fast and the teachers, especially the senior ones, are not abreast of the latest developments, hence routine and mundane teaching continues. The agricultural education at SAUs and agriculture colleges must be revamped to become education for agriculture. For this, multidisciplinary teaching, adequate infusion of basic and social sciences and linkages with relevant institutions in the country across Ministries should be ensured to develop holistic and enriched education for agriculture to increase awareness on the challenges and opportunities of new and complex interrelated issues and developments.

4.9.2 **Since Independence, the annual output of farm graduates has swelled 15 fold. The number of unemployed graduates has also multiplied likewise**. There is a mismatch between employment and education. While the number of employment opportunities is rising more or less at the same rate, as the growth rate of the work force, the type and quality of these opportunities hardly match the expectations of many educated job-seekers. This reflects inadequacies both in the type of employment generated and the type of education being imparted to youth.

4.9.3 Reorientation of education for agriculture within a reasonable timeframe and its visible impact on employability should be launched as a mission to introduce necessary structural changes in the system so as to capture modern realities, challenges

and opportunities. Reforms to forge partnership with various stakeholders, who influence and are influenced by the quality of agricultural education, should receive high priority. Emphasis of futuristic agricultural education should be on introduction of a revised course curricula embracing new teaching and learning areas (typical examples being agribusiness and entrepreneurship, biosecurity, diversification of farming, processing and value addition, natural resources and environment management, marketing, international trade and treaties and biotechnology) and delivery systems (information and communication technology), deployment of highly qualified faculty, creation of infrastructure for extensive practical sessions and linkages with private partners to support career-building training. **Genome clubs** may be formed in schools to promote genetic literacy and the opportunities opened up by the new genetics for strengthening food and health security.

4.9.4 There is need for a few **Centres of Excellence in Agriculture** (Crop and Animal Husbandry, Fishery and Forestry) on the model of IITs and the IIMs. The Agricultural Universities Association should not only bring about curriculum reform for imparting more practical training, but also reforms in the pedagogic methodology taking into account the new opportunities opened up by ICT for promoting a learning revolution among our students. By suitably restructuring the pedagogic methodology using ICT tools, it will be possible to save time for practical work. Agricultural Universities should also organize more non-degree training programmes. All Farm Universities should adopt the motto "**Every Student an Entrepreneur**". Entrepreneurship and innovation must be the key goals of Universities.

4.9.5 Adequate financial support should be made available to the SAU's and other educational institutions which are acutely starved of funds. While the State Governments have rather liberally been establishing new agricultural and related universities, there is negligible increase in the overall financial allocation to agricultural education. It is suggested that one time substantial catch up grant should be provided to the agricultural education institutions for establishing State of the art equipment, training modules and their deliveries and other facilities. Centres of distance education should also be

strategically established. In order to avoid inbreeding, a certain percentage of faculty and students must be recruited and admitted from outside the State.

Revamping University curricula – Mainstreaming Business Management and Applied Courses

4.9.6 The Universities must adjust the formal and non-formal training programmes, syllabi and outreach programmes, particularly of their **KVKs for employment oriented activities related to agro-processing, value-addition and other post-harvest activities** which are bound to create additional employment opportunities. The Universities could promote not only entrepreneurial abilities of the graduates but also help them establish businesses for themselves, such as agriclinics, soil and water-testing facilities, agri-machine hiring and repair facilities, seed production and distribution, etc. **University centres should establish employment and business advisory services** and promotion centres not only for their own graduates but also for other youths. As seen from **Box II**, **convergence between science and agribusiness, University curricula and course contents are fast evolving towards enhancement of employability of the professionals and for the mutual benefit of the science and industry – a win-win situation.**

4.9.7 The following key issues must be addressed towards increasing employment and retention and attraction of farm graduates in farming:

i) Poor and deteriorating quality of graduates and deficiency of practical and business skills for self-employment.

ii) Poor infrastructure and facilities in rural areas, especially irregular and highly inadequate electricity and other energy resources and the lack of desired educational and health care facilities.

ii) Poor communication and information connectivity; lack of technology-market-and employment-related database.

The main reasons for the above shortcomings are:-

i) Routine, mundane, static and stale university curricula; mismatch between the dynamic need/demand of new skills, expertise, talent, tool and techniques and

the actual formal training imparted and technologies/approaches available or developed for the purpose.

ii) Shortage of competent and spark-creating teachers, and large number of teaching, research and extension positions lying or kept vacant.

iii) Intake quality compromised, as in several States no minimum is fixed for entrance examinations.

Box II

Master of Science in Seed Technology and Business
Iowa State University of Science and Technology
College of Agriculture, Seed Science Centre, Ames, Iowa, USA

Iowa State University – College of Agriculture and Business have teamed up to meet up to meet the needs of seed industry, professionals with four-year degrees: the new Online Master of Science Degree in Seed Technology and Business.

Programme Features:

- Science, technology and business courses with a focus on decision-making in the seed factor.
- Flexible and convenient for working professionals: content available on CD's for flexibility.
- Student remain part of an interactive group
- Creative component replaces thesis.
- 33-month study course – 36 to 37 credits depending on scope of creative component – paced for working professionals.
- Administered by the ISU Seed Science Centre through Continuing and Distance Education.
- Quality content taught by highly regarded faculty.

The Centre also offers two graduate certificates: one in Seed Science and Technology and another in Business Management.

4.9.8 The curricula revision stems from the fact that the setting-up of responsive curriculum systems is a key step by which the target of training qualified personnel can be accomplished. New curricula may include the components like physical conditions, broad knowledge including knowledge of humanity, ideological accomplishments, practical ability, scientific theory, professional knowledge, knowledge of related disciplines, and technical skill training.

4.9.9 The education and teaching methods must be improved to do justice with the contents, as suggested below:

- Teaching methods are the ways of carrying out curricula which directly influence the effects of knowledge transformation.
- Using heuristics and discussions in teaching may be adopted in classrooms.
- Obtaining new knowledge, analyzing and solving problems through full use of various resources and a computer-aided teaching system are essential components of improving all-round abilities with a practical outlook.

4.9.10 Practical teaching links must be improved, as suggested below:

- Practical teaching links include teaching practice, scientific research, technical development, extension activities and social services.
- Practical teaching is an important link not only in examining the exact results of curriculum systems and teaching methods being used, but also in training the abilities of innovation, experience and creativity.
- The contents of experimental curriculum systems should be reformed and new teaching practice systems should be established to train operational ability according to specialty or discipline.

4.9.11 The curricula changes should duly reflect national and global visions of food and agriculture and the most appropriate farming system to enhance income, profitability and sustainability under the ever-increasing competitiveness. As the employment in the private sector is fast increasing and also keeping in mind the need for enhancing self-employment, the curricula should emphasize skill development aspects. The major employer and other main stakeholders, namely, the public sector, private sector, industry, agri-business and progressive farmers should be involved in curricula development. For hands on experience due emphasis should be placed on internship.

4.9.12 Emphasising skill development, vocational education is expected to create middle level trained human power, particularly trained persons to run agri-clinics and to serve as technology agents and to meet the varying demands of private sector and for promoting entrepreneurship. In this context, experiential learning of about 1 year integrated skill orientation following 3 year courses during the graduation programme

will be essential. For Home Science graduates, 2 years course work followed by 1 year each for courses and attachment to industry etc. is recommended. Under the WTO regime, specialized courses on export procedures, quality control, management of agri export, commodity trade, commercial agriculture and precision farming should be emphasized. New and emerging areas like value addition, marketing, biosecurity, IPR, INM, SPS, quality standards should be adequately covered.

4.9.13 Hands on experience of developing agri business management modules towards enhancing confidence and analytical skill of farm graduates is essential for promoting new enterprise ventures. In order to give the necessary boost to post harvest management, processing and value addition, adequate training facilities and hands on experiences in these areas should receive highest priority. KVKs, ATMA Centres and other such institutions should be duly strengthened for training in post-harvest management and marketing.

4.9.14 Farm graduates, empowered through need-based vocational training, should be encouraged to embrace agriculture-related and other manufacturing activities. They should be organized in groups and helped to establish clusters of small units. These clusters should be located in or near large market towns, on the peripheries of cities and along major highways or railway lines. There are nearly 6000 block headquarters as also about 7415 APMCs. Many of these as well as many existing industrial clusters present favourable location for focused development.

4.9.15 In the case of medical and veterinary sciences, there is a system of registration of practitioners. It would be useful to develop a system for according recognition to farm graduates to provide Extension and other services by recognizing them as **Registered Farm Practitioners**. It may be necessary to set up an All India Agricultural Council on the model of the Medical and Veterinary Councils to give such accreditation. This will also be an oversight mechanism to ensure the quality and credibility of the services provided by farm practitioners.

4.9.16 Areas like the North Eastern Region and Jammu & Kashmir requires special attention from the point of view of providing Fram Graduates with opportunities for gainful self-employment. For this purpose each State should organize a **Recognition and Mentoring Programme (RAMP)**. In the hilly areas there is a particular need for service centre for farm machinery. **A sub-cadre of agricultural graduates may be established for the NER under the ICAR's ARS to recruit scientists from the region and for the region so that the positions could be filled effectively**. Special training and tooling should be done for these graduates on a regular basis.

4.9.17 The Tenth Plan has called for paradigm shift from food security at the national level to nutritional security at the individual level. There are very large numbers of Home Science Graduates who are unemployed or in-appropriately employed. A new scheme should be formulated for organizing **Nutritional Clinics** on the model of Agri-clinics which will provide an opportunity for Home Science Graduates to ensure the success of ICDS and mid-day meal programme and to fight hidden hunger caused by the deficiency of micro-nutrient in the diet.

4.9.18 The facilities for practical training for farm graduates must be expanded. The Vidya Dairy at Anand which impart end-to-end training as well as the Fish For All Training Centre which is being established by MSSRF at Nagapatnam are good examples of imparting skills through learning-by- doing. This move could be extended to all important commodities like lac, sericulture, ornamental fish production, etc.

National Alliance For Self-employment of Farm graduates

4.9.19 There is need for a **National Alliance** for facilitating self-employment. Such an alliance can bring together all the stake-holders – Private and Public Sector Institutions, Commercial and Cooperative Banks and farm graduates Associations. Such a National Alliance can provide oversight for the implementation of a national strategy for the knowledge and skill empowerment of rural families and for imparting quality and trade literacy. They can also monitor progress in achieving the goal of every student entrepreneur in our Agricultural and Veterinary Universities.

4.9.20 We have to achieve the following revolutions, as we wish our agriculture to become economically rewarding and intellectually stimulating to attract and retain educated youth in farming:

- Productivity revolution
- Quality revolution
- Income and livelihood revolution
- Management and marketing revolution,

In the above context, we should review how our vast research, educational and extension infrastructures could be retooled and restructured to meet the challenges of today and tomorrow. The most urgent tasks today are enhancement of productivity per units of land and water and farmers' income as well as achieving a quantum jump in quality improvement. Quality has to be judged by culinary, organo-leptic, nutritional and processing characteristics. The management and marketing thrust must confer on small producers the advantages of scale both in the production and post-harvest phases of agriculture.

4.9.21 Central and State Governments should not expand official extension departments, if opportunities for remunerative self-employment are to become available to farm graduates. We need a new deal for the self-employed in terms of public policies which promote and not obstruct socially relevant enterprises. Private sector industry can help agricultural progress, particularly in the area of perishable commodities like fruits, vegetables, flowers, fish and animal products by undertaking contract cultivation and entering into buy-back arrangements, duly covered under a Code of Conduct. In their respective catchment areas, industries could provide a wide range of services, as is already being done by the tobacco and sugarcane industries. In particular, private sector should give management and marketing support to agriclinics and agribusiness centres and set up in major production centres computer-aided market information system.

4.9.22 Groups of motivated, like-minded and skilled farm graduates, by themselves or through public sector support or through partnership with established industrial houses,

could create organized large-scale manufacturing units in rural areas. Moreover, they can proactively encourage ancillarization. The Government should support such ventures possibly by offering tax breaks to large units which sponsor the development of small units on a contractual basis. Such farm graduates, even though not directly involved in hardcore farming, their mere presence in rural areas will be a great moral-booster to their own as well as to other families, besides rendering occasional extension and advisory services to the farmers.

4.9.23 China has succeeded in providing work opportunities for its vast rural youth, through an integrated approach to on-farm and non-farm employment. China's twin strategy comprises of: (a) improve small farm productivity and profitability and (b) withdraw surplus labour from unskilled on-farm to skilled non-farm employment through **Township Village Enterprises (TVEs). We suggest that the Ministries of Agriculture and Rural Development may initiate a Pan-Government of India Programme Designed to Provide Work Opportunities for All in Rural India**.

4.9.24 The vast trained manpower now being created in the areas of agricultural biotechnology and information technology, provides an uncommon opportunity for India becoming a world leader in taking up assignments on behalf of other countries – both developing and developed – in the areas of software development for agricultural ICT, hybrid seed production, tissue culture propagated plants, biological software for sustainable agriculture, genome mapping, gene mining, Indian health systems like Ayurveda, Unani and Siddha. **We should ignite a spirit of imagination, pride and innovation in our youth, so that they become the torchbearers of the New Agriculture Movement.**

CHAPTER 5

IMPROVING COMPETITIVENESS OF INDIAN AGRICULTURE

5.1 Introduction

5.1.1 The issues connected with competitiveness of Indian agriculture have assumed considerable importance in the light of the WTO Agreement on Agriculture[1]. Given the limitations of a developing country and inadequate investments in infrastructure and frontier areas of science and education, Indian farmers are being exposed to international competition in an unequal playing field. However, there is also no doubt that if appropriate infrastructure combined with adequate incentives and support becomes available, Indian farmers are quite capable of producing many crops and animal and fish products efficiently and competitively. The globalization and opening of trade could therefore also offer new opportunities provided focused attention is given to improving competitiveness of Indian agriculture with a sense of urgency.

5.1.2 There has been a major change in the macro policy framework after launching of the economic reforms in 1991. The sharp devaluation of Indian Rupee [about 24 percent in June 1991] improved competitiveness of many agricultural commodities [though export subsidies were withdrawn] and resulted in a fairly rapid growth of their exports, leading to an impression that Indian agriculture would greatly benefit from economic liberalization. The annual export growth for agricultural products in value terms was most significant during 1992-97 at 16.04 percent as compared to 5.34 percent during 1986-91 and -3.08 percent during 1980-85. During 1992-97 the import value index of agricultural products also increased by 25.76 percent as compared to - 13.91 percent during 1986-91. Another development was the large increase in input prices and also the Minimum Support Price [MSP]. The MSP of wheat and rice increased from a level of Rs. 225 [per qtl] and Rs. 205 [per qtl] in 1990-91 to Rs 475 and 380 respectively. The increase in MSP of wheat in six years was over 111% and in paddy over 85%. Since

[1] Summary of major provisions under the Agreement on Agriculture [AoA] as were applicable to developing countries by 1995 – 2004 are indicated at Annexure – I.

in the beginning, the world prices of agricultural commodities were rising, it did not adversely affect their competitiveness. However, after 1996, the world prices started falling due to heavy subsidies in EU & USA which led to fall in competitiveness of Indian agricultural products and a slow down in exports.

Competitiveness of Agricultural Products

5.1.3 In no trade situation, comparative advantages and allocations of land within agriculture can be decided by the value of output per acre of land or per unit of input cost. The higher the ratio, the greater is the internal comparative advantage or efficiency in producing the commodity under consideration. However, as land is restricted within the borders of a country and the movement of labour, particularly the unskilled, is restrictive, the above mentioned measures of competitiveness cannot be used to achieve efficiency of allocation of resources between different countries. On the other hand, in a fully liberalized and globalised situation, unlike most factors of production, the commodities could be freely exported or imported. Therefore, the prices in other countries, transportation and marketing costs and the cost of processing influence the resource allocation. With increasing globalization, assessment of global competitiveness has become one of the tools for taking resource allocation decisions.

5.1.4 In due course, the globalization would be characterised by exploiting comparative advantages of nations and by reliable assessment of demand and supply in relation to commodities of importance in international trade and integrating them into global management of the value chain. It would mean a very strong drive for performance competitiveness among countries and between producers within a country. However, the road is long and participating in the long march is not without serious local problems and also constraints.

Measurement of Competitiveness

5.1.5 How is competitiveness measured? The idea of comparative advantage focuses on the cost of production of different commodities in the country vis-à-vis in the major trading countries of the world. However, the actual trade takes place on the basis of

prevailing prices rather than the costs. These prices are distorted due to market structures and business strategies. The standard system for assessing the competitive advantage is to assess the effective rate of protection provided by a country. It is also necessary to make the assessment on the basis of say, 5 to 15 years data so as avoid abrupt fluctuations in prices in some years. There are various measures of competitiveness. The Net Protection Coefficient [NPC] could be used for measuring the competitiveness of domestically produced goods with imports and also for exports. The transport costs have to be added to the export price while assessing the competitiveness for imports and exports. For import competitiveness, the agricultural produce of India at the port should be cheaper than the import price at the same port of the same quality goods and vice-versa for exports. In operational terms, for assessing the import competitiveness, the exporter to our country pays the freight, transport charges etc. while if we were to assess export competitiveness of our products, the freight, transport and handling charges to the destination will have to be added to our local cost of production. The transportation and handling costs both internal and international could make a big difference in the international competitiveness. Another method of assessment of competitiveness is the Effective Protection Coefficient [EPC]. This is a refinement of the Net Protection Coefficient as it takes into account the variation in domestic and international prices of the tradable inputs. It is the ratio of value-added at domestic prices to the value added at border prices expressed in local currency. In simple words it is the ratio between the value added commodity at domestic prices [domestic price of a commodity minus the value of all inputs required to produce a unit of that commodity] divided by value added at world reference price of all traded inputs at border price equivalent minus prices of all traded inputs at border price adjusted for transportation, handling and marketing expenses etc.

5.1.6 The most widely used and comprehensive measure of resource use efficiency is the Domestic Resource Cost [DRC] method. The DRC is the value of domestic resources [primary, non-traded factors of production] needed to earn or save a unit of foreign exchange through import substitution by production of a commodity. The value

of non-traded inputs like land, labour and capital has to be in terms of their shadow prices or opportunity cost to take-care of the market distortions.

Competitiveness of Indian Agriculture

5.1.7 As per on early work of Dr. A. Gulati[2]. India was moderately to highly competitive in rice, wheat, bananas, grapes, sapota, litchi, mango, onions, tomato, mushroom etc. in 1989-90 to 1992-93. In sorghum, apple, mango pulp and apple juice India was not competitive, while maize was a marginal case. The situation became different in the analysis based on 1990-91-1997-98 data. While rice and banana remained highly competitive, wheat, gram, mango, grapes, sapota, onion and potato were only moderately competitive and maize, sorghum, bajra, barley, arhar, groundnut, rapeseed mustard, soybean, sunflower, apple, tomato were non-competitive [NPC above 1 and ranged between 1.14 for tomato to 1.85 for barley].

5.1.8 The study of competitiveness of crops over 1990-91 and 1999-00 for selected commodities in major producing States by Prof. G.S. Bhalla[3] reveals that based on the Net Protection Coefficient [NPC] calculations, India was an efficient producer of wheat, rice and maize and could effectively compete against import of these commodities. In the case of tur, gram, rapeseed and cotton India was import competitive but the same could not be said of sugarcane. During 1997-98 to 1999-2000, groundnut was also import competitive. wheat, rice, tur, gram, maize and jowar were also export competitive. However, in case of cotton, while Punjab and Karnataka were export competitive during 1995-96 to 1998-99, Andhra Pradesh, Gujarat and Maharashtra were not export competitive in 1998-99. However, due to large variations in international prices of cotton, the degree of competitiveness keeps on changing.

5.1.9 The competitiveness of most of our agricultural commodities would change very favorably of the developed countries withdraw the huge domestic support which they extend to their agriculture. However, it may also be noted that import

[2] Export Competitiveness of Selected Agricultural Commodities, 1994
[3] Prof. G.S. Bhalla-State of Indian Farmer-Millennium Study-Globalization and Liberalisation of Agriculture

competitiveness of our agriculture is getting reduced due to various factors like increase in input prices and consequent hike in their MSP year after year, the deceleration of the productivity growth rates and the world trend of downward movement of prices of agricultural commodities till recently.

Box I

Bright Spots and Some Concerns

As stated earlier, India is competitive in several major agricultural commodities. However, the movements of international prices are continuously influencing India's competitiveness. India's traditional exports such as tea, coffee, tobacco and spices are likely to continue as significant constituents of our agri-exports. However, there are emerging exporters challenging us and eating into our export markets like Vietnam. In rice, wheat, cotton etc. we could increase our exports as also in certain fruits, vegetables and fish. However, the productivity levels could be further improved with focused attention to add to our competitiveness. Pulses and other cereals are generally import competitive. The major non-competitive commodity is oil seeds and edible oils. However, we are very short in pulses and oilseeds for our domestic consumption. Per capita consumption of pulses is very low in relation to dietary needs.

Competition from cheaper imports would be a serious concern for our farmers and the Government will have to be very vigilant.

We have to also take care that we do not move from higher value addition to lower value addition in our exports. There is need to guard that the safety standards are not abused as non-tariff barriers against our exports. Needless to say we also have to be more quality conscious and our farmers need more knowledge and training in the matter. The future lies in demand management. The idea is to first identify an international demand and then move backward to the farm. Along the way, identify short comings/weaknesses and attend/rectify those to capture the market.

5.1.10 Huge subsidies provided by the developed countries has greatly affected international prices and the competitiveness of our agriculture. Some indications of domestic subsidies provided by these countries can be seen from the following table:

Table 1: Agriculture subsidies [PSE] and its percentage of Agriculture GDP in select countries

US $ million

Countries	Base -Year 1986-88			1998			1999		
	Subsidies	% to GDP	% to Agri GDP	Subsidies	% to GDP	% to Agri GDP	Subsidies	% to GDP	% to Agri GDP
Canada	5698	1.51	34	3573	1.21	18	3.93	1.24	20
USA	41,890	1.34	25	48,441	1.28	22	54,009	1.32	24
Japan	53,637	3.04	67	49,962	2.60	62	58,885	282	65
EC	95,214	1.79	44	1,22,946	1.82	45	1,14,450	1.95	49
OECD	2,46,226	1.67	40	2,70,869	1.57	36	2,82,780	1.66	40

Source: Agriculture Statistics At a Glance: 2005, Ministry of Agriculture, GOI

The per hectare subsidies in Japan in 1999 were $[4]11,792 in EC $ 831, in OECD $ 218 and USA $ 129. In India it was $ 53. Similarly, the per farmer subsidy in 1999 was $ 26,000 in Japan, $ 21,000 in USA, $ 9000 in Canada, $ 17,000 in EC and $ 11,000 in OECD. In India, the same was $ 66[5]. The aggregate subsidy for agriculture in India was estimated at $ 8.50 billion in 2001-02 as against $ 49.08 billion in USA, $ 47.20 billion in Japan and $ 115.33 in European Union.

5.1.11 The Aggregate Measure of Support [AMS][6] does not include support directly to producers, infrastructural services, pest control, environment programmes, inspection and market intelligence etc., which are clubbed under green box and exempted from reduction commitments. The developed countries have been providing very substantial support to their agriculture under 'Green Box' so much so that it would appear to be more apt to term Aggregate Measure of Support as Partial Measure of Support[7]. As per available data, out of total domestic support provided by developed countries very large amounts are included in Green Box **[Table 2]**

Table 2: Subsidies to Agriculture in Developed Countries

US $ million

	1995	**1997**	**1998**	**1999**	**2000**
USA					
Total Domestic Support	60,926	58296	64965	74054	72129
Green Box	46041	51246	49749	50057	50672
Blue Box	7034	-	-	-	-
De minimis	1641	812	4750	7434	7340

[4] $ is US $

[5] Source: Agriculture Statistics At A Glance, 2002, Ministry of Agriculture, Government of India.

[6] WTO agreement envisaged two kinds of support to agriculture, viz. domestic support and export subsidies. The domestic support is classified into five categories: [a] Aggregate measure of support [AMS] which includes product specific and non product specific support, [b] Green box support [c] Blue box support [d] De minimum support and [e] Special and differential [S & D] treatment box. Out of these, agreement requires reduction only in AMS and export subsidies, whereas support under all other heads is exempted.
The AMS includes [a] sum of total subsidies on inputs like fertilizers, water, credit and power etc. and [b] market price support measured by calculating the difference between domestic administered price.
Normally, the term AMS gives the impression that it is the sum total of all kinds of support. But in reality it is not and huge subsidies provided by developed nations to its agriculture are hidden in blue box.

[7] Dr. Ramesh Chand- Trade Liberalisation WTO and India Agriculture.

S & D Box	-	-	-	-	-
Total AMS	6214	6238	10320	16860	16802
Total Export Subsidies	26	112	147	80	-
Japan					
Total Domestic Support	69607	47748	30414	31909	30552
Green Box	32859	21612	23445	24081	23129
Blue Box	-	-	392	831	826
De minimis	380	294	590	292	283
S & D Box	-	-	-	-	-
Total AMS	36369	25842	5987	6704	6314
Total Export Subsidies	-	-	-	-	-
European Countries					
Total Domestic Support	116538	100689	94843	88340	87818
Green Box	24188	20480	20958	20031	21759
Blue Box	26850	23040	22419	19892	22112
De minimis	1063	612	414	292	535
S & D Box	-	-	-	-	-
Total AMS	64436	56571	51043	48126	43436
Total Export Subsidies	6292	4915	5835	5588	-

Source: Ministry of Commerce-Government of India

In view of the above, it is clear that the AMS covers only a part of the support extended by the developed countries and unless all kinds of support are clubbed together and reduced, the developing countries would find it extremely difficult to improve their trade.

5.1.12 The competitive advantage is a dynamic concept and the position changes with the changes in prices and yields. **However, the competitiveness in costs alone is not enough to succeed in exports. The quality of the produce and reliability of supply are other very important factors**. A significant increase in productivity could improve competitiveness of products which are not competitive at the current levels of yields and prices. The large gaps between the domestic and world yields reflect that the potential for raising productivity is immense provided appropriate steps are taken. **Table 3** shows the average Indian yield as a percentage to the average world yield and to the yield of top five exporters.

Table 3: Gaps between Domestic and World Yield [1999-2001]

Crop	Indian Yield as a percentage of Average World Yield	Indian Yield as a percentage of Average Yield in top five exporting countries
Rice	0.76	0.64
Wheat	0.98	0.81
Pulses	0.77	0.29
Oil Seeds	0.45	0.41
Seed Cotton	0.41	0.28
Onion	0.57	0.29
Tomato	0.63	0.18
Potato	1.16	0.47

Source: Policy Paper-Indian Agriculture Unbound: Making Indian Agriculture Globally Competitive - FICCI [2002]

5.2 Measures to Improve Competitiveness

A. Crop Productivity Related

Deceleration in Growth Rate – Need to Strengthen the Resource Base of Agriclture - More Investment Needed

5.2.1[i] The slow down of yield growth rate of crops in India during the nineties is very clearly is shown in **Table 4.**

Table 4: Trend Growth Rates of Yields 1970-71-2000-01

Period	Yield Growth Rate Foodgrains [Annual]	Yield Growth Rate Non-Foodgrains [Annual]	Yield Growth Rate All Crops [Annual]
1970-71 to 2000-01	2.13	1.66	1.93
1970-71 to 1979-80	1.06	1.00	1.03
1980-81 to 1989-90	2.71	2.28	2.52
1990-91 to 2000-01	1.30	1.08	1.19

Source: RBI- Report on Currency & Finance 2000-01

The deceleration of yield growth during the nineties becomes more worrisome if we compare India's yield rank globally as shown in **Table 5.**

Table 5: India's Global Rank in Major Agricultural Crops 1999-2000

Crop	Area	Production	Yield
Rice	1	2	52
Wheat	1	2	38
Coarse Grain	3	4	125
Pulses	1	1	138
Oil Crops [Primary]	2	5	147
Jute & Jute like fibers	1	1	7
Tea	2	1	13
Cotton Seed	1	4	77
Coffee Green	7	7	14
Sugarcane	2	2	31

Source: FAO

5.2.1[ii] The slow down in capital formation in agriculture in the eighties and nineties, was one of the major reasons for deceleration in agricultural growth. The gross capital formation in agriculture which formed 15.44% of the total capital formation and 9.92% of the Agriculture GDP in 1980-81 came down to 7.96% of the total capital formation and 8.02% of the Agricultural GDP in 1999-2000. Further, trend rate of growth of Gross Capital Formation in Agriculture [GCFA] which was 5.05% per annum in the 1960s accelerated to 8.7% per annum during 1970s, fell to 0.331% in the 1980s and marginally recovered to 2.89% per annum during the 1990s. The share of public sector capital formation to the total capital formation in agriculture also came down from 51.3% in 1980-81 to 25.34% in 1998-99. It is important to remember that private sector investment is not a substitute for public sector investments. Private sector investment is mainly in well endowed irrigated areas [almost bypassing rainfed areas] and in projects with comparatively shorter gestation period. The public and private sector investments need to compliment each other. The investments in storage, post harvest management, processing, tubewells etc. could be more efficiently handled by private sector and the Government needs to encourage it by creating enabling/encouraging environments for the purpose. Measures like developing a suitable scheme for compensating the farmers on

failure of borewell and encouraging development of water markets i.e., sale of well water by farmers owning/installing tubewells etc. could **help in private sector capital information. However, the public sector investments in agriculture related infrastructure particularly irrigation including assured supply of water, power, research and other development works is crucial for a well spread and sustainable high growth rate.** Completing incomplete irrigation projects, modernizing and improving irrigation structures where necessary and improving the quality of irrigation should get a very high priority besides the creation of new irrigation facilities. The need to improve productivity of public sector investments [roads, irrigation, power etc.] by better management including maintenance/distribution can hardly be over emphasized.

Box II

Infrastructure Investment fund for Farmers (IIFF)

The investment in agricultural sector has nearly stagnated during the last three five year plans. However, the Government have paid attention to investment in agriculture of late. It set up Rural Infrastructure Development Fund (RIDF) in NABARD in 1995-96 to provide loans to the State governments for projects in irrigation, electricity supply, marketing of agricultural products and rural roads, rural development etc. The RIDF investment falls short of requirements for rural infrastructure needs of the country. There is need to have an Infrastructure Investment Fund for Farmers (IIFF).

Can the funds be raised from any other sources? Is there such a source available?

India has accumulated foreign exchange reserves (FER) of $165 billion equivalent to about Rs.7.2 lakh crore. These have been sterilized. A part of FER is non-debt creating which means there is not much fear of flight of foreign exchange in respect of such amount. Considering the need to utilize the idle FER, Dy. Chairman, Planning Commission, took up the issue with the Ministry of Finance for utilizing FER for increasing investment in industrial infrastructure. Appreciating this novel move, the Finance Minister in his Budget 2005-06 made provision of Rs.10,000 crore for funding viable infrastructure projects through Special Purpose Vehicle (SPV) for utilizing FER for roads, ports, airports and tourism sectors at low interest and long maturity period. The pattern of earnings of FER shows that the return on FCA and gold, after accounting for depreciation, decreased to 2.1% in 2003-04 from 3.1% during 2002-03.

The proposed IIFF could be used mainly for infrastructure investment for farmers, targeting and monitoring income generating schemes. and improving marketability of their produce. The IIFF can also be funded by floating Farmers' Development Patras (FDP) and other resource raising measures.

India is not the first country to use its FER for infrastructure investment. The Chinese government used FER of $45 billion to fund a new institution, the Central Huijin Investment Company, like our SPV, which in turn funded the Bank of China and China Construction Bank for infrastructure development. Recently in April 2005 Chinese government authorized a $15 billion bailout package to financially weak lender-Industrial and Commercial Bank of China-(ICBs).

5.2.1.[iii] During the nineties the profitability in agriculture declined by 14.2% mainly due to stagnancy of yield growth and increase in prices of purchased inputs outpacing

increase in output prices. The declining profitability in agriculture also led to stagnation of private sector capital formation from towards the end of the nineties. The private sector investment in agriculture during 1999-00 was Rs 35,319 crore (New series at 1999.00 prices) which increased to Rs 38,215 crore in 2001-02 and consistently fell thereafter and reached a low of Rs 30,532 crore in 2004-05 (quick estimates). The data regarding capital formation from 1990-91 is given in **Table 6**.

Table 6: Capital Formation in Agriculture - Share of Public and Private Sector – Percentage to GDP

Year	Investment in Agriculture			Share in Gross Capital Formation		Investment in Agriculture as a percentage of GDP at Constant Prices
	Total	Public	Private	Public	Private	
Old Series (1993-94 Prices)						
1990-91	14,836	4,395	10,441	29.6	70.4	1.9
1995-96	15,690	4,849	10,841	30.9	69.1	1.6
1996-97	16,176	4,668	11,508	28.9	71.1	1.5
1997-98	15,942	3,979	11,963	25.0	75.0	1.4
1998-99	14,895	3,870	11,025	26.0	74.0	1.3
1999-2000	17,304	4,221	13,083	26.4	73.6	1.4
New Series (at 1999-00 Prices)						
1999-00	43,473	7,754	35,719	17.8	82.2	2.2
2000-01	38,176	7,018	31,158	18.4	81.6	1.9
2001-02	46,744	8,529	38,215	18.2	81.8	2.2
2002-03	45,867	7,849	38,018	17.1	82.9	2.1
2003-04	47,833	12,809	35,024	26.8	73.2	2.0
2004-05*	43,123	12,591	30,532	29.2	70.8	1.7

Source: Central Statistical Organisation - Published in RBI, Annual Report 2005-06.

These trends have to be reversed and the resource base of our agriculture needs to be strengthened and private investments encouraged on a priority basis.

Soil Health Enhancement

5.2.2 Soil health enhancement holds the key to improve productivity and returns from investments in inputs like seeds, fertilizers, other nutrients and water. As recommended in the Action Plan for the Year of Agricultural Renewal [Second Report of

the National Commission on Farmers] the need is to re-tool and re-equip all Soil Testing Laboratories [STL] in order to enable them to provide each farm household with a Soil Health Card, containing integrated information on the physics [soil structure, occurrence of hard pan in subsoil etc.] chemistry [soil organic matter, macro and micro nutrient status] and microbiology [occurrence of earthworms, soil microorganism etc.] of the soil and also establish new STL where needed. The soil health cards should stimulate efficient use of plant nutrients and amelioration of micro-nutrient deficiencies which could go a long way in improving competivity of our agriculture by improving productivity and reducing cost per unit of output.

Extension Services

5.2.3 Extension has become extremely weak [the vigour of the Green Revolution years is no more visible], with nearly all the States keeping large unfilled vacancies in the Department and the available staff being engaged in sale/distribution of seeds etc. rather than doing extension work. The role of the extension system is to act as a conduit between the scientists and the farmers. With the near collapse of the extension services and only a few instances of private enterprise entering the field of extension of technology, the main source of information on modern inputs for the farmers are the input suppliers who have a field day in 'educating' farmers in the use of purchased inputs. They naturally have a vested interest in increasing the use of inputs they might be dealing in irrespective of their impact on productivity. Field studies are suggestive about the disproportionate use of all inputs on farms, leading to excessive costs without corresponding increase in productivity. While efforts need to be continued for encouraging private entrepreneurs in extension services, the present situation is not satisfactory. The Krishi Vigyan Kendras [KVKs] have also not performed to their potential. The Central Government and the State Governments need to work together to improve their effectiveness. The State Agriculture Department at the district level needs to have close and effective linkages with the KVKs. The KVKs should also have well equipped laboratories for detailed soil testing and also trained manpower for the purpose of testing and advising the farmers.

Research and Technology Related Issues

5.2.4[i] Another important aspect is that international research is increasingly getting privatized, the outcomes [seeds and other scientific inputs] are likely to be supplied by multinational companies at a very high price [as experienced by Indian farmers in respect of Bt Cotton seeds] leading to various problems. Dependence on multi-national companies for supply of seeds including genetically modified seeds would place the small and marginal farmers to a great disadvantage due to the very high prices. As nearly 80% of farm holdings in India are less than 5 acres [small and marginal holdings] the costs of purchased inputs have a strong bearing on its usage. It is crucial that research efforts in frontier fields are increased within the country, which would require much larger investments and a high degree of accountability of the research institutions. The research has to be market oriented with focus on technology development and reaching the farmers. The progress in achieving yield growth need not wait till new technologies become available. However, different approaches based on local socio-economic and agro-ecological conditions would be required. According to Prof. M.S. Swaminathan, technologies should aim at three time dimensions-

- **Immediate:** Technologies already developed and available for immediate dissemination
- **Medium-term:** Technologies in the pipeline which need testing, incubation and adaption.
- **Long-term:** Strategic research aimed to develop new technologies through the use of new genetics and other areas of frontier science and technology. Anticipatory research is also needed to meet potential changes in climate, particularly temperature and precipitation.

5.2.4[ii] There is a silver lining to otherwise gloomy situation. **With a large pool of capable scientists available across the country, it is possible to considerably improve the in house research and technological support to our agriculture.** According to Prof. M.S. Swaminathan,[8] "Among the frontier technologies relevant to the next stage in

[8] Enhancing our agricultural competitiveness – Current Science, Vol 85, No. 7 ,10 October 2003

agricultural revolution, the foremost is biotechnology." In his view, India has a natural advantage in becoming a world leader in food and agricultural biotechnology due to a large biodiversity which serves as feedstock to biotechnology. According to him, the work already done in India in molecular breeding techniques etc. reveals the immense potential for breeding new Genetically Modified varieties [GM varieties] possessing tolerance to salinity, drought, some major pests, diseases with improved nutritional value. The National Commission has already recommended developing a National Food and Agricultural Biotechnology Policy together with implementation structures including an autonomous, professionally manned and managed Biotechnology Regulatory Authority.

Bridging the Technology Gap

5.2.5 Another important area is the dissemination of existing research knowledge and bridging the technology gap between different areas in the country. **There is huge yield variation in different areas [For example, more than two thirds of the crop areas have an average yield below national average] which shows that the untapped production reservoir in the country even with the available technologies is quite high.** The need is for special attention to dissemination of known technologies and reach in all parts of the country.

Knowledge Revolution

5.2.6 There is a need for greater stress on harnessing power of information and communication technologies for enhancing our agricultural competitiveness. Knowledge revolution in rural India would hold the key to improving productivity and competitiveness. The farmer has not only to have knowledge about various measures to increase productivity in the area of research/technologies, availability of inputs, their prices but also trade literacy regarding the market, time of demand, export practices etc. and the quality norms [codex standards and the sanitary and phytosanitary measures [SPS] applicable in the importing country[9]. The SPS conditions in different countries for different commodities also need to be consolidated for widespread dissemination. The

[9] sanitary and phytosanitary' measures mean any measures adopted by a country to protect human, animal or plant life or health within its territory from risks arising from the entry or establishment or spread of pest or disease-carrying or causing organisms, animal, plants or beverages or foodstuffs.

Government of India have recently decided to support the Common Service Centre [CSC] Scheme as a national programme under the national e-governance Plan. This scheme [establishment of 1,00,000 CSCs] is integral to providing knowledge connectivity to farmers. Some of the basic guidelines suggested for knowledge resolution are:

- Connectivity and content should receive constant attention;
- Training should be imparted to farmers to access information;
- Information provided should be demand-driven and should be relevant;
- The Centres should operate on the principle of social inclusion and a revenue nodel.
- To be effective, linkages of lab to lab, lab to land, land to lab [flow of traditional knowledge and wisdom from farmers to technical experts] and land to land [lateral learning among rural families] have to be developed and maintained.

Input Use-Quality of Delivery-Improvements Needed

5.2.7 Precision farming techniques and improvement in qualitative aspects in the delivery of inputs including seeds, fertilizers, farm machines and implements water, energy, credit would increase productivity and reduce per unit cost of production. **Qualitative aspect of seeds, pesticides/insecticides and their pricing needs urgent attention. Matters concerning seeds in relation to research, multiplication, availability, assurance regarding the qualitative aspects and prices have become extremely important and deserve urgent attention. Availability of quality seeds in different parts of the country in time and at appropriate prices is crucial. Availability of quality farm machinery and implements is also important. Most of the farm implements continue to be reserved for small scale industries [SSI]. The policy requires a relook to improve the quality of inputs and lowering of prices which could be possible with scale economies of production. The potential for export of these implements to Asian and African countries also needs to be explored. While credit delivery and increasing credit flow and the interest rates are getting considerable attention for the last 3-4, years the need for improving outreach, flexibility, simplification and timeliness of institutional credit requires a much**

greater focus. Doubling of institutional credit without adequate attention to bringing in new borrowers and adequate expansion of investment credit would not be of great significance keeping in view the agricultural growth rate of less than 2% and nearly stagnating yields.

B. Marketing, Trade and Quality Related Issues

Efficient Marketing System

5.2.8 Marketing is becoming increasingly important. If appropriate technologies and remunerative marketing opportunities get integrated, impressive production gains and improvement in competitiveness could be achieved. **In international trade, in addition to competitive cost and desired quality, the stability in supply is equally important.** An efficient marketing system requires cost effective channels of transfer of produce, good infrastructure support, liquidity and market orientation among the producers. Extremely poor infrastructure, connectivity and a complete absence of market information means that the farmers can in no way respond to market signals. High transport and other market related costs could negate advantages of a cost effective production system. **While commercialized agriculture is the basis of globalised agriculture, the Indian farmers are operating with a support system which is at best suitable for subsistence farming.** This needs attention. Our agriculture marketing system is restrictive and regulated due to a plethora of laws which have also restrained private sector investments in this sector. **The APMCs and State Agriculture Marketing Boards need to change their role from regulatory to promotional and developmental**. These agencies should focus more on developing new markets for the local products. Their entire functioning, management, operations and disposal of surplus need a relook. The need is also to encourage and support the farmer's cooperatives and private sector to operate the wholesale agriculture produce markets and provide competition to APMCs. [Various aspects connected with agricultural marketing reforms have been discussed in detail in the Second Report of the National Commission on Farmers, Aug 2005]

Box III

Quality Literacy on Codex Alimentarius Standard and SPS Measures among Farmers

The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) and the Agreement in Technical Barriers to Trade (TBT) both encourage the international harmonization of food standards. The SPS Agreement cites Codex standards, guidelines and recommendations as the preferred international measures for facilitating international trade in food. As such, Codex standards have become the benchmarks against which national food measures and regulations are evaluated within the legal parameters of the Uruguay Round Agreement.

The word Codex Alimentarius is taken from Latin and means a code of food standards for all nations. Codex was established in 1962 when the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) recognized the need for international standards to guide the world's growing food industry and to protect the health of consumers. The significance of the food code for consumer health protection was further underscored in 1985 by the United Nation Resolution 39/248, whereby guidelines were adopted for use in the elaboration and reinforcement of consumer protection policies. The **Codex Alimentarius Commission (CAC) is an intergovernmental advisory body under FAO/WHO** with current membership of 174 member countries.

The Government of India has been harmonizing its standards with the Codex requirements for food products. For the overall development and economic growth of the country it is essential that all players down to level of farmers and growers, food processors and trade understand the essence of international food regulations and standards such as Codex and WTO. A farmer has tremendous responsibility to produce agri-product of quality which satisfies the Codex requirement.

The Codex Alimentarius includes standards for all principal foods, whether processed, semi-processed or raw for distribution to the consumer. It includes provisions in respect of food hygiene, food additives, pesticide residues, contaminants, labeling and presentation, methods of analysis and sampling. Codex Food Standards, codes of practice and other guidelines protect consumers from unsafe food and fraudulent practices. At the same time, they allow food producers, processors and traders access to markets by breaking down artificial non-tariff barriers to trade. All products meant for sale have to be packed and labeled as per codex requirement.

The benefits of international trade can be reaped only when the messages of Codex and SPS and TBT requirements reaches the farmer. This can be taken up as a societal programme by the Government and non-governmental agencies to disseminate the standard requirements and rules and regulations under Codex and WTO agreements. Emphasis may be given to them regarding how to reach the standard requirements by adopting Good Agricultural practices in the Farm and HACCP in the processing of agriproducts. Farmers must also be informed about the higher dividend he/she gets by adopting such practices consistently and continuously.

Post Harvest Operations and Value Addition

5.2.9 **Post harvest infrastructure is grossly inadequate resulting in huge inefficiencies and wastages.** In the Third Report of the National Commission of Farmers it was suggested that about 60, 000 lab to land demonstrations may be organised in the post-harvest handling, processing and value addition. Help of CSIR and the Central Food Technology Research Institute [CFTRI], Mysore may be taken by the ICAR while designing these programmes. It was also suggested that a post-harvest technology wing should be added to every Krishi Vigyan Kendras. Poor quality standards, and

absence of grading, low value addition make our products comparatively uncompetitive/unacceptable in the international markets. This is also partly due to the obsolete methods of processing which need to be modernized. Agriculture and food processing activities require modernization and standardization not only in terms of investments but also in terms of enabling rules and regulations and a policy framework for operating in the globalised environments, attract greater investments and encourage the exports. **World over, the demand of processed agricultural products appears to have great growth prospects. Being a very large producer of agricultural commodities, India can not continue to be a spectator in this sector. There is a need to harness export potential in the processed food sector and also more importantly to ensure that the domestic market is not lost to imports. However, entering or building export markets in processed food is not likely to be easy and require a strong policy support including liberal tax benefits/concessions etc. to start with and maintaining high standards of quality to meet codex standards.**

Box IV

Lab to Land Technologies

Utilising science for value addition for agricultural resources for sustainable livelihoods is crucial. Several technologies have been developed by the Central Food Technological Research Institute (CFTRI), Mysore, many of which have also been implemented successfully. The Agricultural Engineering Division of the Indian Council of Agricultural Research (ICAR) is also supporting a programme for developing region and commodity specific post harvest technologies through All India Coordinated Research Project on post harvest technologies with 33 centres across the country and is expecting to cover 60, 000 farmers over a period of three years.

The lab to land programme has to aim at plugging the gaps between demonstration of feasible technologies and make farmers understand the need for total adoption of the package. The ultimate objective is that the innovation of the laboratories must reach the farmer and the grower for value addition to their agriculture products and lead to increased farm incomes. A large number of technologies are available off the shelf with CFTRI. The available technologies range from processing of fresh fruits and vegetables to cereal based products like rice flakes and papads, spices and condiments, with the capital investment required ranging from Rs. 1 lakh for papad to Rs. 35 lakhs for making jowar flakes.

Any fruit and vegetable processing unit requires a license from the Ministry of Food Processing Industries and all products have to comply with regulatory standards of the country viz, Agmark, BIS. Transfer of Technology also has to be accompanied by training on Good Harvest Practices and Good Manufacturing Practices and packaging.

Availability of such off the shelf technologies backed by technical and financial support can lead to growth of a large number of small, tiny, cottage and village industries providing employment in rural areas and help cascade the production by masses into mass production.

Trade Responsive Measures

5.2.10 Indian agriculture will have to become progressively more and more trade responsive to meet the challenge of globalization. For this purpose reliance may have to more on market related instruments like tariffs, credit policies, public investments complimenting community initiatives and to develop market structures etc. **The need is, therefore, to build markets, design financial institutions and strategic organisational structures which work and provide finances for communication, processing, standardization, quality upgradation and trade.**

Box- V

Common Commodity Organizations (CCO)

Out of 178.25 million farmers, 138.85 million (76.7%) are food grain farmers and 13 million farmers produce cotton and sugarcane. They have suffered income erosion during the last five years and prospects of improvement does not appear to be very bright. The specific commodity-farmer centric measures that will improve their lot will have to be designed. The CCOs could evolve supply demand management suiting the market changes and thereby increase farmers' incomes. CCOs will work as pressure group to monitor farmers' income and safeguard their economic interest.

The need has arisen for CCOs when surpluses have arisen in agricultural commodities and markets are getting unfriendly to farmers resulting in falling incomes of the farmer and sometimes suicides. The CCOs is a common feature in European Union (EU) and USA such as the National Cotton Council, American Soyabin Association etc. Recently American Soyabin Association prevailed on President of USA to increase Soya fuel mix with petrol to 20% that benefited the Soya farmers by $2000 per farmer. The Tea, Coffee and Spices Boards are examples of such CCOs in India.

C. Other Issues

Small and Marginal Farmers – Institutional Support

5.2.11 Institutional measures that could help the small and marginal farmers in sharing the potential gains of growth and increase the exports are needed. According to Prof. G.S. Bhalla, a proactive policy should be designed to involve the small and marginal farmers in deriving the benefits of exports through innovative institutions like the milk co-operatives of Gujarat and contract farming etc. However, contract farming arrangements are often a contract between two unequal players. Complaints about inadequate guidance in input use and farm practices as well as non-enforcement of contract are voiced frequently. However, where contract farming is organised in the cooperative mode, with major say of the producers at all the stages of value chain, it may

help in improving productivity and give a better share to the producer from the consumer's rupee besides insulating him from the market risks. The efforts on production front have to be supported by creation of specialised institutions like trading houses, market intelligence services and creation of network of information regarding national and international prices for benefit of farmers and more particularly small farmers. Cooperatives could be a good organisational structure for these institutions.

Priority for Switching Over from Low Value Agriculture to High Value Agriculture

5.2.12 The need is to move Indian agriculture from low value agriculture to high value agriculture and from low yielding activities to a dynamic competitive sector capitalizing on its inherent advantages**. Dr. Y.K. Alagh[10] has suggested that to make the agriculture competitive, the farmer has to be supported in terms of cost of production of efficient farming.** Those costs monetize existing practices, meet the immediate cost of technology adoption and learning and would sometimes embody in new inputs. Many of these would be of immediate kind and after initial thrust and support; the farmer would compete on its own. While the capital cost for such an economy at the margin would be higher than the historical costs, the current output costs would be lower per unit of output. This shift would require larger working capital.

5.2.12[i] **India could also become a potential outsourcing hub for agriculture due to its vast size and diverse agro-climatic conditions provided we take steps to enhance global competitiveness of some selected commodities in specific areas where we have strength.** For that purpose apart from taking general steps like improving productivity, support of research and extension and market reforms, a broad strategy as under could be considered.

- Identifying specific regions having strengths in particular commodity to promote exports by improving competitiveness [for example organic spices, niger and other products in tribal areas of Orissa, Chattisgarh or "basmati" rice in Punjab and Haryana or fruits in Maharashtra].

[10] **"**Prospects and Problems" in Yojana, August 2006.

- Value addition through vertical integration of farmers with agro-processing industries since efficient value addition would enable the processed product to focus on appropriate market segment to gain competitiveness. Agro-processing and value addition can also be taken up by Farmers' companies, cooperatives, groups with professional management.

- Improving rural infrastructure in these identified regions to ensure production of international quality processed goods.

Need for Proactive Advice – Land Use Boards – Restructuring

5.2.13 The existing Land Use Boards are not equipped to provide proactive advice to farmers on land use planning. Without economically and ecologically sound and proactive advice on land and water use, farmers have to fend for themselves in taking decisions on what to grow, how much to grow etc. With the spread of agricultural globalization, this could be disastrous to the economic health of the farmers. **There is urgent need for National Land Use Advisory Services, linked to State and Block Level Land Use Advisory Services on a hub and spokes model.** As recommended in the Second Report of the National Commission on Farmers, these could be virtual organisations with capacity to link land use decisions with ecological, meteorological and marketing factors including exports/imports on location and season specific basis.

Indian Trade Organisation [ITO]

5.2.14 The National Commission on Farmers has recommended establishment of the Indian Trade Organisation [ITO][11] specializing in WTO affairs and ensuring adequate livelihood protection of Indian farmers. It could be a virtual organisation to serve and assist the Government in taking informed and proactive decisions. The proposed National Land Use Advisory Service and the ITO may have to work in close coordination to be able to render proactive advice on land and water use keeping in view the local and international markets and trade opportunities.

[11] Third Report of the National Commission on Farmers. Page 18 of para 11 of Chapter I, Dec. 2005.

Agriculture in the Concurrent List

5.2.15 Agriculture by its nature cannot be centrally managed in a very efficient manner even at a local level. At the same time a vast number of farmers cannot effectively confront liberalized and globalised market condition; they must come together to safeguard their interest and also to make a better deal for themselves. The European Union [EU] has handled agriculture differently than the industries. The members of EU have virtually given up their independent decision making as relating to agriculture and introduced a Common Agriculture Policy [CAP]. This is in sharp contrast to the situation in India where agriculture is a State subject, although crucial decisions relating to credit input, output pricing and research and extension are made at the centre. The States could have different and even conflicting policies with respect to issues like standards, environment etc. As a matter of fact, the States do have differences in octroi, local taxes, charges levied by APMCs for marketing, levies etc. The need is perhaps to bring more uniformity and move towards a Single Market[12] by facilitating/simplifying movement of goods [replacing annual road tax and removal of fitness certificate by a life time payment/system, introducing National Permit for plying commercial vehicles anywhere in India],fiscal matters [introduction of uniform VAT all over the country, uniformity in taxes on commodity, withdrawal of octroi and local taxes] matters relating to tax administration [avoid using the border posts for collection/verification of payment of taxes] etc. These measures would help in enlarging small regional markets into a large national market, reduce transportation cost and improve competitiveness of our agriculture. It may be useful to consider bringing agriculture to at least the Concurrent list, so that the principles of an India Single Market as well as issues relating to prices, production, diversification etc. could be examined by the Centre and States in a participatory mode in the overall interests of farmers and farming.

5.3 Need for Greater Support to Backward Regions/Communities

5.3.1 While agriculture is moving towards liberalisation and globalization let us not forget that agriculture is a way of life for most of our rural population and their only

[12] Discussed in detail in Fourth Report of the National Commission on Farmers-Serving Farmers and Saving Farming –Jai Kisan: A Draft National Policy for Farmers.

means of livelihood [most of them have neither education nor skill nor capital to take up any alternate livelihood]. Agriculture is also the embodiment of country's culture and environment. **We need to give highest priority to our people and local requirements**. About 120 million farming families represent over 60% of our population. It is absolutely necessary to take care of the interests/ concerns of this vast rural population and particularly the economically [mainly agriculturally] backward regions and communities. The vast majority of our farmers have very small holdings [less than 5 acres] and do not have either the resources or capability to easily move away from the crop rotation being followed by them and take up new crops. The cost of making such changes in terms of crop specific investments, arranging seeds/other inputs and marketing is likely to be beyond them. These farmers would find it difficult to respond to take advantage of market signals and are likely to suffer greatly from cheaper import of crops produced by them howsoever, small the imports may be. The Government would require to closely watch such imports and take prompt and appropriate tariff measures to minimize the adverse impact on them. Further, the developed countries have exploited various exemption clauses and the 'Green Box' under WTO and are able to protect their farmers and farming. [Annexure II gives details of various programmes which support farmers and are exempt from the AMS]. We have therefore to be very careful in tariff related matters to ensure that the livelihood of our farmers is not adversely affected.

5.4 Conclusion

5.4.1 Indian agriculture is undergoing structural changes in recent years and this has enhanced the market induced vulnerability of a large section of our farmers. The progressive integration with global economy means that our farmers are also increasingly being exposed to price fluctuations at the international level. These changes have taken place when the rate of growth in agriculture production is decelerating, farm sizes becoming smaller and smaller, inputs becoming costlier and the farmer having to rely more and more in purchased inputs for cultivation. The cost-risk return structure of farming is becoming increasingly adverse. **As the risk mitigation measures are not effective across the country and the prevailing safety net provisions, are either**

grossly inadequate or delivered very inefficiently, it leads to a near crises situation for farmers in many regions of the country.

5.4.2 Various measures are necessary mainly in insurance, credit, employment creation, social security, empowerment, education, skill building and improving sharing of information and knowledge to save the vulnerable sections of our rural families on an urgent basis [most of these could be WTO compatible as already stated in earlier paragraph]. **We also cannot ignore the challenge being faced by Indian agriculture in the wake of liberalisation and globalization.** The process of integration with the world economy would continue bringing many more challenges and also some opportunities.

5.4.3 **The need is to build on our strengths to take advantage of some opportunities that come our way.** The diverse agro-climatic conditions, the rich bio-diversity, one of the World's largest agriculture research system, a vast domestic market, largest irrigated area in the world, huge land size and arable area, innovative and hard working farmers who have a record of succeeding in adverse conditions present a huge potentials and opportunities to our agriculture. Improvement in delivery of services (credit, insurance, extension, research/technology support) availability of quality inputs like seed, energy and water, increased investments for strengthening the resource base of agriculture, relook at the various laws/enactments and policies would be needed to take advantage of the developments by improving competitiveness of our agriculture. These developments coupled with regular supplies, quality consciousness and reducing transport costs, statutory charges, market handling charges, processing costs etc could improve our exports more so if the developed countries reduce their subsidies and play the game as per the spirit of the game and give increased market access to the developing nations. It would be equally necessary to be watchful in the international front regarding imports which could seriously impact the livelihood of our farmers by watching the subsidies given by other countries and fine tuning our tariffs.

5.4.4 Let us also not forget that international agriculture markets are not perfectly competitive in character. Trade in agricultural commodities is dominated[13] by a few very large international companies [mostly from US, Western Europe and Japan etc.] which enjoy considerable clout and unique position. The agricultural trade liberalisation could minimize tariff and non-tariff barriers to trade but cannot ensure perfectly competitive market structures. The apprehensions are that the developing countries would end up paying higher price [than what it would have been in a perfectly competitive market] for their imports and get lower price than what would have been possible for exports in a perfectly competitive market [Indian experience so far is not much different]. Further, the improvement in exports may also not translate much to the growth of welfare of the farmers as their supply response is not very elastic**. The need is, therefore, to try for very substantial reduction in the export subsidies and domestic support given in the developed countries and simultaneously improve our irrigation, power supply, research support, extension, input supply etc., to bring about improvement in factor productivity to reduce the cost of production and improve competitiveness of our agriculture. However, we would require a differentiated approach to meet the emerging challenges of liberalisation. Our agricultural exports form only about 6.2% of the value of our agricultural production. Thus, only a small proportion of our agricultural commodities enter the global market. It is of utmost importance that we take care of the farmer who produces to meet nearly the entire requirements of our population of 110 crores. The crops, including by products/processed products where we have export competitiveness need to be developed for export markets, with appropriate policy and other support measures ensuring all along that these are WTO compatible.**

[13] Three to six of the big companies handle 85% or above share of world exports in wheat, coffee, cotton and jute. While 60% of the World export of sugar, 70% of rice, 70-75% of bananas and 80% of tea trade is handled again by 3-6 companies/firms.

Annexure -I

Summary of Major Provision under the Agreement on Agriculture-Developing Countries Implementation by 1995-2004

Item	**Implementation Schedule**
Domestic support	a) Total AMS to be brought down by 13.3% in 10 years b) Product specific support in excess for 10% of the total value of a product included in the current total AMS [Article 6.4b] c) Non product-specific support [subsidies on electricity, credit, fertilizer, irrigation, transport, live-stock feed, crop insurance etc.] in excess of 10% of the value of total agricultural production included in current total AMS. d) Minimum trade-distorting items like Govt. assistance on general services like research, pest & disease control, training, extension and advisory services, public stock holding for food security purposes, domestic food aid, direct payment to producers through Govt. Participation in income insurance, and safety nets, relief from natural disasters and environmental assistance programmes, referred to as 'Green Box' measures are exempt from AMS calculation. e) Measures like investment subsidies and agricultural input services to low income and resource poor producers are exempt under special and differential treatment.
Export Competition - Export subsidy - Expenditure and Quantities	24% reduction in 10 years 14% of commodities

Market Access	
a) Tariffs	**Ordinary Custom Duties** Reduction commitments on duty levels as of 1986-88 **Tarification of non tariff barriers** To be converted into ordinary bound custom duties in tariff equivalent of the base period [the developing counties had the option to offer 'ceiling bindings'] **Tariff Reduction** Duties resulting from (i) and (ii) to be reduced by 24% on average, with minimum of 10% on each line **Special Safeguard Measures [SSGs]** Not usually applicable to developing countries
b) Minimum Market Access	3% of base period (86-88) consumption must increase to 5% in 2000

Source: **Implications of WTO Agreements for Indian Agriculture-I.I.M, Ahmedabad**

Annexure - II

Agreement on Indian Agriculture under WTO, 1994

ART. 1	Domestic support through a publicly funded Government programme not involving transfer from customers and the support shall not have the effect of providing price support to the producers.
ART. 2	Expenditure in relation to programmers which provide services or benefits to agriculture exempt from being considered under AMS.
ART. 3	Public stock holding for security purposes exempt from being considered under AMS.
ART. 4	Domestic food aid exempted from being considered under AMS.
ART. 5	Support provided through direct payment to producers being claimed for exemption should meet the criteria under Art. 1 and Art. 6 to 13.
ART. 6	Decoupled income support exempt from being considered under AMS.
ART. 7	Govt. financial participation in income insurance scheme and safety net programmes exempt from being considered under AMS.
ART. 8	Govt. participation in crop insurance for relief from natural disasters is exempt from provision of AMS.
ART. 9	Structural adjustment assistance provided through producer retirement programme exempt from being considered under AMS.
ART. 10	Structural adjustment assistance provided through resource retirement programme exempt from being considered under AMS.
ART. 11	Structural adjustment assistance provided through investment aid exempt from being considered under AMS.
ART. 12	Payments under environmental programmes exempt from being considered under AMS.
ART. 13	Payments under regional assistance programmes exempt form being considered under AMS.

Source: ***Reforming Agriculture in the WTO Environment: Lessons from European Union Experiences - Samar K. Datta and Milindo Chakrabarti - Appendix 3.1***

CHAPTER 6

STRENGTHENING THE COPING CAPACITY OF FARMERS UNDER AN UNCERTAIN TRADE ENVIRONMENT

6.1 The Context

6.1.1 During the past decade and a half, the Indian farmer has faced three episodes of uncertainty, in the context of the globalisation of the economy. The first came from the policies of liberalisation that were adopted in the early 1990s, which were accompanied by steep reduction in tariffs, on commodities including agricultural commodities.

6.1.2 The second episode of liberalisation was brought by India's accession to the WTO. In this episode, India was required to remove its quantitative restrictions maintained for balance of payments purposes and this affected a considerable proportion of the agricultural sector. However, a section of domestic producers received some succour in the form of high levels of tariff bindings[1]. India's high tariffs[2] are now under the scanner with many of its trading partners insisting that these high tariffs must be lowered for promoting agricultural trade. The on-going Agriculture negotiations in the WTO that are being conducted under the rubric of the Doha Round have seen such demands being made by many developed countries that have substantial interest in the global market for agricultural commodities.

6.1.3 The third, and the most recent of the episodes of trade liberalisation, has come in the form of the Free Trade Agreements (FTAs). Although only a few of the FTAs involving India have come into effect, a large number of these are currently being negotiated. More critical for India's domestic agricultural interests are the proposed FTAs with the ASEAN and the PTA with MERCOSUR members. These groups have

[1] At the end of the Uruguay Round negotiations, India opted for ceiling bindings, which allowed relatively high levels of tariffs to be imposed on at least the major agricultural commodities. Most primary agricultural commodities were bound at 100%, processed products at 150% and certain oilseeds at 300%.

[2] India's average bound tariff is 114.2%.

significant presence of agricultural exporters and whose major export interests include commodities in which India has sensitivities either from the perspective of food security or livelihoods, or both.

6.1.4 Trade liberalisation has also exposed the Indian farmers to the **risks associated with the widely fluctuating prices for agricultural commodities in the international markets**. During the past decade, international prices for the major agricultural commodities have gone down and have remained sticky at low levels. While the price fluctuations are natural, given the relatively inelastic demand for agricultural commodities, discriminatory policies followed by some of the larger players in the global markets for agricultural commodities, for instance the grant of high subsidies by the US and the EU, that have amplified the considerable uncertainties in the commodity markets arising from fluctuating prices.

6.1.5 The key issue arising in the context of the globalisation of the Indian economy relates to the **mechanisms that policy makers should adopt that would give a reasonable degree of comfort to the Indian farmers**. Policy makers would have to take measures to ameliorate uncertainties facing them, by taking two sets of initiatives. In the first instance, the policy response would have to be in the form of adequate levels of support to the farm sector so that cheap imports, or even a potential threat from cheap imports, do not create a situation where livelihoods are threatened. Secondly, comprehensive changes in agricultural policies must be put in place for reversing the declines in productivity and the consequent erosion of farmers' incomes.

6.1.6 Recent developments have reinforced the point that Indian agriculture is on a knife-edge and that minor uncertainties in the agricultural markets can cause food insecurity and livelihoods concerns. India would have to argue consistently, as it has been doing in the WTO negotiations, that it would need to provide reasonably **high levels of protection to address the twin concerns of food security and support of livelihoods in the farm sector**. According to India, these concerns are part of the non-trade concerns that WTO Member countries have recognised as being of critical importance to developing countries.

6.1.7 One of the major areas of concern for Indian agriculture arises from the threat of cheap imports. Over the past decade, prices of major commodities have remained depressed in the international markets largely because of the weight of subsidies granted by the US and the EU. According to IMF statistics, between 1996-1999, and with a base of 1990-91, the price index has undergone a fall of –43.1%,-45.8%,-25.7%and-31.3% in respect of Cereals ,Wheat, Rice and Vegetable oils and Protein meals respectively. Although the WTO Agreement on Agriculture (AoA) seems to have taken the initial steps towards reining in farm subsidies, the implementation of the Uruguay Round commitments have shown that very little progress has been made in this direction. Effective reduction of farm subsidies remains high on the agenda of the G-20 group of developing countries, which is led by India and Brazil.

6.1.8 Yet another effort was made by the developing countries in the 1970s and the 1980s for stabilising commodity prices. These countries could get the global community to agree to an arrangement that could ensure stabilisation of commodity prices. The establishment of the Common Fund under the aegis of the UNCTAD was a step in this direction. Although the UNCTAD initiative never took off the ground, the need for price stabilisation measures remains, nonetheless.

6.1.9 The second level of response, one that looks at the medium to the long run, should aim at reversing the productivity declines that the farmers have been facing in almost all major crops. This would require a package of measures that would include, *inter alia*, land reforms for addressing the problems arising from uneconomic land holdings, fragmentation of holdings, and easy access to technological inputs that promote sustainable agriculture, and better management techniques for utilising available resources more effectively. Only such a package can improve on-farm efficiency and can help bridge the productivity gap that prevents farmers in India from competing with the more efficient producers.

6.1.10 It needs to be clarified that price fluctuations in international market affect the Indian farmers in two ways. For commodities exported by India, the fall in international prices brings down the price realisation by the Indian farmers e.g. cotton. For

commodities imported by India, an increase in supply brings down domestic prices and also brings down the price realisation of the Indian farmers e.g. edible oils.

6.1.11 This Chapter analyses the implications of the process of globalisation on Indian agriculture by looking closely at four commodities, viz. pepper, coconut, cotton and oilseeds. The need to protect producers involved in the production of these commodities arises from the sizeable number of farm families and workers that are dependent on them. In other words, the issue of livelihoods security arises quite prominently in case of all the four commodities. The case studies bring out the issues involved and have relevance for other agricultural commodities too.

6.1.12 The analysis here would also explore the policy options that need to be looked at for safeguarding the interests of the farmers engaged in the production of these commodities in particular and other crops with global ramifications in general.

6.2 Pepper

6.2.1 Pepper is a smallholder crop and linked to rural development and livelihood security. The pepper growers are full time workers in agriculture depending solely on the crop for livelihoods. Producers of pepper are mainly small farmers with average land holding size about one hectare. More than 17 million people are dependent on pepper cultivation for livelihoods.

6.2.2 Kerala is the largest producer of pepper – in 2003-04 more than 96% of the country's production was accounted for by this state. In 1991, nearly 1,70,000 hectares were under pepper cultivation in Kerala, which was just less than 6% of the State's gross copped area, and by 2003-04, this figure had increased to more than 7%. Exports accounted for nearly three-fourths of the total production of pepper in 1999-2000. However, in the more recent years, exports have fallen to just over a fourth of the total production.

6.2.3 Trends in Pepper Production in India

6.2.3.1 Pepper production in India seems to have gone a full circle during the decade and a half since 1990. After experiencing considerable fluctuations in the first half of the 1990s, pepper production increased to its highest level in 1999 Thus, pepper production had increased by almost 60% from the trough of 48,000 tonnes seen in 1991.

6.2.3.2 Fluctuations in the level of production of pepper in India were driven to a significant extent by movements in domestic prices. The effect of prices on production was more pronounced since the late 1990s. Another feature of pepper production was that the levels were influenced directly by changes in area under cultivation. Thus, in 1999, when production had increased by nearly 60% as compared to the level achieved in 1991, area under pepper cultivation went up by 40%. In other words, until about the year 2000, changes in pepper production could be explained largely by commensurate changes in the area under cultivation. In the more recent years, this link seems to have been broken, as an almost stagnant level of area under cultivation has been witnessing fall in production.

6.2.3.3 This tendency in the later years was a reflection of falling productivity of pepper cultivation in India. After remaining constant at around 300 kg per hectare, pepper yield came down to nearly 200 kg per hectare in 2004. All this while, when pepper yield in India was stagnant, its main competitors, like Vietnam and Indonesia, had improved their position in the global market through efficiency gains. As a result, productivity gap between India and the other leading pepper producers increased quite considerably in the more recent years. The following discussion provides the details.

6.2.4 The Global Market Trends

6.2.4.1 Four countries provide the bulk of pepper produced globally. These countries, viz. Vietnam, Indonesia, Brazil and India, had a combined share of nearly 75% of the global production in 2004. Vietnam emerged as the largest producer in 2004, with a total production of nearly 96,000 tonnes. It had outstripped Indonesia, which was the largest producer since 1998.

6.2.4.2 Production trends of the four leading producers since 1990 indicate that the production centres have changed quite significantly during this period. Brazil was the largest producer in the beginning of the 1990s, after which the country's production suffered a steep decline. Indonesia emerged as the top producer for a couple of years, only to be replaced by India. However, since 1999, India's pepper production declined quite rapidly – from a high of 76,000 tonnes produced in 1999, which was close to 26% of the global production, India was producing only two-third of this level in 2004. What also needs to be pointed out is that since 1999, global pepper production has consistently increased on the backs of robust production performance by all the leading producers barring India.

6.2.4.3 The emergence of Vietnam in the global market for pepper has been the most remarkable development. In the beginning of the 1980s, the country was producing less than 1,000 tonnes of pepper, and within a decade, its production had exceeded 11,000 tonnes. But even after registering a ten-fold increase in production, Vietnam had no more than a 5% share of world production in 1991. However, with production increasing even faster during the 1990s, Vietnam had increased its share in the global production to more than 23% in 2004.

6.2.4.4 Explaining the above-mentioned trends in production across countries are the differences in their yields. For instance, India suffered a relative decline in the market share for pepper since it was the least productive among the four leading producers. While all other countries increased their yields since the late 1990s, yields declined in India during the past few years after remaining nearly stagnant between 1990 and 2001. What emerged from these trends was that in 2004, pepper yields in Vietnam and Brazil were higher by 10 and 12 times higher respectively as compared to that recorded by India. Interestingly, both these countries went through periods in which they recorded even higher levels of efficiency. An added matter of concern for India should be that in 2004, pepper production in the country was nearly 5 times lower than the global average.

6.2.4.5 India's relative decline among the leading pepper producers was manifest in its declining shares in global exports. In 1999, India was the second largest exporter of

pepper, and the volume of exports from India was not significantly below that of the leading exporter, viz. Indonesia. Among the other leading producers, Vietnam had already started challenging the global market leaders, but Brazil was a considerable distance behind.

6.2.4.6 This situation underwent a rapid change since the beginning of the current decade. A more than 25% decline in production in 2002 turned India to the international market as a major importer. India's imports of pepper, in terms of volume, increased more than five-fold within a period of three years, i.e. from 1999 to 2002. Consequently, India emerged as the third largest importer of pepper in terms of quantity.

6.2.4.7 It may be argued that this surge in imports has acted as an added disincentive for the pepper farmers in the country, whose long term prospects have looked dismal in the face of the secular decline in productivity levels of the crop. Aside from the structural nature of the problem that they face, attention must also be given to whether the pressures from the global market, particularly in terms of the relative movement in domestic and international prices have encouraged imports, thus affecting domestic production. The latter possibility would justify the use of tariff protection, at least in the interim, so that the Government can take measures to improve efficiency levels of the pepper producers in India. The following discussion looks at the details in this regard.

6.2.5 Increase in Pepper Imports: Role of relative price movements

6.2.5.1 At the outset, movements in producer price seen in India and its major competitor countries would be analysed. As is evident, differences in producer prices reflect the relative production costs, and this provides a basis for assessing the policy instruments that the government would need to put in place in order to safeguard the interests of the Indian pepper producers.

6.2.5.2 FAO database provides comparable sets of producer prices for two of India's major competitors in the global market for pepper, viz. Indonesia and Brazil. This data are available for the period 1991-2003 (Table 1).

Table 1 : Comparison of Producer prices in leading pepper producing countries

(US $ per tonne)

Years	India	Indonesia	Brazil
1991	1549.8	3382.0	755.0
1993	1412.3	3050.9	708.7
1995	1885.1	3254.3	1309.8
1997	3155.0	3411.2	3353.5
1999	3671.6	2476.2	3944.4
2000	2924.2	2803.9	2322.8
2001	1509.8	2383.2	1238.5
2002	1485.3	2810.1	895.3
2003	1414.1	3313.2	787.4

Source: FAOSTAT

6.2.5.3 Data for producer prices provided in Table 1 show interesting tendencies across countries. Producer prices have remained relatively low in India despite the fact that the productivity levels in the country are significantly lower than in the other countries. In case, the trends in producer prices seen in the above Table bring out the inherent limitations of the country's pepper production system quite clearly. The smallholder dominated pepper production system in India was not able to benefit from scale advantages accompanying increases in production recorded in the second half of the 1990s. Thus, producer prices escalated with increased production and in 1999 when India recorded the highest level of pepper production, its producer price was almost a third higher than Indonesia, which was then the country's main competitor.

6.2.5.4 Available data on producer prices indicate that in recent years India did not face any threat from Indonesia, the largest producer of pepper after Vietnam. Producer prices in Indonesia have been significantly higher as compared to those in India, particularly since 2001[3]. More importantly, Indonesia seems to have lost ground in the global markets as its export volumes have seen sharp reduction.

[3] During this period, India experienced downward movement in producer prices that accompanied declining production volumes.

6.2.5.5 However, Brazil did pose a threat to India, since it was able to bring down its producer prices quite appreciably. The sharp decline in producer prices recorded by Brazil since 2000 was reflected in the country's growing presence in the global markets. In 2004, Brazil was the second largest exporter, having upstaged Indonesia.

6.2.5.6 Relative movements in domestic and international prices captured in Table 2 also suggest that Indian producers do not face an apparent threat from imports, given that the latter have exceeded the former by an average of nearly 20% in recent years.

Table 2 : Domestic and International Prices of Pepper

(US $ per tonne)

Years	Domestic Prices	International Prices
1997-98	4665.7	5290.0
1999-2000	4961.6	5030.0
2001-02	1826.3	1970.0
2002-03	1673.7	1910.0
2003-04	1616.9	1700.0
2004-05	1553.5	1650.0

Source: Spices Board

6.2.5.7 Evidence presented above would suggest that the Indian pepper producers do not face any competitive threat from imports at present since domestic prices were considerably below international prices. Furthermore, imports have increased during the past few years not because of the worsening competitive strengths of the Indian producers but for meeting the slack in domestic demand arising from the shortfall in production.

6.2.5.8 A closer evaluation of available data, however, indicates that cheap imports are a potential threat to Indian producers. Data on unit values of import of pepper show that during the past few years two of India's principal competitors, viz. Vietnam and Brazil, exported below international prices, while Indonesia exported pepper at prices that were below the corresponding domestic prices. Table 3 provides the details.

Table 3 : Unit Import Values and Domestic/International Prices of Pepper

(US $ per tonne)

Years	Unit Values of Imports			Domestic Prices (India)	International Prices
	Indonesia	Vietnam	Brazil		
1999-2000	2790.2	2337.4	-	4961.6	5030.0
2000-2001	3104.7	2264.2	-	3813.2	3660.0
2001-2002	1537.0	1945.2	-	1826.3	1970.0
2002-2003	1637.8	1597.8	-	1673.7	1910.0
2003-2004	1495.9	1430.9	1466.7	1616.9	1700.0
2004-2005	1810.9	1283.1	1400.0	1553.5	1650.0

Source: DGCIS

6.2.5.9 The actual threat faced by the domestic producers from cheap imports, originating in Vietnam, in particular, can be gauged by observing the tariff-adjusted import parity prices. Import tariffs on pepper were bound at 100%, while the applied rate was 70%. Table 4 provides a comparison between domestic prices and the tariff-adjusted import parity prices; the latter having being based on Vietnam's unit values of imports.

Table 4: Domestic Prices and tariff-adjusted import parity prices for pepper

(US $ per tonne)

Years	Domestic Prices	Tariff adjusted import parity prices
1999-2000	4961.6	3973.6
2000-2001	3813.2	3849.1
2001-2002	1826.3	3306.8
2002-2003	1673.7	2716.3
2003-2004	1616.9	2432.5
2004-2005	1553.5	2181.3

6.2.5.10 Table 4 shows that barring 1999-2000, tariff-adjusted import parity prices for pepper have been above India's domestic prices. Since 2003, however, steep fall in international pepper prices have significantly reduced the difference between the two sets of prices.

6.2.5.11 From the above discussion it can be surmised that India's pepper producers do face an import threat as the two major exporters, viz. Vietnam and Brazil, try to expand their presence in the Indian market. But it is the formalisation of the Indo-Sri Lanka Free Trade Agreement (ISLFTA) that poses the biggest threat to the domestic pepper producers. It has widely been reported that ISLFTA has provided an opportunity to pepper originating from Vietnam to use Sri Lanka as a conduit to gain access to the Indian markets. The evidence above supports this point of view. Pepper imports from Sri Lanka have increased substantially since 2002, i.e. after the ISLFTA has come into operation.

6.2.5.12 A two-pronged strategy can therefore be suggested to protect farmers engaged in pepper production. The short-term strategy would entail imposing appropriate levels of tariffs that effectively address the problem of cheap imports finding their way into India. In this regard, Vietnam poses the greatest threat since it has been found to be exporting pepper considerably below the international price. Accounting practices of the transition economies is not easy to decipher, and consequently comparable data on their cost of production are not available. It is therefore, imperative that adequate attention is given for protecting the interests of the pepper producers in India.

6.2.5.13 Alongside the short-term strategy, a medium to long-term strategy also needs to be adopted. This would entail addressing the problems of declining production and productivity that face the pepper producers in India. A well-coordinated strategy should be put in place in this regard. Besides providing means for the farmers to benefit from technological advancements, it is necessary to give due consideration to the institutional bottlenecks that prevent the farmers from maximising their returns on investment.

6.3 Coconut

6.3.1 The Domestic Scenario

6.3.1.1 Production of coconut in India has shown an upward trend over time. It increased from 5883 million nuts in the triennium ending 1982-83 to 12486 million nuts in 2002-03. However, annual growth rate of coconut production declined from about 7% during 1982-83 to 1992-93, to just 0.4% in the period 1992-93 to 2002-03. Drastic fall in

production in Andhra Pradesh, Tamil Nadu and Kerala, the three largest coconut-producing states, was largely responsible for the considerable slackening of coconut production.

6.3.1.2 The area under coconut cultivation expanded from 11 lakh hectares in TE 1982-83 to nearly 19 lakh hectares in TE 2002-03. But during these two decades, the rate of growth of area under coconut cultivation suffered a steep decline. While area expansion was 3% per annum during 1982-83 to 1992-93, it fell by one-half during 1992-93 to 2002-03. And, perhaps more importantly, since the beginning of this decade, area under coconut cultivation suffered an absolute decline.

6.3.1.3 Alongside production, coconut yield also declined during the present decade, after reaching its peak in 1998-99. As compared to peak level of 7821 nuts per hectare in 1998-99, coconut yield declined to 6422 nuts per hectare in 2002-03, a fall of nearly 19%. The drop in yields occurred as Andhra Pradesh and Tamil Nadu, the two high acreage states, recorded negative growth during this period. Contributing to the problem was the presence of large number of senile and uneconomic palms, small and fragmented holdings and lack of irrigation.

6.3.2 Global Trends in Coconut Production

6.3.2.1 India is the world's third largest producer of coconuts, behind Indonesia and the Philippines. In 2004, Indonesia produced more than 16 million tonnes of coconut in 2004, which was the culmination of a steady increase recorded since 1999-2000. As regards the Philippines, the period between 2002 and 2004 was one in which the country was seeking to reverse the decline in production witnessed since the mid-1990s. India, on the other hand, experienced an increase in production during the first half of the 1990s, following which a steady decline in production was registered. Although its 2004 production of 9.5 million tonnes marked a recovery from one of the recent troughs reached in 2002, it remained well below the record production levels achieved in the early 1990s.

6.3.2.2 The three leading producers accounted for almost 75% of the global production of coconuts. Data available for the period 1990-2004 show that the three countries had near constant shares in global production throughout. While Indonesia, the world's largest producer of coconuts, had a 30% share, the Philippines and India maintained their shares at 27% and 20% respectively.

6.3.2.3 Among the leading producers, Indonesia recorded the fastest growth in coconut production between 1990 and 2004, which was somewhat higher than the global average. In fact, all the three leading producers increased their production of coconuts in excess of the global average. But, for India, trend growth in output was positive only during the first four years of the 1990s, following which a marginal negative trend was observed.

6.3.2.4 Although coconut yields in India were comparable with the world average, its inability to maintain the impressive growth in yields registered during the first half of the 1990s is a cause for concern. This is where India differs from the other major coconut producers. While Indonesia managed to consistently increase coconut yields, the Philippines took rapid strides at improving the yields.

6.3.2.5 India's future prospects do not look very promising as the major coconut producing states have been experiencing downturn in production and productivity in recent years. This spectre of declining productivity levels raise concerns about the ability of the Indian producers to meet price competition from their counterparts in countries like Indonesia, which have benefited from the secular increase in coconut yields. This issue would be analysed in the following section.

6.3.3 Price Competitiveness of the Indian Coconut Producers

6.3.3.1 Here, the analysis would be based on two sets of data. In the first place, FAO data on the producer prices of coconut would be used. This dataset is available from 1991 to 2003. The second set of data relates to prices of copra, for both domestic and benchmark international prices. The two datasets have been used independently to comment on the relative efficiency or otherwise of the Indian coconut producers.

6.3.3.2 Table 5 provides a cross-country comparison of coconut producer prices for the period 1991-2003.

Table 5 : Coconut Producer prices: A cross-country comparison

(US $/tonne)

Years	India	Indonesia	Philippines
1991	214.1	81.5	65.9
1994	95.3	97.3	80.6
1997	109.8	112.0	67.5
1999	87.8	124.0	99.3
2000	87.0	82.4	44.8
2001	68.1	97.7	32.6
2002	60.9	80.6	54.7
2003	62.1	96.3	48.9

Source: FAOSTAT

6.3.3.3 Barring the few years in the early 1990s, India was price competitive vis-à-vis Indonesia for most years during 1990-2003. But vis-à-vis the Philippines, price competitiveness of Indian coconut producers eroded quite significantly since the year 2000, when the former started reaping benefits from sustained increases in yields. However, the differences between producer prices existing in India and the Philippines were not large enough to offset the import duties that coconut attracts at present. The bound tariff for coconuts is 100%, while the applied tariff is 70%. This level of applied tariff protection is insufficient for Indian farmers and increased imports seen in recent years have acted as a disincentive to them.

6.3.3.4 In case of copra, India's benchmark prices for the product, viz. the minimum support prices remained consistently above the international prices. Copra attracts an import duty of 70%, and even at this level of protection, domestic producers find themselves unable to safeguard their interests. This becomes evident if domestic copra prices are compared with the tariff adjusted import parity prices **(Table 6)**.

Table 6 : Domestic prices and Tariff adjusted import parity prices of Copra

(US $ per tonne)

Years	Domestic Prices (MSP)	Tariff adjusted import parity prices
1995-96	747.4	827.9
1996-97	760.6	768.4
1997-98	780.3	676.6
1998-99	736.8	795.6
1999-2000	750.0	606.9
2000-01	722.4	353.6
2001-02	691.9	416.5
2002-03	686.0	487.9
2003-04	761.7	720.8

6.3.3.5 The differences between the MSP and the tariff adjusted import parity prices that have been seen particularly in the more recent years provide a strong justification for the imposition of tariffs that would be close to, if not equal to the WTO bound rates. Coconut tariffs are currently bound at 100%, but the applied tariffs for fresh and desiccated coconuts have been kept fixed at 70% for some years now. It is clear that the current applied rate does not provide adequate protection to domestic copra producers and that increase in imports that have been seen since the beginning of the current decade have acted as a disincentive for them.

6.3.3.6 The threat to domestic producers could increase manifold if the proposed FTA with the ASEAN that India has been negotiating takes effect. Adequate care must be taken to ensure that commitments to introduce a duty-free regime in coconuts are not taken as a part of this FTA. In the ensuing FTA negotiations, primacy must be given to protecting livelihoods of the coconut producers who are essentially operating at the margins .It may be unfair to compare the efficiency and productivity of farmers growing coconut in their homesteads and commercial plantations in other countries.

6.4 Cotton

6.4.1 Domestic Production Scenario

6.4.1.1 Cotton is among the more significant commercial crops produced in India. Between 1999 and 2001, cotton was produced on nearly 5 per cent of the country's gross cropped area. This share is not-too-insignificant considering that food crops account for about two-thirds of the country's gross cropped area.

6.4.1.2 Cotton production has witnessed a steady increase since the mid-1980s due to improvements in both area and yield. In the 1990s, production growth experienced a slowing down because of sharp decrease in yield gains. However, since 2000, rising yields and, more recently, an increase in area have revived production growth.

6.4.1.3 Cotton producers in India have made huge strides forward in cotton production, increasing their average yields from just over 0.2 tonnes per hectare in 1999-2000 to nearly 0.5 tonnes per hectare in 2004-05. Consequently, cotton output more than doubled from just less than 12 million bales in 1999-2000 to over 24 million bales in 2004-05. Most of this expansion was registered in 2004-05, a year that saw a 5 million bale surplus being generated (Table 7).

Table 7 : Demand and Supply of Cotton in India

(in million bales)

Year	Production	Consumption	Demand-Supply Gap
2000-01	14.0	17.3	(-)3.3
2001-02	15.8	17.2	(-)1.4
2002-03	13.6	16.9	(-)3.3
2003-04	17.9	17.7	0.2
2004-05	24.3	19.4	4.9

Source: USDA

6.4.1.4 The increase in cotton production in recent years brought a chronically deficit country to a situation where it is in a position to become a major exporter, thus threatening some of the large exporters like the US. But in a recent assessment of India's potential in the global market for cotton, the USDA argued that India's expanding cotton production is unlikely to affect U.S. cotton producers, at least in the short term. But, if

India's cotton production continues to outpace its consumption needs for some more years, USDA expects Indian cotton to start displacing U.S. cotton in other markets.

6.4.1.5 A contrary view has also been presented by some commentators who opine that this impressive growth notwithstanding, it is uncertain if these gains will be sustained. Output continues to show large annual variations due primarily to weather-induced fluctuations. These commentators have further argued that India has to go a long way towards bridging the yield-gap, which exists vis-à-vis, the leading cotton producers. This aspect is dealt with in the following sections.

6.4.2 The Global Scenario

6.4.2.1 India is the third-largest cotton producer in the world. In the early 1990s, India was quite a distance behind China and the United States, the two leading cotton producers. However, following India’s strong performance since the year 2000, one that has not been matched by the leading duo, the gap between the top three producers has decreased quite significantly.

6.4.2.2 Area under cotton production in India is significantly larger than in any other country. Almost 25% of the world’s planted area under cotton is accounted for by India. At nearly 9 million hectares, cotton acreage in India is more than 70% higher than that in China. In recent years, there has been a slight decline in the area under cotton cultivation, possibly because of better land utilisation.

6.4.2.3 One of the prominent weaknesses of cotton production in India has been the relatively low average yield. Cotton yields in India were lower than those recorded by the top ten global producers, although in the past few years the gap has been decreasing. Moreover, progress in raising yields toward levels achieved by other major producers has been slow. Yield differences aside, the quality of cotton produced in India has often been found unsuitable by the domestic cotton mills. The quality of India’s cotton is often poor because an array of technical, economic, and institutional bottlenecks have affected the production systems. The extent to which these productivity and quality factors can be addressed will be critical in determining India’s competitiveness in global textile markets

and whether rising cotton demand will be supplied by domestic producers or by global markets.

6.4.2.4 This raises the critical issue of relative competitiveness of cotton production in India. In many parts of the country, cotton farmers have argued in the past that the level of protection that the crop enjoys at present is threatening their livelihoods and that there is a need to calibrate the tariff rates. This issue would be dealt with in the following analysis, where a case for increased protection is examined, given the movement in relative prices.

6.4.3 Is there a case for raising tariff protection for cotton ?

6.4.3.1 This issue would be addressed by analysing the relative movements in domestic and international prices of cotton. At the outset, it should be mentioned that the data on domestic prices for cotton are not very well organised. The exception in this regard is the availability of data on MSP.

6.4.3.2 Table 8 provides a comparative picture of domestic and international price trends observed in different categories of cotton.

Table 8 : Price Comparison of Cotton Varieties

(US $ per tonne)

Varieties	1997 -98	1999 -2000	2000 -01	2001 -02	2002- 03	2004 -05	2005 -06
Cotton F414/H-777 (MSP)	357.9	363.5	355.7	351.2	346.1	391.7	391.1
Cotton H-4 (MSP)	411.7	409.6	399.5	393.1	387.4	436.2	440.0
Medium Staple Cotton Wholesale Prices	560.7	442.2	484.2	386.4	465.1	N.A.	N.A.
Cotton "A" Index*	1589.7	1165.1	1262.1	923.3	1230.4	1180.1	1217.0

6.4.3.3 The table above seems to suggest that the Indian market faces no perceptible threat from imports given that domestic prices are considerably below the international benchmark price. However, price movements observed in the National Commodity & Derivatives Exchange Limited (NCDEX), suggest that the “market price” of cotton in India is considerably higher than what the data presented above indicate. According to

NCDEX, Trading centres of Mumbai, Saurashtra region of Gujarat and Rajasthan serve as reference markets for prices of cotton traded across the country. NCDEX has reported that currently, raw cotton prices in upcountry markets across the country is ruling in the range of Rs. 41000 to 89000 per tonne for various varieties/grades (equivalent to US $ 890 to 1900). This scenario is a cause for concern for the cotton producers in India, since the average "market price" of US $ 1400 of all varieties of cotton is about 20% higher than the international prices as indicated in the Table above. This implies that the current applied rate of 10% for cotton look quite inadequate in providing protection to the domestic producers.

6.4.3.4 The issue of providing protection to Indian cotton producers needs to be considered in the light of the country's cotton import scenario. As stated above, India was unable to meet it domestic consumption requirements until 2002-03, after which the country has started generating surpluses. However, even after 2002-03, imports have not reflected the changed demand-supply scenario in the domestic market. Although imports in the first nine months of the previous financial year have shown some signs of slackening, there is a need, to protect domestic cotton producers against import threats by providing appropriate levels of tariff protection.

6.4.3.5 This is in view of the fact that international prices of cotton have been extremely volatile during the decade. The benchmark cotton price in the international market, viz. Cotton 'A' Index, declined from nearly US $ 2200 per tonne in 1995 to under US $ 1200 per tonne in 1999. Although there was a minor reversal of this trend which saw international prices reach US $ 1400 per tonne, in the past couple of years, prices have again been on the downslide.

6.4.3.6 One of the major factors responsible for the volatility in cotton prices has been the subsidy granted by one of the largest producers of cotton, viz. the USA. The US was expected to reduce its subsidies on cotton as a part of the deal that would have incorporated the results of the negotiations in the Doha Round. An understanding reached at the end of the Hong Kong Ministerial Conference in December 2005 was that the US would reduce its subsidies in the interest of the cotton producing states in Africa, which

have suffered considerable losses in export earnings because of their inability to compete with the subsidised cotton originating in the US. However, with the Doha Round facing an impasse, the succour to the cotton producers in the developing countries that the US was expected to provide by lowering its subsidies on cotton, may not be in the offing.

6.4.3.7 In India, the issue of protecting cotton farmers raises an internal dichotomy, one that pits the interests of the farmers against those of the textile industry. While the industry has argued that the farmers have not been able to provide them their preferred long staple cotton, the farmers have argued that they can make the necessary adjustments to satisfy the requirements of the industry given the right kind of incentives. The most meaningful incentive that can be provided to the domestic producer is to protect his market from imports. The distress that the cotton farmer presently faces should be the opportune time to extend the incentive that he needs to protect his livelihood.

6.5 Oilseeds

6.5.1 According to an USDA study, India, the world's seventh largest producer of oil crops (2001-03 average), is a major producer of soybeans, rapeseed, groundnut, cottonseed, and sunflower seed and their derived products. India is traditionally an importer of vegetable oils and an exporter of protein meals, but a negligible trader in oilseeds. Oil imports have been on the rise because of strengthening consumer demand and import liberalisation measures implemented in 1994. During 2001-03, India was the second largest edible oil importer in the world, behind the European Union (EU-25).

6.5.2 The country grows mainly nine oilseeds, viz. groundnut, rapeseed, sesame, safflower, linseed, niger seed, castor seed, soybean and sunflower. Groundnut, rapeseed/ mustard account for about 60% of total production, although since the 1990s, soybean, sunflower and cottonseed have also grown in importance.

6.5.3 Production of oilseeds underwent expansion after efforts made by the oilseeds mission, which was established in the 1980s, bore fruit. Total production of oilseeds, which was only about 12 million tonnes in the later 1980s, went up to more than 20

million tonnes in 1992-93. This growth in production was largely due to higher yields, although in the 1990s, increase in the area under cultivation also played its part.

6.5.4 The growth momentum of oilseeds production seen in the early 1990s was not maintained. After reaching the lowest level in nearly a decade and a half, total production reached the highest levels ever in the two most recent years for which data are available.

6.5.5 As was indicated earlier, rapeseed and groundnut have historically contributed a lion's share of India total oilseeds production. However, since the beginning of the 1990s, production of these two oilseeds went through considerable fluctuations with both rapeseed and groundnut production remaining depressed after 1997-98. On the other hand, soybean, sunflower seed and cottonseed production had increased. In fact, soybean had topped both rapeseed and groundnut to record the highest tonnage among all major oilseeds in 2005-06. Table 9 below provides the details.

Table 9 : Production Levels of India's Major Oilseeds

('000 tonnes)

Oilseeds	**1990**	**1993**	**1995**	**1997**	**2000**	**2002**	**2003**	**2004**
Cottonseed	3358.1	3641.6	4395.2	3700.0	3281.8	2964.0	4689.0	5130.0
Groundnut	8309.0	8322.0	7524.0	7090.0	6558.6	5953.5	6000.0	6702.1
Rapeseed	4125.3	4800.0	5758.0	6657.9	5788.4	5082.6	3918.0	6200.0
Soybean	2601.5	4745.2	5096.0	6463.1	5275.8	4558.1	7900.0	7500.0
Sunflower seed	873.0	1350.0	1260.0	890.0	646.4	901.9	1086.0	1300.0

Source: FAOSTAT

6.5.6 The trends in oilseeds production portend to the problems that this sector faces. The inability of the major oilseeds sector to maintain its growth momentum seen in the late 1980s was manifest in the stymied domestic production of edible oils, as can be seen from Table 10 below.

Table 10: Edible Oils Production in India

('000 tonnes)

Edible Oils	1990 -91	1995 -96	1997 -98	1999 -2000	2001 -02	2002 -03	2004 -05	2005 -06
Coconut	250	375	420	445	456	440	462	462
Cottonseed	405	620	560	562	550	488	845	840
Palm	0	20	30	50	35	35	40	40
Groundnut	1740	1700	1754	1357	1901	1360	1748	1778
Rapeseed	1570	1800	1650	1630	1510	1345	2068	2287
Soybean	425	712	859	792	833	615	900	971
Sunflower seed	285	455	370	425	470	532	397	458

Source: USDA

6.5.7 Thus, while in the beginning of the 1990s, domestic production was seen to be matching the growing oilseeds consumption in the country, in the past few years, consumption had far outstripped production.

6.5.8 Quite clearly, the major challenge for the Indian oilseeds sector is to meet the increasing demands of its consumers. This would be possible if the production system improves its efficiency and meets the standards set by the other major oilseed producing countries.

6.5.9 India's Oilseeds Production in the Global Context

6.5.9.1 In the following discussion, India's production performance in the oilseeds sector is analysed by taking four of the more important oilseeds into consideration. These are rapeseed, groundnut, soybeans and sunflower seed.

6.5.9.2 Three countries, viz. China, Canada and India, dominate the global rapeseed production. China has been the largest producer of rapeseed for more than a decade and a half, followed by India. However, after the mid-1990s, India has fallen considerably behind China in terms of absolute levels of production. While the former nearly double

its production between 2002 and 2005, India was struggling to reach its peak production levels that were attained in the late 1990s.

6.5.9.3 Differences in yields essentially explain the production performance of the three leading rapeseed producers. India was able to break away from its long-term trend of 0.7 tonnes per hectare by increasing the yield to one tonne per hectare in the beginning of the 1990s. Decline in the yields in the subsequent period and the increases registered by the other major rapeseed producers meant that by 2005, yield levels in India were just one-half of that recorded by China.

6.5.9.4 In case of groundnut, the domination of China was even more marked. Between 1990 and 2004, China was able to increase its production by nearly 125%. In sharp contrast, India, which was the world's largest producer of groundnuts in 1990, experienced a 7% decline in production during the same period. Groundnut production in India can be divided into three phases. While the 1990-98 saw an increasing trend around minor fluctuations, the four years after 1999 was one in which production levels declined by more than 50%. A recovery took place during the 2003 and 2004, but this was not enough to compensate for the earlier decline in production.

6.5.9.5 A combination of declining yields and area under cultivation affected India's groundnut production between 1990 and 2004. Indian producers could not average more than a tonne per hectare of groundnut production during this period. At this level, India's groundnut yield was almost a third of that registered by China. During this period, area under groundnut cultivation in India registered a 19% decline, as against an increase of more than 60% registered by China.

6.5.9.6 Among all the major oilseeds that India produces, soybean registered sustained increase between 1990 and 2004. Soybean production increased more three-fold until 2003, before a minor downturn in 2004. India's performance is however dwarfed by those of Brazil and Argentina, both of which have been able to increase their share in the global market. Together with the USA, Brazil and Argentina, account for

80% of the total global soybeans production. India, on the other hand, continues to be only a minor player in the global context, with a production share of only 4% (2004).

6.5.9.7 As in the case of rapeseed and groundnut discussed above, Indian soybean producers have suffered in relative terms because of depressed yields. Although soybean yields have shown improvement over time, these increases have not been able to match the appreciable increases that the three leading producers have been able to register. In 2004, India's soybean yield of 1.1 tonne per hectare was less than half of those recorded by both Argentina and Brazil.

6.5.9.8 Trends in production and consumption of oilseeds and edible oils discussed above clearly indicate that India's oilseeds sector did not respond to the country's growing consumption needs in the 1990s. This non-response on the part of the producers seems somewhat anomalous given the fact that production was on an upsurge following the successful intervention made by the Oilseeds Mission in the second half of the 1980s. Changes in the trade policy, in particular the liberal tariff regime that was adopted after the mid-1990s, explains this anomaly to a considerable extent.

6.5.10 Edible Oil Import Regime and its Impact on Domestic Producers

6.5.10.1 **Until the early 1990s, imports of edible oils were restricted, with import duty on palm oil fixed at 125%**. This regime provided higher incentives for domestic production of oilseeds, which was manifest in the higher levels of output registered by almost all the major oilseeds. When imports of edible oils were liberalised in 1994, output of oilseeds witnessed a slowdown, which had an impact on production as well as exports of oil cakes. In March 1994, imports of palm oil were put under Open General Licence (OGL) attracting an import duty of 65%, while, at the same time, state agencies like STC and National Dairy Development Board were allowed to import palm oil at a lower duty of 20%. After February 1995, this initial phase liberalisation gave way to far more sweeping changes in the import regime: all edible oils except for coconut oil were put under OGL at an import duty of 30%. And in 1998, the import duty on palm oil was reduced to 15%, the lowest level yet. This liberal import regime in oilseeds was reversed

in 1998. Import duty was initially increased to 28%, and in 2001, the duties were increased to over 90%. The changes in the palm oil import duties since the beginning of the 1990s are captured in the Table 11 below:

Table 11 : Changes in the Import Duty applicable to Refined Palm Oil

Period	Import duty (%)
1990	125.0
1992	65.0
1994	65.0
1995	35.0
1996-97	25.0
1998	15.0
1999	28.6
2000	71.6
2001	92.2
2003	70.0
2004	75.0
2005	90.0

Source: Centre for WTO studies database

6.5.10.2 The variations in the import duties on palm oil affected the domestic production to a significant extent. The period of low duties on palm oil coincided with the phase when the domestic production of major oilseeds suffered a decline. Two factors influenced this decrease in import duties. The first was the effect of the overall policy regime, which, since the early 1990s, had laid more emphasis on the liberalisation of the economy. The second, and the more important, was the response of the government to encourage imports while domestic consumption of edible oils was experiencing an upswing. But after the government reposed faith in the domestic producers by increasing import protection towards the end of the 1990s, the latter also responded to this regime by increasing level of production to highest-ever levels during 2004-06.

6.5.10.3 **There have been detrimental effects of the stop-go policies adopted in respect of tariff protection to palm oil, which makes for the bulk of edible oil**

imports in India, on domestic edible oil production. Increase in imports acted as a disincentive for the domestic producers, which resulted in the reversal of the strong expansion that the domestic oilseeds production had started to show from the late 1980s. This experience with the oilseeds sector sends a strong message that prudence needs to be exercised while deciding on the level of protection that should be provided to critical sectors like oilseeds. Over the past decade, the country had to suffer sizeable foreign exchange outgo on import of edible oils and oilseeds because of the tariff policies. In the early 1990s, domestic production was level pegging with consumption, but import duties on oilseeds were soon slashed only to trigger a steep fall in domestic production. Even the gains of the Technology Mission on Oilseed and Pulses in increasing area and yield were lost. **This was an object lesson on the need for ensuring synergies between technology and public policy, and lesson is relevant even today.**

6.5.10.4 This issue assumes added significance in light of the recommendations made by the Committee on Rationalisation of Customs and Excise Duties on Edible Oils and Oilseeds[4] to lower import duties on all edible oils, except soybeans to 65 per cent, from the existing 75-80 per cent. The Committee based its recommendations on the tariff adjusted import-parity prices of the major edible oils, which, according to the Committee was 24 per cent higher than the domestic prices in case of rapeseed. The data used by the Committee to arrive at this conclusion was for a one-year period, viz. December 2004 to December 2005.

6.5.10.5 **The above-mentioned recommendation of the Committee needs careful reconsideration** on at least three counts. First, the period for which the comparison between domestic and international prices was made appears too short given that agriculture is prone to cyclical behaviour. Secondly, prices of edible oils in the international market have displayed considerable volatility in the past, which is also indicated by the Committee in its report. For instance, rapeseed prices in the global markets declined by nearly 13 per cent between December 2004 and December 2005.

[4] The Committee was set up by Department of Economic Affairs, Ministry of Finance, which was headed by Dr. Ashok Lahiri, Chief Economic Adviser to the Govt. of India. The final report was submitted in January 2006.

Lastly, domestic prices were somewhat depressed during the reference period as they were influenced by the record production of oilseeds in the country. There is substantial merit in the Note of Dissent from the Department of Agriculture and Cooperation, Govt. of India, in that continued support for oilseed sector is essential in the interest of the incomes of farmers cultivating marginal soils, and for generation of employment in rural areas, crop diversification, improved cropping intensity and restoration of soil health .All these elements are central to the efforts to reduce agrarian distress.

6.5.10.6 Government of Kerala had set up a Commission on WTO concerns on Agriculture under the Chairmanship of Prof. M. S. Swaminathan. Its report titled "Building a Sustainable Agricultural Trade Security System for Kerala", and submitted in January 2003 has studied several commodities having global ramifications like Coconut, Black pepper, Cashew nut, plantation crops, Rubber, Tea, Coffee, Cardamom, Livestock products, Marine products and Fisheries. The recommendations made in the Report should be actively implemented.

6.6 Conclusions

6.6.1 At the outset, it must be appreciated that India has been well aware of the problems likely to be faced by the Indian farmers in the context of the globalization and the WTO commitments. The issues of access for India's exports to the market of the developed countries, and the unfair competition faced by the Indian farmers due to the heavy subsidization of their agriculture sector by many developed countries have been central to India's position in the negotiations under the Doha Round of the WTO.

6.6.2 Developing countries like India have focused on three main instrumentalities in any further market access commitments under the Doha Round. Firstly, consequent upon India opting for ceiling bindings in the Uruguay Round, the bound tariffs across most agricultural products are at 100% for primary products, 150% for processed products, and 300% for certain edible oils. With gradual liberalisation, the applied tariffs are generally well below bound rates, providing the Government the flexibility to calibrate the applied rate within the bound level depending upon the emerging situation. The G-20, of which India is a founder member, has proposed cuts on bound tariffs in the

Doha Round of a maximum of 36% on average for developing countries, provided that the developed countries undertake proportionately higher tariff cuts of at least 54%. Assuming G-20 cuts are agreed, at the end of the implementation period of the Doha Round in India's case across over 80% of the agricultural tariff lines the final bound tariff would still be at or above the current applied rates. Secondly, it has already been agreed in the negotiations that developing countries shall have the flexibility to self-designate an appropriate number of agricultural tariff lines as **Special Products**. This self-designation shall be guided by indicators based on the fundamental criteria of **food security, livelihood security and rural development needs**. The tariff reductions on designated Special Products shall be more flexible than on the non-Special Products. Negotiations are underway to reach an agreement on the appropriate number of Special Products as well as the tariff reduction commitments. It would be critical for India's farmers to ensure that as many of our agricultural commodities as possible related to rural development, food security and livelihood security are designated as special products noting that for a country like India as much as 70% of the population is linked to agriculture. Thirdly, in the negotiations under the Doha Round it has been agreed that developing countries shall have recourse to a **Special Safeguard Mechanism** which permits the application of a safeguard duty in situations of either an import volume surge or price decline of the imported product. This safeguard mechanism would be unlike the current provisions of safeguard duty or quantitative restriction under the WTO Agreement on Safeguards available to countries like India.

6.6.3 The large domestic support granted by US and EU under the three boxes to their farmers are compared with the low level of support in India, based on latest data available, as under:

Table 12 : Domestic Support granted by the European Union, the United States and India

European Union

(Figs. In US $ billion)

Subsidies/Years	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/2001	2001/2002
Green Box	23.8	25.1	20.3	20.4	18.4	19.6	19.5
Blue Box	26.5	24.4	22.9	21.8	18.2	19.9	22.4
Amber Box	64.5	58.8	56.7	50.1	44.4	39.6	37.8
Total Subsidies	114.8	108.3	99.9	92.4	81.0	79.1	79.6

United States

(Figs. In US $ billion)

Subsidies/Years	1995	1996	1997	1998	1999	2000	2001
Green Box	46.0	51.8	51.3	49.8	49.7	50.1	50.7
Blue Box	7.0	0.0	0.0	0.0	0.0	0.0	0.0
Amber Box	7.7	7.1	7.0	15.1	24.3	24.1	21.5
Total Subsidies	60.8	58.9	58.3	65.0	74.0	74.2	72.1

India

(Figs. In US $ billion)

Subsidies/Years	1995/96	1996/97	1997/98
Green Box	2.2	2.5	2.9
Article 6.2 Support	0.3	4.9	5.2
Amber Box	-23.8	2.0	2.3
Total Subsidies	-21.4	9.4	10.3

Source: IIFT, New Delhi

6.6.4 Elimination of all forms of export subsidies, which are the most trade distorting, by developed countries has already been agreed by 2013 under the Doha Round. Developing countries like India will retain the right to provide marketing and transport subsidies on export shipments for a period of 5 years beyond the end date for all forms of export subsidies by developing countries. This date is still under negotiation. On trade distorting domestic support, it has been agreed that the three heaviest subsidizers, namely, the EU, the US, and Japan, shall reduce their overall trade-distorting subsidies by progressively higher cuts in order to achieve harmonization of permitted support levels. Moreover, Blue Box subsidies will be capped and will also be subject to disciplines to ensure that Blue Box support is less trade distorting than Amber Box support. Green Box criteria will also be reviewed with a view to ensure that Green Box payments have no, or at best minimal, trade-distorting effects.

6.6.5 Regarding FTAs, India's agricultural sensitivities have been safeguarded under the proposed India-MERCOSUR PTA even though other partners to the PTA have substantial export interest in agricultural commodities. Perhaps, this could be a model for the other FTAs under negotiations in order to ensure safeguards for Indian farmers. It would be desirable to set up a road map for FTAs with adequate domestic transparency and proceed in a sustainable and measured manner. FTAs can bring substantial benefits to Indian farmers, if safeguards are built-in

6.6.6 Briefly, therefore trade policy gives sufficient options to protect the interests of the Indian farmers and should not become a barrier to the interests of the Indian farmers. It is for the Indian farmers to improve their productivity and enhance quality literacy with assistance from the Government to benefit from liberalization.

6.6.7 Having said this, the cases of four of agricultural commodities presented above indicate the threat that the producers engaged in each of these commodities face from imports that have been encouraged by the liberalised trading regime. Trade liberalisation has affected the domestic producer thrice over. The first was the liberalisation adopted in the early 1990s; the second followed India's accession to the WTO, and the third is the developing interest for FTAs. Although only a few FTAs have come into effect, their impact has already been felt.

6.6.8 Liberalisation has affected several commodities, the most prominent of which are oilseeds and cotton. Increased imports have affected the fortunes of India's oilseeds producers and at a time when their future prospects looked quite promising. Subsequently, however, increasing tariffs rectified the damage caused to domestic producers, but this change in policy was brought about only after the domestic production was put back, in some cases, by more than a decade.

6.6.9 In case of cotton, the Government has been sympathetic to the demands of the domestic textiles industry, in the interest of exports of textiles, which has unfortunately worked to the detriment of the interests of the farmers. The cotton farmers have made persistent demands to increase import tariffs, but despite universal recognition of the

distress of the farmers due, in part, to persistent imports, tariffs have remained unchanged.

6.6.10 **India's commitments to the WTO in agriculture allow a level of comfort for the country to impose higher levels of tariffs. However, in many agricultural commodities, the advantages of high tariff bindings have not been taken**. This includes coconut, a commodity in which the country has been faced with increasing imports since the applied tariffs are inadequate to provide effective protection to the domestic producers.

6.6.11 Among the FTAs that India is currently a part of, a mention must be made of the India-Sri Lanka FTA. This FTA has had an adverse impact on the Southern States, in particular Kerala. Several commodities, including pepper and coconut, that form the lifeline of Kerala's economy, have been affected by the duty free access provided to imports from Sri Lanka.

6.6.12 From the evidence available, a case can be made for designing trade policies that are sensitive to the needs of the domestic producers. Besides the fact that a large country like India, can ill-afford to depend on external sources to meet its requirements in a sustained manner, imports are detrimental to the interests of a considerable section of farming households. In some of the commodities mentioned above, smallholder agriculture dominates the production system. The issue of livelihood security assumes even greater importance under such circumstances.

6.6.13 The evidence should also be carefully considered by the Government, which is currently engaged in negotiating a series of FTAs. It needs to be emphasised in this context that while there may be Foreign policy and Trade policy imperatives for engaging in the FTAs, **the adversities that the farmers in India have faced during the episodes of trade liberalisation should get due consideration while decisions on the extent of participation in the FTAs are taken**.

6.6.14 In this regard, appreciative mention must be made of the uncompromising stand that India has taken in the WTO negotiations by arguing that the interests of

farmers cannot be bartered away in trade deals. The following arguments must be kept in mind:

a) Considering the strong interlinkages among the three pillars of the Agreement on Agriculture, substantial and genuine reductions in trade distorting supports in developed countries must come into force before greater market access could be considered by India. This should involve elimination of Blue Box and reform of Green Box. b) Export credits and other support subsidies, being the most trade distorting should be phased out at the earliest. c) Livelihood support through tariffs should be seen as the only option. Since market access in developed countries is not coming through and trade continues to be distorted and unfair. d) Diversity of India's agriculture and its huge populations dependence on agriculture as a way of life, in spite of minimal returns should be seen as enough justification for a comprehensive coverage for special products. e) Consequent to the volatile international prices and trade distortions, a comprehensive coverage for special safeguard mechanism would be fully justified, and f) The commitments in the Doha round of WTO as well as the livelihood security of 70% of our population dependent on farming need to be safeguarded.

6.6.15 This should be the reference point for all future trade negotiations. The bottom line of our Trade policies on agriculture and even our Foreign policy should be the economic well being and livelihood security of our agricultural families. It would be wasteful and counterproductive to provide assistance to farmers for increasing their production and then pursuing Trade and Foreign Policies, which end up depressing their price realisation. Simultaneous application of the accelerator and the brake can never be regarded as a good driving habit and can only lead to generation of heat and no motion and lead to a waste of fuel. It is admitted that in a global economy, the Trade and Foreign policy compulsions cannot be wished away, but then good governance is all about a skilful and balanced use of options. The distress amongst the Indian farmers growing oilseeds, cotton, pepper and coconut shows that a correction and tilt in favour of farmers is perhaps overdue. Short-term palliatives and adhoc packages may not suffice for long.

6.6.16 Even while arguing for higher subsidy support to Indian farmers to meet the threats of unfair trade in the global market, it should be simultaneously appreciated that

India does have constraints in providing high levels of support to its farmers primarily because it would involve assisting 70% of its population involved in farming by the remaining 30%. In contrast, in US, 98% of the population subsidises 2% of its population engaged in farming. Besides, US/EU have the advantage of much higher GDP as well as economic clout.

6.6.17 The Government needs to recognise that the concerns of the farmers in the era of globalisation would have to be addressed in a systematic and sustained manner. This can be possible only through the establishment of a Farmer-centred institution that would function in a network mode with the States. Towards this end, the proposal made by the National Commission on Farmers in its Third Report, Chapter 1, for setting up of an **Indian Trade Organisation (ITO)**, dedicated to safeguard the interest of farm and fisher families by providing a Livelihood Security Box to ensure fair trade, needs to be reiterated and stressed. The Livelihood Security Box should have provisions to impose quantitative restrictions on imports and/or increases in import tariffs, under conditions where imports of certain commodities will be detrimental to the work and income security of a large number of farming families.

6.6.18 The justification for such an approach, comes from the fact that there is no level playing field between the capital, subsidy and technology driven **mass agriculture production** of the developed countries with a very limited number of persons engaged in agriculture and the **production by masses** in India with seventy percent of its population connected to farming and characterised by weak support services, deficient infrastructure, heavy debts and resource and technology constraints. This argument can find favour with a very large number of developing countries with a similar spectrum of farmers in the WTO fora. The Indian Trade Organisation should serve as “a brain and information bank” for enabling the Government to take proactive and quick reflex decisions in a timely manner on potential surpluses and shortages of agricultural commodities. ITO should have an arm to be called National/State level land use Advisory Service which could serve as a friend, philosopher and guide, to small farmers, providing proactive advice on land use and crop planning, based on best available assessment of home and external trade opportunities.

6.6.19 Briefly therefore, the small and marginal farmers in India can be protected from price fluctuations in International markets by a judicious mix of several strategies: increasing productivity by following various suggestions contained in the Reports of the NCF for achieving economies and efficiencies of scale, establishment of an Indian Trade Organisation, enhancement of domestic demand, greater attention to price, quality, consistency, reliability of supply and to trade literacy, and farmer friendly Trade and Foreign policies.

6.6.20 Mahatma Gandhi had given a Talisman for testing conflicts between Policy options, by noting, "I will give you a talisman. Whenever you are in doubt, or when the self becomes too much with you, apply the following test. Recall the face of the poorest and the weakest man [woman] whom you may have seen, and ask yourself, if the step you contemplate is going to be of any use to him [her]. Will he [she] gain anything by it? Will it restore him [her] to a control over his [her] own life and destiny? "Given the complex compulsions of globalisation, the Indian farmers need the protection of this Talisman. Their job and livelihood opportunities must be protected and inspite of constraints, such options, both in the Trade and Foreign policies and in the domestic policies relating to input prices, Minimum Support Prices and Market Intervention Operations exist and must be tapped more vigorously.

6.7 Recommendations: Way Forward

6.7.1 It is being realised that Marrakesh Agreement has given substantial benefits to the developed countries by permitting them to cover their large farm subsidies. Prof. M.S. Swaminathan has opined, **"WTO has no visible agenda for the resource-poor farming families".** Globalisation has proved to be inherently asymmetric in its impact. Countries most dependent on export of primary commodities have not been able to derive benefits from a "free trade" regime". It has not been fair enough. Nevertheless, globalisation and competitiveness are facts of life and the Central Government, State Government and the farmers would have to act in tandem to ensure that WTO requirement and FTAs commitments do not drag Indian agriculture and Indian farmer families down but convert challenges into opportunities. Given India's vast plant and animal bio-diversity and varied agro-climatic conditions, Indian farmers need not go into

a defensive mode, provided the following recommendations are kept in mind by all the three players mentioned.

6.7.2 Central Government

i) While negotiating under the WTO or FTAs, for promoting India's interest in other segments of the economy or as a part of the foreign policy, **Livelihood Impact Analysis** on the Indian farmers must be undertaken. Simultaneously, the impact on employment opportunities for the Indian rural youth should also be carefully studied, considering that provision of employment opportunities is a major concern and such opportunities have been shrinking due to a variety of reasons.

ii) A set of Ground Rules must be laid down which should be sacrosanct in the interest of the Indian farmers in all trade negotiations, as spelt out in Para 6.13 above. No country could object, if India attempts to protect the interest of 70% of the population which is engaged in farming as a means of livelihood and pursuing a way of life, inspite of minimal returns, while many richer countries continue to provide huge support to miniscule sections of their population, engaged in commercial farming.

iii) Rules relating to country of origin for agricultural produce must be strictly and honestly enforced so that FTAs do not become a conduit for countries not entitled for its benefits. Claims of value addition should also be carefully scrutinised. Quality of imports must also be checked very carefully.

iv) India must become a part of the process by which Sanitary and Phytosanitary Standards (SPS) are decided in order to ensure that these are not utilized as non-tariff barriers against our export to developed countries.

v) India must evolve SPS standards for our domestic produce as well as imports.

vi) Since the various boxes in the 1994 Marrakesh Trade Agreement of the WTO have been utilized by developed countries to continue to provide substantial protection to their farmers to the detriment of the farmers in developing countries, an effort should be made to do away with these boxes, earlier than

planned, or at least impose constraints on their use if developed countries do not bring down their subsidy levels substantially by a cut off date. These should be replaced by a clear statement on support which is trade distorting and which is not.

vii) Besides the effort to disband the system of Boxes, due to non-performance, **a strong case for a Livelihood Security Box should be made so that assistance to farmers in developing countries for their income/employment opportunities could be safeguarded**. It should be possible to distinguish between life and livelihood saving support to small farmer families and support for commodities entering the global markets

viii) Considering that an overwhelming proportion of India's Agricultural production goes for internal consumption in view of our large population, there is a need to set up an Indian Trade Organisation (ITO) with a National Land Use Advisory Service, as a self-empowerment measure and its own boxes for domestic support. It should advise farmers on implications of domestic regulations, WTO rules and Regional Trade Agreements. It would function as an information bank, a forum for dialogue and strategy think tank. It would also be a link between global and domestic markets. ITO has been recommended in Chapter I of the Third Report of NCF.

ix) Investments/support for more than a billion small farmers with limited access to technology, inputs, rural infrastructure and post harvest facilities should never be seen to be a barrier to free trade and trade distorting, especially when such farmers have to compete in under tapped markets in developed countries which have highly subsidized capital, inputs and technology. This argument should be forcefully articulated.

x) A **Price Stabilization Fund** should be established for major commodities to support farmers, when international prices fall by a certain percentage.

xi) Commodity Boards, on the pattern of Tea, Coffee and Rubber Boards should be set up for other commodities where farmers are under threat due to

globalisation/competition from highly subsidised production in developed countries. Farmers should have representation on these Boards.

xii) Since productivity and competitiveness would be the key to survival in the liberalized global market, more resources need to be provided for research and extension. Simultaneously, the personnel would need to carry out time bound farmer oriented programmes with the responsibility of working out affordable recommendations. Their success should be measured in terms of gains in productivity.

xiii) Farmers should be made more competitive through greater use of Information and Communication Technology (ICT) in order to ensure digital inclusion. This would be necessary in order to ensure "more crops per unit of input" which would provide strength to Indian farmers in global trade. The concepts and modalities of setting up Village Knowledge Centres have been elaborated and recommended in Chapter VIII of the First Report of NCF.

xiv) The use of Plant and Animal genetic resources should be optimized for developing competitiveness and tapping niche markets globally.

6.7.3 State Government

i) States must ensure convergence of resource available under programmes like NREGP, Bharat Nirman and National Rural Health Mission as well as various programmes of Department of Women and Child Development to build up infrastructure for the Indian farmers, which would enable them to increase their productivity and competitiveness.

ii) They should carry out amendments to their Agriculture Produce Marketing Acts to ensure greater transparency and provide choice to farmers for marketing their produce. It would also facilitate the participation of larger companies, who could procure for the international markets after appropriate grading/processing, and using their marketing strengths for creating a win-win situation for the farmers too.

iii) Good governance should be ensured by facilitating timely delivery of inputs and knowledge so that the farmer could avoid unnecessary and avoidable costs and delays, which affect productivity.

iv) State Land Use Board should be revitalized so that they could actively guide the farmers to the demands of the international market by correlating data on soil, weather, market prices and market demand. The Board should have a technical and multi-disciplinary team with participation of the farmers and should provide recommendations, which would be ecologically sustainable and affordable.

v) There should be active coordination between the State extension machinery/ ATMA and Krishi Vigyan Kendras so that proper synergies could be built up and farmers could take up knowledge-based agriculture.

vi) State should facilitate a Consortium of progressive and innovative farmers for encouraging other farmers to take up novel practices and projects for enhancing incomes in a sustainable manner. It would be desirable to involve farmers whose products have been successfully exported in this Consortium so that concepts of quality, trade and legal literacy could also be propagated.

6.7.4 Farmers

i) **Increase in the productivity and competitiveness, especially of the small and marginal farmers, would be the cornerstones of the farmers' efforts to gain from globalization**. Given the fact that the bulk of the holdings are operated by small and marginal farmers and most of the cropped area is rainfed which is subject to vagaries of weather and facing barriers to technology upgradation, the task is difficult but certainly achievable through steps like the organisation of Small Farmers' Estates.

ii) Various measures to increase competitiveness have been elaborated and recommended in Chapter III of the Fifth Report and other Reports of NCF and cover issues like Investments inputs, technology, knowledge revolution soil health and move towards high value agriculture, marketing, post harvest

operations and value addition etc. The farmers would have to pay attention to all these strategies not only to climb up the ladder of competitiveness but also to stay above others. It should be remembered that competitive advantage is a dynamic concept and many internal and external factors can upset balances.

CHAPTER 7

SHAPING THE ECONOMIC DESTINY OF FARMERS

7.1 Indian agriculture is characterized by the following distinctive features, as per the data collected under the 59th Round of NSSO (Report No. 497) as well as other studies:

- Over 60% of the population depends on crop and animal husbandry, inland and marine fisheries, forestry and agro-processing for their livelihood.
- Over 60% of the consumers are farm families and the prevailing widespread malnutrition can be eliminated only by improving their income and purchasing power
- Farming is the largest private sector enterprise in the country; State-wise information shows that the lowest percentage of farm households, out of total rural households is 35% in Tamil Nadu. The highest at 91% is in Jammu and Kashmir.
- Out of 115 million holdings, 90 million are 1 hectare or less in size. Tiny holdings limit the capacity of farmers to take to the technological upgrading of farm enterprises. They also limit their coping capacity to withstand economic shocks caused by meteorological and / or marketing policies.
- Out of 178.25 million farmers, 136.85 million (76.7%) are foodgrain farmers. 13 million farmers produce cotton and sugarcane.
- Rural poverty and under-nutrition are higher than urban poverty and hunger
- There is increasing feminisation of agriculture. Women constitute over 50% of the agricultural work force. Yet, women have no land rights and are push-outs of the credit system

- Rural infrastructure is poor, particularly in the area of post harvest technology. There is a mismatch between production and post-harvest technologies in most farming systems.
- Capital formation in agriculture is going down and the credit-deposit ratio is adverse in rural branches.
- The principle of financial inclusion is yet to become a reality in rural India.
- Prime farm land is being diverted for non-farm purposes, due to the lack of an agricultural land conservation policy; consequently more food and other agricultural products will have to be produced under conditions of diminishing per capita availability of arable land and irrigation water.
- The rate of growth of employment in rural areas is poor, leading to the population supporting capacity of the ecosystems being exceeded in most parts of the country and to the unplanned migration of the rural poor to urban slums.
- The average monthly income per farmer household is Rs.2115 and does not cover the average per capita monthly consumption expenditure of Rs. 2770. Only households with landholding of 4 ha and above have a surplus of income over expenditure.
- The cost-risk-return structure of farming is getting adverse leading to a sense of despair in the rural areas. Consequently, the youth in villages are reluctant to take to farming as a career.
- The ecological foundations essential for sustainable agriculture like land, water, forests and biodiversity are in varying degrees of decay and adverse changes in climate appear a distinct possibility as a result of global warming.
- In the prevailing atmosphere of gloom and doom, **there are many bright spots** – farmers with access to adequate land, water, capital and technology are doing very well in areas like horticulture and animal husbandry and are demonstrating the strengths of Indian agriculture, arising from abundant sunshine and a rich diversity of agro-ecological and agro-climatic conditions.

7.2 The persistence of widespread under- and malnutrition in the country arises from policies which fail to recognize that the farming population including landless agricultural labour constitute the majority of consumers. Unfortunately, the term, "Consumer" seems to cover only the urban population in the minds of the policy makers. This is one of the reasons why we are off-track in achieving the UN Millennium Development Goal of reducing hunger by half by 2015. **Enhancing small farm productivity and profitability, as a single step, will make a major contribution to reducing hunger and poverty. This in turn will depend on our ability to assure remunerative prices for their produce.**

7.3 In industrialized countries, farmers constitute 2 to 4 percent of the population. The per capita income of farmers is high both because of the size of the farm operated and the extensive support extended by government. They are technology, capital and subsidy rich. Public policies concurrently promote conservation, cultivation, consumption and commerce. Extensive support is given to promote conservation farming. **The collapse of the Doha round of negotiations in agriculture is an indication that farming cannot survive in industrialized countries without substantial support from public funds to ensure its economic viability**.

7.4 What then is the future for India's rural population numbering over 700 million? **We cannot be silent onlookers to a situation where 30% of India is shining and 70% is weeping**. If we want farmers and farming to survive, several essential steps should be taken immediately. In addition to the areas mentioned in the first four Reports of NCF and in the draft National Policy for Farmers, the following four areas needs urgent and integrated attention: technology, training, techno-infrastructure and trade. Technological, ecological and management upgradation of small farms is the need of the hour.

7.5 Technology

7.5.1 Technologies which can help to enhance land, water and labour productivity are urgently needed. They should lead to an evergreen revolution in small farms, i.e. increase in productivity in perpetuity without associated ecological harm. The smaller

the farm, the greater is the need for marketable surplus in order to generate cash income. The small farm can lend itself to higher productivity and profitability, provided the small farmer is enabled to overcome his/her handicaps arising from lack of capital and credit and access to appropriate technologies and inputs and remunerative markets. There is need for a **small farm management revolution**, which can result in conferring the power and economy of scale on small producers both in the production and post-harvest phases of farming; if this does not happen, mounting debts arising from adverse economics will continue to affect them. The strategy for a Small Farm Management Revolution will have to be developed by Panchayati Raj Institutions (PRIs) with technical help from Agricultural, Rural and Women's Universities as well as IITs and IIMs, since much of the action will be location-specific. Cooperative farming, service cooperatives, stakeholder companies, formation of compact production and processing Estates by Self-Help Groups and farmer centric contract farming can all help to improve the economics of small holdings and thereby foster improved management. The pace of the implementation of the Wasteland Development Programme is slow. The recommendations of the Mohan Dharia Committee on Wasteland Development are yet to be adopted in a serious manner.

7.5.2 At the production end, there is need for integrating frontier technologies like biotechnology, information and communication technologies, space and nuclear technologies and renewable energy technologies such as solar, wind, biogas and biomass based energy systems with traditional ecological prudence. Bio-energy based on pyrolysis and gasification of biomass can be a decentralized source of energy. Bio-fuels also offer scope wherever ecological and economic conditions are favourable. Biomass is an under-utilized resource. **Bio-Parks** can be promoted in every block to convert the available biomass into a wide range of economic products, including energy and manure.

7.5.2 Conservation farming is the pathway to an evergreen revolution. The greatest problem with applying conservation agriculture concepts in dry land areas is the lack of adequate quantities of crop residues. The removal of crop residues for alternative uses accelerates the already fast decline of soil organic matter content in dry land areas.

Long term sustainability of dry land soils may be significantly enhanced by reduced tillage that leaves more crop residues on the soil surface.

7.5.3 Besides enhancing soil fertility and soil organic matter, the need for the economic and efficient use of irrigation water cannot be over emphasised. The average yield of cereals can be increased by 30 to 60% annually in dry farming areas by increasing crop water use by 25 to 35 mm. This can be readily achieved by conservation agriculture. High input costs, uncertain rainfall and poor income lead to widespread indebtedness. **The younger generation will be reluctant to take up farming as long as income prospects are poor**. Declining terms of trade between farm and non-farm sections is a matter of concern.

7.5.4 It is in this background, that we have to examine the opportunities opened up by new technologies. New agriculture technologies like genomics and information technology together with improved agronomic management should form the cornerstone of increasing agriculture productivity and profitability of small farms both in irrigated and rainfed areas as well as in problem soils and coastal areas. Recombinant DNA technology has already resulted in the breeding of crop varieties possessing tolerance to salinity and drought as well as to serious biotic stresses caused by the triple alliance of pests, pathogens and weeds. It is however essential to have a professionally and socially credible National Biotechnology Regulatory Authority, on the lines recommended by the Swaminathan Committee in 2004. **The bottom line for any biotechnology regulatory policy should be the safety of the environment, the well being of farming families, the ecological and economic sustainability of farming systems, the health and nutrition security of consumers, safeguarding of home and external trade, and the biosecurity of the nation.**

7.5.5 The Village Knowledge Centre (VKC) or *Gyan Chaupal* movement recommended by NCF in its first report (December 2004), will help to bridge the growing gap between scientific knowledge and its field application. **It will also facilitate the removal of many intermediaries from the marketing chain.**

7.5.6 The wholesale fruit and vegetable markets are likely to lose their importance under the growing influence of contract farming and direct supply relationships between producers and major market chains. Changes in intermediary relationship will occur as internet based marketing tools are adopted by both producers and suppliers. **Bharat Nirman has rightly given priority to knowledge connectivity, in addition to physical connectivity through roads**. As a single step, the *Gyan Chaupal* will bring about a transformation in the economic conditions and social relations in our villages. **Bridging the digital divide is a powerful method of bridging the gender divide, since rural women master the ICT technologies with ease**.

7.5.7 India is poised for a major ICT revolution in rural India. The broad strategy recommended by NCF is as follows:

- Establishment of a Village Resource Centre (VRC) in every block with the help of the Indian Space Research Organisation. These VRCs will be linked to satellites and will have telecommunication facilities.
- Every Panchayat headquarter will have a Gyan Chaupal or Village Knowledge Centre (VKC). This will have internet connectivity. Alternatively, the Gyan Chaupal can be established in the village school or any other public space where there will be social inclusion in access to the technology.
- The last mile and last person connectivity will be through FM / Community radio and / or mobile phones. **The internet – radio – mobile phone synergy is a very powerful tool for social inclusion in access to all the needed information, including warning of impending natural disasters**. Villagers give priority to health and marketing information. In addition, an Entitlements Database can empower them with information on all the Government schemes designed for their well being. Gender-specific information is equally important. Every farmer in the village should be issued with an Entitlements Pass Book.

7.5.8 NCF is happy that the Government of India has approved the setting up of 100,000 rural Common Services Centres (CSC) across the country at a total cost of

Rs.5742 crores. This will help to accelerate progress in achieving the goal of Every Village a Knowledge Centre. The Village Level Entrepreneur (VLE) envisaged under the programme should be supported by a capacity building programme. The Fellows of the Jamsetji Tata National Virtual Academy may be able to organize such capacity building and mentoring programmes. **The Rural Knowledge Revolution is now on the way to becoming a reality.**

7.5.9 We are thus on the threshold of both a biotechnology and information technology revolution. Biotechnology does not imply only GMOs. Non GMO applications are many, such as tissue culture for multiply elite germplasm, bio-fertilizers, bio-pesticides and bio-remediation of ground water as well as marker-assisted breeding. In the case of GMOs, safe and responsible use should be ensured. Organic farming procedures permit the use of varieties developed by marker-assisted breeding.

7.5.10 The third technological revolution relevant to agriculture is the ecotechnology movement. This involves the appropriate integration of frontier sciences with the ecological prudence of farming communities.

7.5.11 The ecotechnology revolution underpinning the ever-green revolution movement has many pathways as indicated below.

Green Revolution : Commodity-centred increase in productivity	**Ever-green Revolution**: increasing productivity in perpetuity without associated ecological harm
Change in plant architecture, and harvest index	Organic Agriculture : cultivation without any use of chemical inputs like mineral fertilizers and chemical pesticides
Change in the physiological rhythm-insensitive to photoperiodism	Green Agriculture : cultivation with the help of integrated pest management, integrated nutrient supply and integrated natural resource management systems
	Ecoagriculture : based on conservation of soil, water and biodiversity and the application of traditional knowledge and ecological prudence
	EM Agriculture : system of farming using effective microorganisms (EM)
	White Agriculture : system of agriculture based on substantial use of microorganisms, particularly fungi
	One-straw Revolution : system of natural farming without ploughing, chemical fertilizers, weeding and chemical pesticides and herbicides

7.5.12 For most small farmers, green agriculture will be the most feasible form of eco-agriculture. Crop-Livestock integrated systems of production will be ideal for organic farming. More research is needed on nitrogen fixing tree species and shrubs, as well as green manure plants. Our soils are hungry and thirsty and they need both nutrients and water.

7.5.13 In addition to BT, ICT and Ecotechnology, there are opportunities in space application, nuclear techniques and GIS and GPS based precision farming. What is important is the training of Farm Science Managers (atleast 1 woman and 1 man) in every village, so that there is a new dawn in Indian agriculture, which capitalizes on both traditional wisdom and frontier science and technology.

7.5.14 In their 2004 report on "Revamping and Refocusing Agricultural Research" the Swaminathan Committee stressed the need for greater investments in strategic research. Fortunately, the Finance Minister responded positively and provided Rs. 50 crores for this purpose in the Union Budget for 2005-06. This should be activated and used for purposes like the preparation of **Bio-bricks** through the science of synthetic biology. Also, like the Silicon Valley, Biovalleys could be organized in Western and Eastern Ghats and the Himalayas, to run training programmes combining conservation and sustainable use to enable the local population to convert biodiversity into bio-wealth. **We can then end the irony of the co-existence of prosperity of nature and poverty of people**. Organic farming also requires support from strategic research in the areas of feeding for high yields and pest management. An area of technology of great importance to the survival of small scale agriculture is proactive advice on land use based on anticipated meteorological and marketing conditions. A Land Use Advisory Service, using the latest meteorological and computational tools is badly needed. We cannot abandon farm families with small holdings to their fate in a globalized economy without adequate support services based on the best in modern science. A Market Intelligence Service should be set up which can monitor crop trends in the country and advise farmers what to plant in the coming season, so as to prevent gluts and price crashes. This can be disseminated through the Village Knowledge Centre.

7.6 Training

7.6.1 How can such a technological, ecological and managerial upgrading of small farm agriculture be brought about? This is where training, re-training, re-tooling and redeployment of both farmers and farm graduates become important. Fortunately, we have 47 Agricultural and Animal Husbandry (including Fisheries) Universities. Nearly 20,000 farm graduates including about 7000 postgraduates become available each year. There is a vast chain of National Research Institutes and Centres, National Bureaus and All India Coordinated Projects under ICAR. There are also a growing number of R & D institutions in the private sector and a number of civil society organisations working on agricultural issues. The Indian National Agricultural Research System (NARS) is thus a formidable one.

7.6.2 NCF has already recommended the following steps:

- Promote farmer to farmer learning by establishing **Farm Schools** in the fields of outstanding farmer-achievers.
- Revitalize and upgrade **Krishi Vigyan Kendras** by adding a post-harvest technology wing.
- Organise 60,000 Lab to Land demonstrations in the areas of post-harvest processing, marketing and value addition to primary produce all over the country.
- Establish **Gyan Chaupals** in every village based on the integrated use of the internet, cable TV, community radio, cell phone and local language community newspapers. If Mission 2007: Every Village a Knowledge Centre is accomplished, the knowledge deficit currently prevailing in villages can be removed and the “know-how” – “do how” gap can be bridged.
- Establish Capacity Building Centres for those operating Gyan Chaupals.
- Train one woman and one male member of every Panchayat as **Farm Science Managers**

- Establish at the District level a **SHG Training and Mentoring Centre**, in order to build a local level cadre of SHG catalysts, capable of organizing **Sustainable Livelihood Banks** based on micro-credit.
- Establish in coastal areas **Fish for All Training Centres** to provide training in all aspects of fisheries ranging from capture/culture to consumption.

7.6.3 Training of farm and home science graduates also needs revamping. **NCF has proposed that the major mission of our Agricultural, Veterinary, Fisheries, Rural and Women's Universities should be to help every scholar to become an entrepreneur.** They can then organize Service Co-operatives, Stakeholder companies, Agri-clinics, Agri-business centres, Bio-Parks, Food-Parks and other enterprises which can help to improve the efficiency and economics of farming. **Home Science Colleges could be restructured as College of Human Sciences, where both men and women learn the science and art of nutrition, agro-processing and home economics**. This is why NCF has included farm and home science graduates in the definition of farmers. They should be proud to belong to the dominant vocation of India, namely farming and farm-based enterprises. **The cover of this last report of NCF has an extract from the Visitors' Book of the National Dairy Research Institute, Bangalore, showing that the father of the Nation Mahatma Gandhi chose to describe himself a "Farmer"**. Only youth can revive the glory of Indian farming.

7.6.4 Service cooperatives by farm and home science graduates can help to upgrade speedily the efficiency and economic viability of small farms, since they can facilitate highly productive decentralized production supported by key centralized services. Cooperatives should be organized on a stakeholder rather than on a shareholder principle.

7.6.5 A reorientation in the mindset of farm graduates can be brought about only by innovative changes in curricula and courses. In all applied areas, business and financial management should be added to the disciplinary training. For example, a course in Seed Technology can be restructured and designated as "Seed Technology and Business". Similarly, nutrition courses could be reorganized as **Food Safety and Nutrition Security** programmes. Courses in Agronomy could be developed

into Agronomy and Agri-business Programmes. **If the business, financial and trade aspects are integrated with disciplinary training, such courses will give the farm / home science graduates the self-confidence essential for embarking upon a career of self-employment**. We recommend that attention be given to imparting a business orientation to all the applied courses in Agricultural Universities. A large number of graduates are now being trained in the field of biotechnology. However, many of them are not able to utilize their training after taking degrees due to lack of appropriate employment opportunities. Agricultural Biotechnology is an area where there are considerable opportunities for remunerative self-employment. It would therefore be appropriate that support is extended to the creation of a **National Association of Genome Entrepreneurs** who could be supported with Venture Capital Fund in order to enable them to convert the rich knowledge available in Government institutions in the field of functional genomics into commercially viable products. They could also undertake work for other countries in the area of preparation of genome maps of the crops of interest to those countries. The National Centre for Plant Genome Research set up by the Department of Biotechnology at New Delhi could organize short term course on Functional Genomics and Business Development. **Mainstreaming entrepreneurship and business skills in all applied courses, rather than keeping Business Management Course as a separate entity is essential, if small farm agriculture is to become economically sustainable and educated youth are to be attracted to take to a career in agriculture**.

7.6.6 Another urgent need is the establishment of a chain of Regional Institutes for Food Safety and Security. They can be established in appropriate Agricultural, Veterinary or Fisheries Universities. To begin with seven such Centres may be established during the 11th Plan period. Home Science Graduates can be employed in such Regional Institutes to launch a movement for food safety including awareness of codex alimentarius standards. They should also spread quality literacy among farmers through Gyan Chaupals.

7.6.7 Training of all engaged in agricultural administration in the basic principles and economics of farming is essential. In the United States, practising farmers often

occupy leading positions in Agricultural Departments for specific periods. **It would be useful to begin posting active and accomplished farm/fisher women and men as Directors in State Departments of Agriculture, Horticulture, Animal Husbandry, Fisheries, etc on a 5 year tenure. Unless there is an upgradation in the practical knowledge of those responsible for developing agricultural programmes and policies, there is no hope for Indian agriculture in a globalised economy**.

7.6.8 The other urgent task is to sensitise the policy maker on the ground realities of farm economics. We suggest that the **Sixth Pay Commission may be requested to familiarize itself with the "net take home income" of farm men and women who constitute the genuine majority of our population**. A comparative study of the positions of the salaried class and of the self-employed farmers working in sun and rain to feed the small elite salaried class, is in the broader interest of the Nation, particularly in the context of a commitment to inclusive growth. **Understanding the economics of farming will help the Sixth Pay Commission to appreciate the social context in which the salaries and privileges of a small section of the population need to be fixed.**

7.7 Techno-infrastructure

7.7.1 Bharat Nirman should help to improve the infrastructure essential for a technological upgrading of farm operations. Post-harvest infrastructure, particularly for perishable commodities, is extremely weak. This is why the Swaminathan Committee recommended in 1981 the establishment of a National Horticulture Development Board, solely devoted to the cause of improving post-harvest infrastructure, processing and marketing. Unless this is attended to on an urgent basis, farmers will not be able to get adequate return for their labour. Fortunately, the National Horticulture Mission is likely to fill this felt need. Similarly facilities for food safety, water quality, sanitary and phytosanitary measures and biosecurity need to be improved. The Small Farmers' Agri-business Consortium (SFAC) started by Prime Minister Dr Manmohan Singh, in 1992, when he was Union Finance Minister, is yet to serve the purpose of enabling small farmers to take to market driven agri-business. It is high time that SFAC is restructured,

revitalized and financially strengthened as indicated by the Union Finance Minister in his budget speech in 2004.

7.7.2 Credit at the right time and in adequate amount is a basic requirement of small farm families. In keeping with its commitment to inclusive growth, the Government of India is promoting Financial Inclusion (FI) in respect of access to credit. The RBI Policy Statement for 2006-07 has asked SLBC in all States / UTs to identify atleast one district in their area for achieving 100% financial inclusion, by providing a "no frills" account and a General Purpose Credit Card (GCC). Some of the other considerations which need to be kept in view are the following:

- Expand and strengthen the Bank-MFI-SHG route with support services for capacity building and training
- Launch a massive campaign of financial literacy in the local language
- Open Farmers' Counselling Centres at taluka level. Bank of India is already doing this at the district level in Wardha
- Take an integrated credit requirement approach and combine investment, production and consumption requirements
- Examine and replicate innovative schemes already in operation like the Kalinga **Kisan Gold and Silver Card** Schemes launched by the Orissa State Cooperative Bank and the financing of tenant farmers cultivating land on "oral lease basis" in Andhra Pradesh through **Rythu Mitra** scheme, to address the genuine credit needs of farmers
- Devise innovative insurance schemes, both credit card linked and otherwise to cover crop, animal life, human life, healthcare
- Link with Government departments at the district level to ensure integrated delivery of schemes to the people.

7.7.3 Facilities for soil testing, particularly estimation of micro-nutrient status also need considerable strengthening. **Unless more investment is made in strengthening**

the support services needed by farmers for the scientific upgradation of farming, the average productivity will continue to remain low and youth will not be attracted to farming. Simple but safe storage bins need to be popularized on a large scale, along with low cost refrigeration facilities for perishable commodities. As recommended in the earlier Reports of NCF, a Livestock Feed and Fodder Corporation, a Land Use Advisory Service, an Indian Trade Organisation, Living Heritage Gene Banks to conserve unique local breeds of farm animals, internationally recognized certification agencies for organic farm products, an Agricultural Price Stabilisation Fund, integrated insurance products like Parivar Bima Policy and other essential support services are needed to help increase the productivity and profitability of small farm agriculture. The National Fisheries Development Board and the National Rainfed Area Authority recommended by NCF have fortunately come into existence. **It is essential that such bodies should serve as professional powerhouses in their respective fields and help to upgrade the technological, ecological and management aspects of culture and capture fisheries on the one hand, and rainwater harvesting, conservation, sustainable use, aquifer recharge, more crop and income per drop of water and other issues relating to achieving the goal of Jal Swaraj in rainfed agriculture, on the other.**

7.8 Trade

7.8.1 Producer oriented market holds the key to remunerative and sustainable farming. Quality and trade literacy should receive high priority in Gyan Chaupals. Facilities for Farmers' Markets need to be expanded rapidly. In commodities essential for maintaining the Public Distribution System, the procurement price should be the market price at the time of purchase. Those providing essential commodities for the PDS should be recognized through the provision of Smart Cards, which will entitle them to certain benefits while purchasing essential farm inputs, including agricultural implements and machinery.

7.8.2 The wheat import plan announced by the Government of India during 2006 is in response to the need for maintaining adequate food stocks both for the purpose of food security and for feeding the public distribution system. Following the Wheat Revolution

in 1968, Smt Indira Gandhi decided to build a sufficient buffer stock of foodgrains under Government control in order to ensure that the basic staples are available at reasonable prices even under conditions of unfavourable monsoon. **She was also deeply conscious of the linkage between food security and national sovereignty in foreign policy and hence had decided that the Government should remain at the commanding height of the food security system**. Maintaining adequate food reserves is an absolute must from the point of view of avoiding both panic purchase and man-made famines, particularly at times when there are indications of aberrant monsoon behaviour. A few years ago, the Government of India had over 60 million tonnes of foodgrain reserves and substantial quantities were exported to reduce the cost of maintaining stocks of that order. There was criticism at that time that while we are exporting foodgrains, millions of children, women and men go to bed partially hungry in our country. The situation was described in the media as "grain mountains and hungry millions". Even now we have the largest number of malnourished children in the world. Only the grain mountains have disappeared.

7.8.3 Wheat imports have now become essential to build and maintain a buffer stock and maintain prices at a reasonable level. Normally much of the surplus grain is bought by Government Agencies like the Food Corporation of India and State Corporations at the support price announced by Government. During 2006, private parties including large corporations have also entered the grain market and have been able to procure a part of the surplus grains at a slightly higher price than that offered by Government. The farmers are certainly happy when they are able to get higher prices. However this situation has led to a shortfall in procurement target necessitating wheat imports.

7.8.4 Maintaining food security for our over 110 crores of people is a fundamental obligation of Government. Fortunately, we have sufficient foreign exchange reserves and hence imports can be resorted to where there is no other alternative to replenish the buffer stock and operate the PDS. What is important is to draw appropriate lessons from this year's experience and undertake the development of a long term policy for home grown food based food security, where both the public and private sectors perform well defined and mutually reinforcing roles. Such a strategy should be designed to promote the

availability of the staple grains and food commodities needed for nutrition security at the right time and place **as well as at an affordable price**. The private sector should develop its own code of conduct and should not indulge in actions where for short term financial gains, the health and nutritional security of millions of children, women and men are sacrificed. There is need for a transparent and well defined code of conduct in the areas related to the purchase and trade of basic staples. Speculative trading should be prevented. The nation as a whole must take pride in an effective food security system.

7.8.5 There have also been adverse comments on the removal of 10% tariff imposed on the import of pulses. In our country the situation with reference to producers and consumers is different from those of the industrialised nations. **Nearly 65% of the consumers in India are also producers**, many of them operating farms of 1 ha. and below in size. Rural malnutrition is more widespread than urban malnutrition. Small farm families depend for their livelihood on income from the sale of whatever surplus quantities of foodgrains, vegetables, fruits and milk they may have for the market. Pulses and oilseeds are predominant crops of rainfed and dry farming areas. Productivity is low since efforts in spreading new technologies and seeds are poor or inadequate, although there is a huge stockpile of underutilized technologies including new varieties. **If we continue the practice of importing large quantities of pulses and oil seeds, without determined action to produce them within the country, dry farming areas will continue to languish in poverty and malnutrition**. The linkages between low small farm productivity and the persistence of poverty and malnutrition is very strong. Therefore, the sooner we revise our import policies in relation to pulses and oil seeds and divert our attention to helping the millions of farmers toiling in rainfed areas to produce more of these essential commodities by assuring them of a support price, the greater will be the possibility of reducing substantially hunger and poverty in the country. Whenever there is a good crop of pulses or oilseeds like the one in mustard this year, farmers suffer due to lack of assured and remunerative marketing opportunities. **The interests of the producer-consumer needs greater protection than those of the interests of trader-importers**. Prime Minister Rajiv Gandhi started the Oilseeds and Pulses Missions to give holistic attention to all links in the production-consumption chain. The Missions

also had a striking impact in their early years. Subsequent policy changes and leadership vacuum have unfortunately led to the stagnation in the productivity of these life enriching crops.

7.8.6 The twin goals of ensuring justice to farmers in terms of a remunerative price for their produce, and to consumers in terms of a fair and affordable price for staples (65% of consumers are also farmers) can be achieved through the following integrated strategy:

- MSP should be regarded as the bottom line for procurement both by Government and private traders. Purchase by Government should be MSP plus cost escalation since the announcement of MSP. This will be reflected in the prevailing market price. Government should procure the staple grains needed for PDS at the same price private traders are willing to pay to farmers. Thus the procurement price will be higher than the MSP and will reflect market conditions. The aim of Government purchase is to feed the PDS, while the goal of the private trade will obviously be for making a large profit when the prices go up a few months after harvest. Thus, Government purchases foodgrains for public good, while private traders purchase for commercial profit. By purchasing at prevailing market rate, Government ensures that both farm families and urban consumers get a fair deal. At the same time, opportunities for the private trade to buy and store large quantities of staple grains and sell them when the prices go up substantially can be curtailed. In other words, if the market price of wheat is Rs. 800 per quintal soon after harvest, Government should give farmers that price for the quantities needed for PDS and buffer stocks. Trade will offer a little higher price than Government, in order to sell the produce when the price goes up, say to Rs. 1500 per quintal after a few months.
- The food security basket should be widened to include the crops of the dry farming areas like **bajra**, **jowar**, **ragi, minor millets** and **pulses**. PDS should include **these nutritious cereals and pulses purchased at a reasonable MSP**.

This will be a win-win situation both for the dryland farmer and the consumer. **We will witness neither a second green revolution, nor much progress in dryland farming, unless farmers get assured and remunerative prices for their produce.** A nutritional literacy programme also needs to be launched through Gyan Chaupals in conjunction with PDS.

- Food security with home grown foodgrains can alone eradicate widespread rural poverty and malnutrition, since farming is the backbone of the livelihood security system in rural India. This will enable **Government to remain at the commanding height of the national food security system**. Building a food security system and containing price rise with imported foodgrains may sometimes be a short term necessity, but will be a long term disaster to our farmers and farming. **A well-defined, pro-farmer and pro-resource poor consumer Food Security Policy is an urgent necessity.**
- Both universal PDS and enforcing MSP throughout the country for the selected crops are essential for imparting dynamism to agriculture.

7.8.7 The Commission on Agricultural Costs and Prices (CACP) should be an autonomous statutory organization with its primary mandate being the recommendation of remunerative prices for the principal agricultural commodities of both dry-farming and irrigated areas. The Minimum Support Price (MSP) should be atleast 50% more than the weighted average cost of production. The "net take home income" of farmers should be comparable to those of civil servants. CACP should become an important policy instrument for safeguarding the survival of farmers and farming. Suggestions for crop diversification should be preceded by assured market linkages. The membership of CACP should include a few practicing farm men and women. The terms of reference and status of CACP need review and appropriate revision.

7.8.8 Credit and insurance are twin basic needs of farmers. Farmers' Associations feel that either NABARD should be renamed as **National Bank for Farmers** in order to enable it to focus attention on farmers rather than only on farming or else a new Bank for Farmers may be set up. Obviously, there is need to look at this issue carefully.

7.8.9 To sum up, imports or exports of foodgrains may be necessary from time to time, but the **bottom line of our import-export policies must be the livelihood security of both the farm and non-farm populations of rural India who constitute 70% of our population.** Time has come for Government to set up a multistakeholder **National Food Security and Sovereignty Board** chaired by the Prime Minister with its membership including the Minister for Agriculture and Food and other concerned Ministers of GoI as well as a few Chief Ministers of food surplus and deficit States, leaders of all national political parties, a few experts including specialists in the gender dimension of agriculture and food security, and mass media representatives. We are confronted with the need to safeguard the food security requirements of both resource poor farmers and resource poor consumers. The bulk of such resource poor farmers are small or marginal farmers and landless agricultural labour in unirrigated areas. It is these linkages which need to be understood and attended to. The proposed National Food Security and Sovereignty Board can attend to these complex linkages in a holistic manner and develop and implement a transparent national food security policy in the interests of all regions of the country and all sections of our population.

7.9 Shaping our Agricultural Future – A three pronged Strategy:

7.9.1 India will remain during most of the 21st century a predominantly agricultural country, particularly with reference to livelihood opportunities. Therefore there is need for both vision and appropriate action in the area of shaping our agricultural destiny. Our major agricultural strengths are our large population of hard working farm women and men, our varied climatic and soil resources, abundant sunshine throughout the year, reasonable rainfall and water resources, a long coast line and rich agro-biodiversity. Converting them into jobs and income is the challenge.

7.9.2 In our view, we should look upon agriculture not just as a food producing machine for the urban population, but as the major source of skilled and remunerative employment and global outsourcing hub.

7.9.3 Just as IT industries have specialized in handling outsourcing assignments efficiently, we must enable our farm graduates and farmers to take up outsourcing jobs, in areas where we have a comparative advantage. Some examples are hybrid seed production, tissue culture propagated plants, organic farm products, biological software for sustainable agriculture like biopesticides, biofertilizers, pheremones as well as herbal products, fruits, flowers and vegetables, vaccines and sero-diagnostics and veterinary pharmaceuticals based on medicinal plants. There is also scope for becoming a global outsourcing hub in the areas of plant and animal genomics and ICT for rural poor. Farm, Veterinary, Fisheries and Home Science Graduates should be trained to become genome and digital entrepreneurs. To start with, a few of our Agricultural, Animal Sciences and Fisheries Universities could set up **Bureaus for Outsourcing Business in Agriculture** to facilitate contacts between farmers' organizations as well as agri-business centers operated by farm and home science graduates and external agri-business enterprises. Outsourcing should not only be from other countries to urban India, but also from urban to rural India, so that educated youth continue to live in villages.

7.9.4 We need a new vision for agriculture. That vision should aim to spread happiness among farm and rural families. **Bio-happiness through the conversion of our bio-resources into wealth meaningful to our rural families should be the goal of our national policy for farmers**. The hidden and unrecognized opportunities for creating more skilled jobs and income in the farm and non-farm sectors need to be tapped through appropriate public policies and programmes. Technology Missions should be revamped and revitalized on the lines envisaged by Bharat Ratna Rajiv Gandhi when he first proposed them as organizational and management tools to help the nation leapfrog in the production of essential commodities like oilseeds and pulses.

7.9.5 A structurally progressive economy should reduce the share of people dependent on a sector as the share of that sector falls in the GDP. As the share of agriculture in the GDP falls, the share of people dependent on agriculture is also expected to fall in the same proportion. However in the Indian Economy though the share of agriculture in the GDP is falling steadily, there is no corresponding decline in the share of population dependent on agriculture. Because of population growth, the absolute number

of people depending on agriculture is increasing, even if there is a decline in percentage terms. This is why NCF has recommended a major integrated Rural Non-farm Livelihood Initiative, so that both on-farm and non-farm livelihoods become skilled and profitable.

7.9.6 The Technology strategy for an evergreen revolution should have the following three components:

Defending the Gains

7.9.6.1 Punjab farmers provide 60% of wheat and 40% of rice to the PDS and national buffer stocks. The net productivity has increased in the Punjab in rice and wheat from 1.2 t/ha and 1.1 t/ha to 4.3 t/ha and 3.9 t/ha respectively from 1960-61 to 2004-05. However, in recent years there is stagnation in productivity improvement due to a variety of causes of which the following are important:

- Declining farm size and income
- Depleting natural resources base, as for example a steep fall in ground water table and impaired water quality.
- Increasing input costs, particularly diesel and adverse economics of farming
- Deficiency of micro-nutrients in the soil and deteriorating soil health
- Inadequate post harvest technology
- Uncertain market prospects except for wheat and rice though MSP is announced for the following 25 agricultural commodities:
    - Cereals – paddy, rice, wheat, jowar, bajra, maize, ragi, barley
    - Pulses – gram, tur, moong, urad, masur
    - Oilseeds – groundnut, soyabean (yellow/black), rapeseed and mustard, toria, sunflower seed, safflower, nigerseed
    - Sugarcane, cotton, jute, tobacco
- High indebtedness of farmers – the total debt of Punjab farmers for instance is estimated to be about Rs. 24,000 crores.

7.9.6.2 Similar conditions prevail in Haryana and Western UP. **Thus, the heartland of the green revolution is in grave trouble**. These areas need conservation farming which will help farm families to conserve and improve soil health, water quantity and

quality and biodiversity. Some of the eco-technologies developed by the Punjab Agricultural University are: bed sowing of wheat saving 20 to 25% water, leaf colour chart saving 15% N application in rice, tensiometer based irrigation scheduling, zero tillage technology for wheat, and IPM in cotton saving 40% pesticides. Thus, there is vast scope both to promote Green Agriculture and to reduce the cost of production through enhanced factor productivity. **A course on Sustainability Science should be introduced in all Agricultural Universities. India will not be able to maintain a stable food security system, if the "fertile crescent" (i.e. Punjab, Haryana and Western UP) region is not saved through adequate support for conservation farming. Defending the gains already made in this region is an urgent task.**

7.9.6.3 An example of the need for support for Conservation Farming is provided by the situation in rice cultivation in the Punjab. At present, nearly 26 lakhs hectares are under rice in the Punjab. Much of the irrigation water used is ground water. The water table in the Central districts of the State producing rice and having 70% of the tubewells is receding at an alarming rate of 2 to 2.5 feet annually. At present about 30% of the tubewells have become submersible and it is estimated that during the next 10 years practically all the centrifugal pumps will become nonfunctional and will have to be converted into submersible pumps. It would therefore be advisable to restrict rice cultivation to 2 million hectares in the Punjab with a yield target of 5 tonnes per hectare. The remaining area can come under maize, pulses and oil seeds which are all at the moment in short supply. **Conservation Farming in the Punjab as well as in other intensive agriculture areas will involve a scientific programme of restructuring farming systems**. Such a restructuring is an urgent need in the interests of the long term livelihood security of Punjab farmers and food security of the nation. The same is true in parts of Haryana, Western Uttar Pradesh as well as in many of the early IADP districts in the country. NCF suggests that an initial allocation of Rs.1,000 crores may be made for farming systems restructuring based on the principles of ecology, economics, social and gender equity and employment generation in the areas of importance to national food security.

7.9.6.4 Eternal vigilance is the price of stable agriculture. NCF had recommended in its Third Report the establishment of a science-based **National Biosecurity System. The sooner the NCF recommendation is implemented, the safer will be the country from the point of freedom from invasive alien species, which could cause potential harm to crop and animal husbandry, fisheries and forestry**. Our wheat crop for example, now faces threats from new strains of rusts like the 78S84 (similar to Yr 27 virulence) race of yellow rust Ug 99 strain of stem rust could also cause trouble. The steps taken to defend the gains already made should therefore include pest surveillance and management and gene deployment for checkmating the spread of pathogens. This is equally important in the case of poultry and animal enterprises.

7.9.6.5 In every State, the agricultural "bright spots" and "hot spots" will have to be mapped. The State should develop a strategy for enlarging the extrapolation domain of bright spots. Similarly, every State should develop a **Good Weather Code** to maximize the benefits of adequate moisture availability, a **Drought Code** to minimize the adverse impact of drought, and a **Flood Code** both to prevent excessive distress and damage, and to promote a post-flood production plan. In the desert areas of Rajasthan, the Good Weather Code should include provision for raising nurseries of appropriate plants, so that in years of excessive rainfall, an extensive tree planting and sand dune stabilization drive can be launched. This will help to strengthen the ecological infrastructure of the desert, and gradually convert the desert into an oasis. The Drought Code should include the adoption of crop life saving technologies and contingency plans to change the cropping pattern according to moisture availability. "**Be prepared**" – both to take advantage of a good monsoon and to reduce the impact of adverse seasons – should be our national motto in agriculture.

Action 2006-07: Contingency Plans and Compensatory Production Programmes

7.9.6.6 The first advance estimate of production of foodgrains for **kharif** 2006-07 has been pegged at 105.2 million tonnes against a target of 115.2 million t indicating an overall shortfall of ten million t. Rice production is likely to be 75.7 million t against a target of 80.7 million t. **Such variations may occur more frequently in the future, if**

there are adverse changes in precipitation and temperature as a result of global warming and climate change. It will therefore by prudent for the National Rainfed Area Authority to develop computer simulation models on the likely impact of different weather patterns on the major crops. Data from the All India Coordinated trials of ICAR provide opportunities for developing such simulation models. For example, an increase in the average temperature by 1^{o}C during **rabi** may lead to a reduction in the duration of the wheat crop by 1 week in Northwest India, including the Punjab. This may reduce wheat yield by 400 to 500 kg per ha.

7.9.6.7 The simulation models can help in the preparation of contingency plans to face different weather possibilities. They can also help in making advance preparations for compensatory production programmes during **rabi** to offset the loss in **kharif**. Such an opportunity is available only to tropical and sub-tropical countries where crops can be grown throughout the year.

7.9.6.8 The highest wheat production so far was 76.7 million tonnes in the year 1999-2000. Since then, production and productivity have been declining. How do we turn the tide and how can we step up the production of wheat and rice during **rabi** 2006-07, to compensate for the loss of 10 million t in kharif? First, it must be emphasized that **seed reserves are important for crop security, just as grains reserves are important for food security**.

7.9.6.9 Second, in wheat there is a vast untapped production reservoir available in UP, Madhya Pradesh, Bihar and Rajasthan. The ICAR Wheat Directorate in Karnal has calculated that we can produce an additional quantity of about 24 million t of wheat immediately by bridging the gap between potential and actual yields, with technologies and varieties now on the shelf **(Table 1)**.

Table 1: Achievable Targets by Bridging Yield Gaps through available Technologies under irrigated conditions (based on National Demonstrations)

State	Current Area 2003-04 (,000 ha)	Current yield gap t/ha	Additional production possible (000 t)
UP	8418.0	1.346	11330.5
MP	2831.8	2.071	5864.7
Rajasthan	2103.1	1.646	3461.7
Bihar	1483.0	1.196	1773.6
Haryana	2303.0	0.581	1338.0
Gujarat	660.7	0.714	471.7
Maharashtra	581.1	0.656	380.0
Karnataka	97.0	0.998	96.8
Punjab	3444.0	0.241	82.9
			24800.0

7.9.6.10 It will be prudent to launch a well designed farmer-centric compensatory production programme in Bihar, Rajasthan, MP and UP, with priority attention to soil health enhancement and varietal choice.

7.9.6.11 Similarly, there is vast scope for increasing rice production in West Bengal, Assam, Orissa, Andhra Pradesh, Tamil Nadu, Karnataka and even Kerala during the **rabi** season. The yield of **boro** rice is high in Assam and West Bengal. Over 27 high yielding rice hybrids are now available to suit different agro-climatic and growing conditions, as well as grain quality requirements. They are from both the public and private sectors. Pusa RH-10 is a superfine, aromatic grain hybrid suitable for cultivation in North-West India. KRH2 is a high yielding and widely adapted hybrid, while DRRH 2 is an early hybrid with a good yield potential. **States with an unutilized yield reserve in their Agricultural Production Bank should be encouraged immediately to initiate action with the guidance of experienced farmers and scientists to utilize the yield reserve wisely to improve production and productivity**. The precise agronomic package will have to be developed on a location specific basis with the help of Agricultural Universities.

7.9.6.12 In the case of wheat, the following nine steps will help to improve wheat production during the 2006-07 **rabi** season:

- As a result of floods during August / September of 2006, Gujarat, South Rajasthan, Madhya Pradesh and Maharashtra, which account for nearly 7.0 million hectares of land sown to wheat, will need wheat varieties that will mature in 120 days. Farmers would like to sow more wheat due to current ruling prices and availability of good soil moisture. P**reparedness for timely supply of seeds is necessary, along with other inputs**.
- Adequate and timely availability of credit is essential, particularly due to the financial loss suffered during **kharif**.
- Wheat should be sown before 15 November in NW Plain Zone to get maximum yield and to escape from potential heat stress in March.
- Use of seed drill to capture soil moisture, adopt proper seeding depth and complete sowing in time should be recommended. **Resource conserving tillage agronomy should be subsidized to save water and improve yield.**
- Avoid sowing wheat during late October in the Punjab as such early sown wheat often suffers if temperatures during December are above normal.
- Balanced use of fertilizers including Zinc should be promoted and overuse of urea should be curtailed.
- Pre emergence weed control or a post emergence chemical weed control should be recommended over the Indo-Gangetic plain
- Varietal diversity should be ensured all over the wheat growing region and farmers should grow three of four different varieties to avoid genetic vulnerability to diseases.
- Wherever limited irrigation facility is available, atleast one irrigation around crown root stage / early tillering should be recommended followed by need based weeding and fertilization.

7.9.6.13 **Rabi** and **boro** rice production can be enhanced considerably by giving attention to balanced fertilization, particularly to the supply of the needed micronutrients like zinc, Boron and sulphur. Together with plant protection the enhancement of soil health will help to improve productivity atleast by an additional tonne per hectare. There are nearly 5 million ha under **rabi** and boro rice in the country and improved varieties are available for all the States where rice is cultivated between November and May. Striking progress in improving the yield of rainfed maize, soybean, sorghum, green gram, blackgram, pigeon pea, chickpea, finger millet (ragi), pearl millet (bajra), castor etc., can be achieved through balanced fertilization (NPK and the needed micronutrients). Seeds of improved varieties should be maintained in Village Seed Banks in rainfed areas, so that alternative cropping strategies can be introduced depending upon monsoon behaviour. Improved cultivars alone can enhance productivity by 10 to 50%. Varietal choice should be based on the likely moisture availability. The short duration chickpea variety **Shwetha** (ICCV2) has revolutionized chickpea production in Andhra Pradesh. The productivity increased from 470 kg per ha in 1993 to 1084 kg per ha in 2004. Area also increased seven fold. There are nearly 12 million ha of rice fallows in MP, Orissa, Jharkhand, Chattisgarh and West Bengal. In such rice fallow areas, chickpea can be grown by using residual soil moisture. Simple seed priming technologies like soaking seeds in water and micronutrient solution for 6 hours and drying in shade will help in establishing a good chickpea crop in rice fallows. In Madhya Pradesh 2 million ha remain fallow during the **kharif** season. Using broad bed and furrow, balanced nutrient management and short duration soybean cultivars like Samrat, farmers in the Vidisha district were able to take a crop of chickpea or wheat during **rabi** and thereby double their income. Many such simple steps in soil-water-crop management can lead to major advances in both crop output and farmers' income. This is the pathway to making farming economically viable.

7.9.6.14 The timely and adequate supply of credit, seeds and electricity, together with addressing the micronutrient deficiencies in the soil will help to offset the loss in production during kharif**. Those States which had heeded to the NCF appeal made in**

December 2005 that 2006-07 may be observed as the Year of the Farmer and Agricultural Renewal will be in a much better position to improve rabi production. The 5 pronged strategy recommended then consisted of soil health enhancement, water harvesting and management, credit and insurance, technology and inputs and remunerative marketing.

7.9.6.15 Adaptation to climate change is an urgent task. The Climate Management Unit of the National Rainfed Area Authority should develop computer simulation models of weather behaviour coupled with the public policy and agronomic responses needed to meet diverse possibilities.

Extending the Gains

7.9.6.16 Eastern India (eastern UP, Bihar, Chattisgarh, Orissa, West Bengal, Assam and NE States) have a large untapped production reservoir even with the technologies now available. In these areas, poor water management, rather than water availability, is the major constraint. **The Indo-gangetic plains offer scope for becoming the major bread basket of India through an appropriate mix of technology, services and public policies.** In many of these areas, the aquifer should be enriched during the S W Monsoon period, and extensive ground water use should be promoted during the October – April period. Given the right strategy, the Ganges Water Machine could become the main anchor for our food security system. **Bihar in particular is a sleeping giant in the field of agriculture**. The work of IARI in the Dharbhanga district and Sone Command area has shown that the wheat yield can be increased substantially with good seeds and improved agronomic practices. The major bottleneck is however the absence of a Grain Purchasing Machinery which will provide the MSP to farmers.

7.9.6.17 Action to extend the gains of higher productivity and profitability should cover all rainfed areas. This should be a priority task of the National Rainfed Area Authority. The recommendations of the Swaminathan Committee on "More income per drop of water (2006)" should be converted into action plans on a location and farming systems basis.

Making New Gains

7.9.6.18 The immediate prospect for making new gains lies in the areas of post-harvest technology, agro-processing and value addition to primary produce. NCF has made several recommendations in this area in its first four reports. In the longer term, there is need for new yield and quality breakthroughs in major crops through genomics and gene pyramiding. For example, Super Wheats capable of yielding about 8 t/ha are now in the breeders' assembly line. Such wheats have a complex pedigree and illustrate the importance of genetic resources conservation and exchange.

7.9.6.19 Super Wheats are semi-dwarf with robust stem, broad leaves, large spikes with more number of grains per panicle and more grain weight. The Super Wheat architecture in the breeders' assembly line, both at CIMMYT and AICWIP, is derived from a blend of Tetrastichon (Yugoslavia), Agrotriticum (Canada), Tetraploid Polonicum (Poland) Gigas (Israel), Morocco wheat (Morocco) and semi-dwarf wheats currently grown in India

7.9.6.20 We can produce 100 Million t of wheat by 2015, by the following two steps:

- Average yield of 4 t / ha from 25 million ha
- Harnessing the large untapped yield reservoir in eastern, central and western India

7.9.6.21 Every State should develop a detailed agricultural strategy for their major farming zones and systems based on the 3 pronged approach outlined above.

7.9.6.22 Irrigation Water is going to be a serious constraint since as pointed out earlier, ground water is being over exploited. Therefore NCF supports the recommendation of the Swaminathan Committee set up by the Ministry of Water Resources that the Agricultural Year 2007-08 (June 1, 2007 to May 31, 2008) may be observed as "**Year of More Crop and Income Per Drop of Water**"

7.9.6.23 During this year starting with a kharif of 2007, 5000 Farmer Participatory Action Research Programmes may be initiated throughout the country with the help of appropriate Agricultural Universities, ICAR Research Institutes, ICRISAT and WALMIs.

50 such institutions may be entrusted with the responsibility of organizing jointly with farm families 100 Action Research Programmes each for demonstrating that it is now possible to increase yield and income per drop of water through generating synergy among water, variety, agronomic practices, particularly relating to macro and micronutrients in the soil, and implements. Each programme will cover a minimum of one hectare and will be implemented in a participatory mode, with the farm family having a sense of ownership of the programme.

7.9.6.24 The emphasis will be on rainfed areas where catalytic technological and management interventions will be introduced to make a striking impact. The programme will be so designed that a small Government Project leads to a mass movement in the area of water conservation and use efficiency, as happened in the case of National Demonstrations in Wheat during 1964-65. The economic benefit to the farmer as a result of this programme should be measured. Each Action Research Programme will need about Rs.50,000. Thus the total cost of 5000 Farmer Participatory Action Research Programmes will come to Rs. 25 crores. A well-planned Water Literacy Drive together with the revitalization of traditional systems of water conservation will also be undertaken as a part of this programme. Also, Action Research Projects in irrigated areas will aim at phasing out flood irrigation by the end of the 11th Plan.

7.9.6.25 We urge that such a Farmer Participatory Action Research Programme may be initiated during 2006-07 in arid, semi-arid, hill, coastal and irrigated areas. The necessary financial provisions may be made in the Union Budge for 2007-08.

7.10 Integrated Asset Reform

7.10.1 There is need to complete the unfinished agenda in land reforms. Kerala, West Bengal and now Tamil Nadu have set good examples on the distribution of both ceiling surplus land and appropriate Government land to the landless poor. Tamil Nadu's recent step in providing 2 acres of land to the landless labour families is commendable. This should be emulated by all States. **We should revive the spirit of Acharya Vinobha Bhave**. In addition, there is need for aquarian reform for the equitable and

efficient utilization of all community and government water bodies. Aquarian reform is also needed in respect of marine fisheries and coastal aquaculture. This should be high on the agenda of the National Fisheries Development Board. Because of population pressure, both land and aquarian reforms alone may not be adequate to provide productive assets. Land and aquarian reforms could form part of an **integrated asset reform system** designed to provide some productive asset to everyone in the village. Livestock rearing, training in market driven skills or any other form of income security could all form part of an Integrated Asset Reform Policy. Livestock provide good opportunities for strengthening both income and nutrition security. A **Livestock Development Council** would help to promote integrated attention to all aspects of Livestock Care and Sustainable use. Every Veterinary and Animal Sciences University should establish a Vidya Dairy on the model of the one at Anand, and a Vidya Abattoir to promote the efficient use of the entire animal biomass like skin, bones and blood.

7.11 From Suicide Relief to Suicide Prevention

7.11.1 In the agrarian distress hotspots, there is need for a paradigm shift from "Suicide Relief" to "Life-saving Support". While immediate relief measures are important, prevention should be the goal. This is the pathway to providing every farm and landless labour family with an opportunity for a productive and healthy life.

7.11.2 The occurrence of farmers' suicides in several States of the country (particularly Andhra Pradesh, Maharashtra, Karnataka, Kerala and the Punjab), since the year 2000 marks a sad chapter in India's agricultural history. The extreme step of taking one's life marks the loss of hope in the prospect for leading a productive and satisfying life. The Farmer suicide tragedy has several dimensions – economic distress and despair, breakdown of social and State support systems and psychological nightmare. The response to this situation has also to be multi-dimensional, with priority going to mitigating economic distress. The various steps taken by Central and State Governments, Prime Minister's visit to Vidarbha and the different relief packages announced so far have helped to stir hope in the minds of farm families. Nevertheless, farmers' suicides are continuing.

7.11.3 There is a concern that suicides could lead to socio-cultural changes in our society. For instance, recent research from Oxford University, UK, suggests that imitative suicides occur when suicidal behaviour is portrayed as a natural or understandable response to problems such as financial crisis**.** Self-poisoning with pesticides account for about a third of all suicides worldwide; hence, the monitoring of pesticide use in the suicide hotspot areas will be useful. The measures to be taken to deal with this situation have been described in the earlier NCF reports. They broadly fall under the following 5 categories:

i. **Saving the Living:** Immediate attention to the livelihood needs of widows and education and employment needs of children should be the first priority. Pain and sorrow can be reduced by the care and concern manifested in the form of concrete action.

ii. **Ending the "debt death"**: Extinguishing bush fires is not enough, but steps are needed to eradicate the causes underlying frequent and continuing bush fires in the form of farmers' suicides. Immediate action has to be in the form of loan and interest waiver, so that the family again becomes credit worthy. Obviously the loan waiver has to be done with care and after discussion with the affected families and local panchayats.

The debt deaths underline the need for urgent reform of farm credit. China gives loans to farmers at zero percent interest. Obviously, the Government and not the Banks meet the transaction cost. NCF had recommended 4% interest rate based on both government subvention and pruning of all avoidable expenditure by Banks. We are glad that the Centre and State Governments have now arranged to provide credit to farmers at 6 to 7% interest. Further, the credit cycle in drought prone areas should be 4 to 5 years. Also, it should be holistic catering to the needs of farm families for health care, domestic needs and agriculture.

In order to insulate both Banks and farmers from losses, the agricultural insurance system should be revamped and made effective and affordable. Insurance system should cover crop losses arising from both meteorological and marketing factors.

iii. **Strengthening Livelihood and Income Security**: Loans which have led to suicides have often been taken for adopting high cost technology in the expectation that higher returns will be forthcoming. The resource poor farmer has little coping capacity to withstand the shock of crop failure. Similarly, loans have been taken to dig tube wells, which have failed. Technologies should be life-giving and not life-taking. There is need for proper and timely advice on land use planning and choice of technologies. Scientific organic farming will reduce the debt load, because of the substitution of home grown inputs for market purchased ones. Agricultural Universities and Departments have a grave responsibility in this area. Steps to provide crop life saving irrigation need to be stepped up considerably. Remote sensing technology should be used for helping farmers to select sites for digging borewells.

There is also need for providing multiple livelihood opportunities like the rearing of livestock such as dairy cattle, poultry, sheep, goats etc, as well as non-farm occupations in areas such as biomass utilization and post-harvest technology. There has to be an integrated on-farm and non-farm livelihood strategy. Income security largely depends upon output prices and the market. The prices received by farmers for their produce should be atleast 50% more than the cost incurred. Low and uncertain returns are among the important causes for farmers' despair. **As a single step, assured and remunerative prices for farmers' commodities will help to end the "debt deaths"**. Market reform should be designed to ensure better and more stable income for farm commodities. Central and State Governments and Financial Institutions could establish a **Price Stabilisation Fund** to end distress sales when the crops are good, and where no arrangements exist for providing MSP.

iv. **Life Saving Social Support and Security:** The Gram Sabhas should discuss frequently the economics of farming and methods of avoiding debt deaths. The village communities should strengthen their social support systems, and revive traditional values in terms of support to those suffering from extreme deprivation and distress. Although the joint family system of social support is fast vanishing, the Gram Sabha and Panchayat can develop **a collective security system** designed to prevent suicides.

The Agricultural Universities should form **Hope Generation Teams** to visit and stay for some time in the affected villages and help the farmers in adopting low risk and stable income technologies. At the same time, the Government of India in association with State Governments should develop and introduce a **Social Security System** for farm families, on the lines recommended by the National Commission for Enterprises in the Unorganized Sector. **The other help needed from the Government of India is the undertaking of a livelihood impact analysis of imports and tariff policies**. Policies which are likely to endanger livelihoods should be avoided.

v. **Reinforcing the Psychological Strength :** Youth for Life Corps: There is need for psychosocial measures which will spread the "we shall overcome" spirit. Gyan chaupals can become counseling and hope instilling Centres. A cadre of young women and men who are well versed with counseling procedures, who can help to bring some hope and cheer in the families plunged in darkness and despair, may be formed on the NSS model. A **Youth for Life Corps** should be immediately set up in suicide hotspots by a Consortium of Universities and Social Science Institutions.

7.11.4 An integrated action plan with the above components will help to end suicides related to the agrarian crisis.

7.12 Environmental Sustainability and higher and assured income are the twin urgent needs of Indian agriculture. Our progress in agriculture should be measured not merely by growth rates in production, but also by the growth rate in the real income of farmers. If we are to produce another 100 million tonnes of foodgrains by 2020, we will need the enthusiastic participation of atleast 100 million farmers. They will not produce more if the present uneconomic nature of farming persists. **Ecology and Economics are the twin determinants of the pace of agricultural progress. While technology is the prime mover of change, technology will succeed in changing our agricultural destiny only if it is environmentally benign and economically viable.**

7.13 It would be useful if a comprehensive **Rural-Urban Parity Index** is prepared at the State and district levels in order to help in the continuous refinement of the Bharat

Nirman Programme. If the evolution of rurban societies is planned carefully, there will be symbiotic linkages between the village and the town, each enriching the other in both economics and employment opportunities. **Work, water and energy are the key needs of rural India**. The VIth Five Year Plan (1980-85) gave over riding priority to these sectors, together with attention to technology, natural resources conservation, women's empowerment and enhancement, and remunerative marketing (for the first time, the VIth Plan introduced special Chapters on Environment and Development, Women and Development and a New Deal for the Self-employed). **This strategy resulted in agricultural growth rate (5.7%) exceeding for the first time, the overall GDP growth rate (5.5%)** during the plan period. Thus, given right priorities and strategies, we can accelerate progress both in agricultural growth and agrarian prosperity. It may be useful to revisit the VIth Plan strategies while preparing the XIth Plan.

7.14 Redesignating the Ministry of Agriculture as **Ministry of Agriculture and Farmers' Welfare** will lead to positive results only if this is accompanied by a structural reorganization. **Leading farmers should be inducted at the senior level in the Ministry for specific tasks and specific periods**. This will help to change the "beneficiary" mindset in agricultural planning to one of regarding farmers as innovators, policy planners and life-givers. Agriculture will then become our nation's pride and "Jai Kisan" will acquire true meaning and significance.

7.15 Pan-Government of India Initiatives

7.15.1 We suggest a **Pan-Government of India Initiative in the areas of food, water and work security and land care during the XIth Plan Period**. A beginning can be made jointly by the Ministries of Agriculture and Rural Development in improving work and income security as well as land care in rural areas through a **Pan Agriculture-Rural Development Programme in the area of skilled and market oriented non-farm employment**. If this does not happen, Jawaharlal Nehru's statement that "We are a poor people inhabiting a rich country" will continue to remain valid.

7.15.2 We are aware that the culture of a Pan-Government of India coordinated action plan is more easily proposed that accomplished. Necessity is the mother of

invention and we hope that the prevailing widespread agrarian distress, under nutrition and deprivation will lead to the generation of the necessary political will and action, “Where there is a will, there is a way”.

7.15.3 Finally, we urge the Central and State Governments to consider seriously the question of including Agriculture under the Concurrent List in Schedule VII, Article 246 of the Constitution. Important policy decisions like those relating to prices, credit and trade are taken by the Government of India. Also, several pieces of legislation including the Protection of Plant Varieties and Farmers Rights Act, the Biodiversity Act, the Food Bill, etc., are administered by the Government of India. Substantial funds are provided by GoI for rural infrastructure development including irrigation, village roads and markets. By placing agriculture on the Concurrent List, serving farmers and saving farming becomes a joint responsibility of the Centre and States, i.e. a truly national endeavour in raising the morale, prestige and economic well being of our farm women and men.

Annexure-A

DETAILS OF TECHNICAL CONSULTATIONS

S. No	Subject of Consultation	Place	Date	Collaborator
1.	Farmers' Suicides : Causes and Cures	Chennai	4 September,04	MSSRF
2.	Cotton Farming and Cotton textiles	Delhi	16 September,04	ICMF
3.	Regional Consultation of Southern States on Mission 2007 : Hunger Free India	Hyderabad	20 September,04	WPF and MSSRF
4.	Dry land Farming	Hyderabad	20 September,04	CRIDA & ICRISAT
5.	Insurance for farmers	Delhi	6 October,04	
6.	Women in Agriculture	Delhi	7 October,04	
7.	Regional Consultation of Western States on Mission 2007 : Hunger Free India	Ahmedabad	28-29 October,04	WFP and MSSPF
8.	Regional Consultation of Eastern and NE States on Mission 2007 : Hunger Free India	Barapani, Shillong	3-4 November,04	WFP and MSSRF
9.	Interactive Discussion with Farmers	Dehradun	7 November,04	
10.	Interactive Discussion with Farmers	Koraput	16 November,04	
11.	Regional Consultation of Northern States on Mission 2007 : Hunger Free India	Delhi	18-19 November,04	WFP and MSSRF
12.	Uncommon Opportunities: A Roadmap for Peace, Employment and Food Security	Delhi	20-22 November,04	WFP and MSSRF
13.	National Consultation on Nutritional Security and Prevention of TB and HIV/AIDS	Delhi	2-3 December,04	WFP and MSSRF

S. No	Subject of Consultation	Place	Date	Collaborator
14.	Beyond Tsumani	Chennai	10 January,05	MSSRF
15.	Sugarcane Farming	Pune	17 February,05	Vasant Dada Institute, Pune
16.	Draft National Biotechnology Policy	Delhi	22 February,05	
17.	Organic Farming	Chennai	7-10 March,05	MSSRF
18.	Seed Bill	New Delhi	15 March,05	Gene Campaign
19.	Producer Oriented Market	Bhopal	18-19 March,05	Govt. of M.P
20.	Non Farm Employment	Ahmedabad	21-22 March,05	SEWA
21.	Coastal Area Farming	Chennai	2 April,05	MSSRF
22.	Sugarcane Farming	New Delhi	5 April,05	National Academy of Agricultural Sciences
23.	Fishery Development (Inland Fisheries and Aquaculture)	Kolkata	7-8 April,05	Govt. of West Bengal
24.	Sugarcane Farming	Lucknow	15-16 April,05	National Sugarcane Research Institute
25.	Arid Zone Farming	Jodhpur	22-23 April,05	ICAR (CAZRI)
26.	Hill Area Farming	Barapani	26-27 April,05	ICAR Complex for N.E. Hill Region
27.	Fishery Development (Marine Fisheries)	Vizag	2-3 May,05	Bay of Bengal Programme
28.	Hill Area Farming	Shimla	2-3 May,05	Govt of H.P
29..	Medicinal Plant Resources	Bangalore	9-10 May,05	MSSRF, UAS Bangalore, FRLHT
30.	Producer Oriented Market	Bangalore	10-11 May,05	Govt. of Karnataka
31.	Issues facing Poultry & other, Farmers in Namakkal region of Tamil Nadu	Namakkal, T.N	15 May,05	MSSRF
32.	Interactive Discussion with Sesame farmers	Erode	15 May, 05	MSSRF
33.	Non Farm Employment	Bhubaneswar	16-17 May,05	KVIC
34.	Aquaculture	Chennai	25 May, 05	Aquaculture Authority
35.	Workshop to develop a Food Guarantee Bill	Chennai	19 June, 05	MSSRF

S. No	Subject of Consultation	Place	Date	Collaborator
36.	Traveling Workshop-Tsunami	Chennai and T.N. Coast	16-18, July,05	MSSRF
37.	Measures for enhancing income and employment in rural areas in farm and non farm sector	New Delhi	1 September,05	
38.	Empowering male and female members of elected local bodies	New Delhi	19 September,05	
39.	Consultation on Hindu Succession (Amendment) Act, 2005 and its impact	New Delhi	21 September,05	
40.	Technology Mission	New Delhi	7 Dec,05	
41.	Animal Husbandry	New Delhi	17 March,06	
42.	Bio Security	New Delhi	18 March,06	
43.	Water and Agriculture	New Delhi	22 March,06	
44.	Cotton	New Delhi	10 June, 06	CSE and NAAS

VISITS UNDERTAKEN BY THE NATIONAL COMMISSION ON FARMERS

S.No.	Place	Date
1.	Patiala, Sangrur, Mansa and Bhatinda Districts of Punjab	16-18 October, 05
2.	Vidarbha Region of Maharashtra	19-21 October, 05

Annexure-B

DETAILS OF REPORTS SUBMITTED BY NATIONAL COMMISSION ON FARMERS

S. No.	Report	Title	Date of Submission
1.	First Report	Serving Farmers and Saving Farming	29 Dec, 2004
2.	Second Report	Serving Farmers and Saving Farming From Crisis to Confidence	11 Aug, 2005
3.	Third Report	Serving Farmers and Saving Farming 2006: Year of Agricultural Renewal	29 Dec, 2005
4.	Fourth Report	Serving Farmers and Saving Farming JAI KISAN: A DRAFT NATIONAL POLICY FOR FARMERS	13 April, 2006
5.	Fifth Report	Serving Farmers and Saving Farming Toward Faster and More Inclusive Growth of Farmers' Welfare	4 Oct, 2006

Annexure-C

DETAILS OF STATE LEVEL CONSULTATIONS FOR FEEDBACK ON DRAFT NATIONAL POLICY FOR FARMERS

S. No.	States	Place	Date
1.	Andhra Pradesh	Hyderabad	6 July, 06
2.	Assam & North East States	Guwahati	8 September, 06
3.	Bihar	Patna	12 July, 06
4.	Chhattisgarh	Raipur	8 August, 06
5.	Gujarat	Ahmedabad	15 June, 06
6.	Haryana	Chandigarh	25August, 06
7.	Himachal Pradesh	Shimla	26 May, 06
8.	Jammu & Kashmir	Srinagar	18 May, 06
9.	Jharkhand	Ranchi	13 July, 06
10.	Karnataka	Bangalore	24 June,06
11.	Kerala & Lakshadweep Island	Thiruvananthapuram	25 July, 06
12.	Madhya Pradesh	Bhopal	21 July, 06
13.	Maharashtra	Nagpur	1 May, 06
14.	Maharashtra and Goa	Pune	5 September, 06
15.	Orissa	Bhubaneshwar	28 July, 06
16.	Punjab	Chandigarh	24 August, 06
17.	Rajasthan	Bikaner	29 August, 06
18.	Tamil Nadu, Pondicherry and Andman & Nicobar Islands	Chennai	27 June, 06
19.	Uttaranchal	Dehradun	20 June,06
20.	Uttar Pradesh	Lucknow	4 August, 06
21.	West Bengal	Kolkata	1 August, 06

Annexure-C

OTHER MEETINGS FOR FEEDBACK ON DRAFT NATIONAL POLICY FOR FARMERS

S. No	Subject of Consultation	Place	Date	Collaborator
1.	Year of Agricultural Renewal	Jaipur	17-18 April, 06	Govt. Of Rajasthan
2.	Attract Veterinary and Agricultural Graduates to Farming	New Delhi	28 May,06	
3.	Consultation on Agriculture Credit and Insurance	Mumbai	31 May, 06	NABARD
4.	Women and Tribal Farmers, Empowering Panchayati Raj Institituions	New Delhi	8-9 June, 06	
5.	Consultation with Farmer Achievers	Chennai	26 June, 06	MSSRF
6.	Consultation with farmers of Medak and Mehboobnagar districts	Hyderabad	19 July,06	ICRISAT
7.	Poultry Sector	Pune	18 August,06	Venkateshwara Hatcheries Ltd.
8.	Animal Husbandry	Tirupati	19 August, 06	S.V. University
9.	Cauvery Delta Farmers	Thanjavur	28 August,06	MSSRF

Annexure-D

TERMS OF REFERENCE COVERAGE IN THE FIVE REPORTS OF THE NATIONAL COMMISSION ON FARMERS

S. No.	Terms of References	Report	Chapter, Para & Page
1.	Work out a comprehensive medium-term strategy for food and nutrition security in the country in order to move towards the goal of universal food security over time.	First Report Second Report Fifth Report - Vol. I	Chapter II Annexure I Chapter IX Chapter II Chapter 2
2.	Propose methods of enhancing the productivity, profitability, stability and sustainability of the major farming systems of the country based on an agro-ecological and agro-climatic approach and the harnessing of frontier technologies.		
	A) Propose methods of enhancing the productivity, profitability, stability and sustainability of the major farming systems	First Report Second Report	Chapter III Chapter 4.1, 4.2, 4.3
	B) Harnessing of frontier technologies	First Report Second Report Third Report Fourth Report	Chapter VIII Chapter 4.5, 4.6 & 4.7 Chapter I Para 6.4 Chapter 3.7

3.	Bring about synergy between technology and public policy and recommend measures for enhancing income and employment potential in rural areas through diversification, application of appropriate technology including IT for information on market, weather, credit facilities and e-commerce, training and market reforms.		
	A) Bring about synergy between technology and public policy	Third Report	Chapter II, Para 2.11.B.0 Page 91
	B) Measures for enhancing income and employment potential in rural areas through diversification	Third Report Fifth Report - Vol. I	Chapter II, Para 2.9.10 Page 62 Chapter 3
	C) Application of appropriate technology including IT, for information on market weather, credit facilities	First Report Second Report Third Report	Chapter VIII Chapter I, Para 1.9.0 Annexure -4
	D) e-commerce	First Report	Chapter VIII
	E) Training	First Report Third Report	Chapter I, Para 18 Chapter II, Para 2.11.B.28,
	F) Market reforms	Second Report Third Report Fourth Report	Chapter V Chapter I and Chapter III Chapter 3.9
4.	Suggest measures to attract and retain educated youth in farming and recommend for this purpose; methods of technological upgrading of crop husbandry, horticulture, animal husbandry, fisheries (inland and marine), agro-forestry and agro-processing and associated marketing infrastructure.		
	A) Suggest measures to attract and retain educated youth in farming and recommend for this purpose	Fifth Report - Vol. I	Chapter 4

	B) Methods of technological upgrading of:		
	➢ Soil Health Enhancement	First Report Third Report	Chapter I, Para 15,16,17 Chapter I, Para 6.1.1
	➢ Crop husbandry	Cotton – First Report Sugarcane- Second Report	Chapter VI Chapter 4.4
	➢ Horticulture	First Report Second Report Third Report	Chapter V Chapter 4.1, Para 4.1.2.0 Chapter 4.2, Para 4.2.4 Chapter IV
	➢ Medicinal Plant	Second Report	Chapter 4.5
	➢ Animal husbandry	Second Report Fourth Report	Chapter 4.2, Para 4.2.5.0 Chapter 3.5
	➢ Fisheries (inland and marine)	Second Report Fourth Report	Chapter III Chapter 3.4
	➢ Agro-forestry	Fourth Report	Chapter 3.6
	➢ Agro-processing	Fifth Report - Vol. I	Chapter 3 & 4
	➢ Associated marketing infrastructure	Second Report	Chapter V
5.	Suggest comprehensive policy reforms designed to enhance investment in agri-research, substantially increase flow of rural credit to farmers including small and marginal, triggering agricultural growth led economic progress, which can lead to opportunities for a healthy and productive life to rural families.		
	A) Comprehensive policy reforms designed to enhance investment in agri-research	Third Report	Chapter II

	B) Substantially increase flow of rural credit to farmers including small and marginal	First Report Second Report Third Report Fourth Report	Chapter II, Page 15,43 Annexure III Chapter I, Para 6.3 Chapter 3.8
	C) Triggering agricultural growth led economic progress	Fifth Report - Vol. I	All Chapters
6.	Formulate special programmes for dryland farming for farmers in the arid and semi-arid regions, as well as for farmers in hilly and coastal areas in order to link the livelihood security of the farming communities living in such areas with the ecological security of such regions. Review in this context, all ongoing Technology Missions like those relating to pulses, oilseeds, maize, cotton, watershed etc. and recommend methods of promoting horizontal integration of vertically structured programmes. Also suggest credit-linked insurance schemes which can protect resource poor farm families from unbearable risks. Further, suggest methods of strengthening and streamlining the National Horticulture Development Board.		
	A) Dryland farming for farmers in the arid and semi-arid regions	First Report Second Report	Chapter III Chapter 4.2
	B) Hilly areas	Second Report	Chapter 4.1
	C) Coastal areas	Second Report	Chapter 4.3

	D) Review in this context, all ongoing Technology Missions like those relating to pulses, oilseeds, maize, cotton, watershed	Third Report	Chapter IV
	E) Recommend methods of promoting horizontal integration of vertically structured programmes	First Report Second Report Third Report	Chapter III Chapter II, Chapter 4.2 Chapter 4
	F) Credit-linked insurance schemes which can protect resource poor farm families from unbearable risks	First Report	Chapter II
	G) Suggest methods of strengthening and streamlining the National Horticulture Development Board.	First Report	Chapter V
7.	Suggest measures for enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive through providing necessary facilities and application of frontier science and promote quality literacy for codex alimentarius standard, sanitary and phyto-sanitary measures among farmers through reorienting and retooling extension machinery. Also suggest methods of providing adequate protection to farmers from imports when international prices fall sharply.		
	A) Measures for enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive through providing necessary facilities	Second Report Third Report Fifth Report - Vol. I	Chapter I, Para 1.6.0 Chapter II, Para 2.11.A.55 -A.57 Chapter 5
	B) Application of frontier science and promote quality literacy for codex alimentarius standard, sanitary and phyto-sanitary measures among farmers through reorienting and retooling extension machinery.	First Report	Chapter VII

	C) Methods of providing adequate protection to farmers from imports when international prices fall sharply.	Third Report Fifth Report - Vol. I	Chapter I Chapter 6
8.	Recommend measures for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership.		
	A) Recommend measures for the credit, knowledge, skill, technological and marketing empowerment of women, taking into consideration the increasing feminization of agriculture	First Report Third Report	Chapter IV Chapter II, Para 2.11.B.14 - B.20 Annexure 8c
	B) Proposed conferment of right to land ownership	First Report Third Report	Chapter IV Annexure 8a, 8b
9.	Suggest methods of empowering male and female members of elected local bodies to discharge effectively their role in conserving and improving the ecological foundations for sustainable agriculture like land, water, agro-biodiversity and the atmosphere with priority attention to irrigation water.	Third Report Fourth Report	Annexure 8a Chapter 3.3
10.	Consider any other issue, which is relevant to the above or is specially referred to the Commission by Government.		
	A) Beyond Tsunami B) Suggestions sent by NCF relating to NREG Bill, 2004 C) Suggestions sent by NCF relating to Seed Bill, 2004 D) Field Visit to Punjab, Maharashtra E) Draft Biotechnology Policy F) Towards Agricultural Biosecurity **G) Draft National Policy for Farmers**	First Report Second Report Second Report Third Report Third Report Fourth Report	Chapter XI AnnexureI AnnexureII Annexure 1,2 Annexure 3 Chapter 4

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