

**REPORT OF  
THE STEERING GROUP  
ON**

---

**AGRICULTURE  
AND  
ALLIED SECTORS**

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**FOR THE TENTH FIVE YEAR PLAN  
2002-2007**



सत्यमेव जयते

**PLANNING COMMISSION  
GOVERNMENT OF INDIA  
NEW DELHI  
JANUARY, 2002**

**M, S, SWAMINATHAN RESEARCH FOUNDATION**

M.S.SWAMINATHAN *Chairman*

3rd January 2002

Shri K.C.Pant  
Deputy Chairman  
Planning Commission  
New Delhi- 110001.

Dear Shri Pant Ji

I am grateful to you and Shri Sompal ji for giving me the privilege of chairing the Steering Group on "Agriculture and Allied Sectors" for the Tenth Five Year Plan. I have pleasure in enclosing our Report. In preparing this Report, we had invaluable inputs from eleven Working Groups. We also had the advantage of discussing with the Chairpersons and Convenors of all Working Groups. In addition, we were immensely benefited by the advice and insights of the Union Minister for Agriculture, Shri Ajit Singh and Member (Agriculture), Shri Sompal.

The substantial grain reserves currently available with the Government should not lull us into a sense of complacency on the food production front. Leading food policy institutions like the International Food Policy Research Institute and the World Watch Institute of USA have been warning that India will have to resort to substantial food imports by 2020, if we do confront the serious challenges and constraints faced by our hard working farming Community. This is what we have tried to do in our Report.

In contrast to the situation in industrialized countries, where agriculture is by and large a food-producing machine, farming in our country is the backbone of our rural livelihood security system. In addition, self-reliance in our food needs is fundamental to our national sovereignty. Hence, the Tenth Five Year Plan should provide a new impetus to agricultural intensification, diversification and value addition and to creating new jobs and livelihoods both in the on-farm and non-farm sector. Above all, the economic survival and well being of farm families should be the bottom line of our public policies and investment decisions. We have therefore proposed a National Mission for Farmers'. Well-being by providing horizontal linkages among all the ongoing commodity centered. Technology Missions and the Watershed Development and Water Harvesting Missions. We have also suggested methods of remedying regional imbalances in agricultural growth. In all our recommendations, the underlying principle is getting the best out of our existing institutional structures, rather than creating many new ones.

Our recommendations are unanimous except in one area. Dr. C.M. Singh, President of the Veterinary Council of India and a Member of the Steering Committee, does not agree with the adoption of a farming systems approach in agricultural research and education and has advocated the establishment of an Indian Council of Veterinary Research on the model of ICAR. Most of the other Members feel that research and education should not be divorced from real life, where crop-livestock integrated farming is both a way of Site and a means to livelihood. There are a few other areas in agricultural research where some differences in view point exist. Therefore, we have recommended the setting of an

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M.S.Swaminathan  
*Chairman*

Agricultural Science Commission to go into all such issues and make recommendations to Government. Technology and public policy are the prime movers of change and we should aim to achieve substantial technological and managerial upgrading of small farm agriculture during the next 5 years.

This is essential for the urgently needed revolutions in productivity and quality. The last year of the Tenth Plan (2007 - 2008) coincides with 60th anniversary of our independence. Hence, we have suggested the organization of a National Grid of Community Food Banks, which can help us to realize Mahatma Gandhi's vision of a hunger free India.

All members of the Steering Committee gave generously their time and shared their vast knowledge. In particular, I must acknowledge our deep indebtedness to Shri M.D. Asthana, Principal Advisor (Agriculture), Planning Commission, who served as convener of this Steering Group and guided us throughout our deliberations.

Our gratitude also goes to Dr. M. Lall, Joint Advisor (Agriculture) and the relevant staff of the Planning Commission for their invaluable assistance.

Our agriculture is at the crossroads. Both internal and external threats to sustained agricultural progress need urgent attention. We hope that our Report will be of some assistance in taking to the right path leading to an ever-green revolution in our farms and fish ponds.

With warm regards,

Yours sincerely



(M.S. Swaminathan)

Chairman, Steering Group

CC: Shri Sompal, Hon'ble Member for Agriculture.

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# CHAPTER-1

## CONSTITUTION AND TERMS OF REFERENCE OF STEERING GROUP

The Steering Group on 'Agriculture and Allied Sectors' for the formulation of Tenth Five Year Plan was constituted by the Planning Commission vide Officer Order No.M-12043/11/2000-Agri dated 15<sup>th</sup> November, 2000 under the Chairmanship of Prof. .M.S.Swaminathan former Member, Planning Commission & UNESCO Chair in Ecotechnology & Chairman MS Swaminathan Research Foudnation, Chennai with Shri M.D.Asthana, Pr.Adviser (Agri), Planning Commission as the convenor of the Group (Annexure-1.I). The Terms of Reference of the Steering Group included the following:-

- (i) To give guidelines for various Working Groups constituted by the Planning Commission , for formulating /evolving approach, strategy and setting the objectives & targets of agricultural development including allied activities for the Tenth Five Year Plan.
- (ii) To identify specific areas/ subjects for consideration and working out the details by the Working Groups connected with the formulation of the Tenth Five Year Plan in respect of Agriculture and Allied Sectors; and
- (ii) To consider the reports of various Working Groups and wherever necessary make suggestions/ amendments and recommendations to the Planning Commission for further consideration;

2. Besides the Steering Group on 'Agriculture & Allied Sectors', the Planning Commission also constituted 11 Working Groups to formulate and devised the strategy for the development of various sub-sectors in agriculture during the Tenth Five Year Plan. The Working Groups constituted were as under:-

- 1) Working Group on 'Crop Husbandry, Demand & Supply Projections and Agricultural Inputs' under the Chairmanship of Shri K.Rajan, former Secretary, Department of Agriculture & Cooperation, Govt.of India.
- 2) Working Group on 'Agriculture Development in Eastern and North-Eastern India' under the Chairmanship of Shri Bhaskar Barua, the then Secretary Deptt. of Agriculture & Cooperation, Govt. of India.
- 3) Working Group on 'Watershed Development, Rainfed Farming and Natural Resource Management' under the Chairmanship of Shri J.C.Pant, former Secretary, Department of Agriculture & Cooperation, Govt. of India.
- 4) Working Group on 'Horticulture Development including Spices, Aromatic & Medicinal Plants and Plantation Crops' under the Chairmanship of Dr.K.L.Chadha, National Professor and former Dy.Director General, Horticulture, Indian Council of Agricultural Research.

- 5) Working Group on 'Agriculture Infrastructure/Warehousing/Rural Godowns/ Marketing/Post-Harvest Management, Processing and Cold Storage, Trade and Export Promotion' under the Chairmanship of Dr. V.Prakash, Director Central Food Technology Research Institute, Mysore.
- 6) Working Group on 'Animal Husbandry & Dairying' under the Chairmanship of Prof.P.N.Bhat, former Dy.Director General (AH&D), Indian Council of Agricultural Research.
- 7) Working Group on 'Fisheries' under the Chairmanship of Dr.N.Gopakumar, Dy.Director General, Indian Council of Agricultural Research.
- 8) Working Group on 'Organic & Bio-dynamic Farming' under the Chairmanship of Dr.G.S.Sirohi, former Head of Division, Indian Agricultural Research Institute, New Delhi.
- 9) Working Group on 'Agricultural Credit, Cooperation and Crop Insurance' under the Chairmanship of Shri S.S.Sisodia, (former Minister of State, Govt. of India), Chairman, National Cooperative Union of India.
- 10) Working Group on 'Agriculture Statistics' under the Chairmanship of Dr.N.S.Sastri, Director General and CEO, National Sample Survey Organization, Govt. of India.
- 11) Working Group on 'Agriculture Research & Education' under the Chairmanship of Prof. S.K.Sinha, President, Ex-Director and National Professor, Indian Agricultural Research Institute, New Delhi.

3. The Steering Group in all had ten meetings and discussed very elaborately on different issues in the various sub-sectors of agriculture. The Steering Group also discussed the Reports of all the eleven Working Groups which were presented during the meetings by the Chairman/Member-Secretary of the respective Working Group. Besides, the Steering Group also discussed the Reports of the Working Group on 'Minor Irrigation Programme' constituted under the Chairmanship of Shri M.S.Billore, former Secretary (WR), Govt. of Madhya Pradesh; on 'Forestry' constituted under the Chairmanship of Secretary, Environment & Forests and on 'Hill Area Development/Western Ghat Development Programmes' constituted under the Chairmanship of Dr.N.C.Saxena, Secretary, Planning Commission. In addition, the Steering Group also discussed the 'Report of the Task Force on Organic Farming' which was constituted by the Department of Agriculture & Cooperation, Ministry of Agriculture, Govt. of India under the Chairmanship of Dr.Kunwarji Bhai Jadav, former Director Agriculture, Govt. of Gujarat.

4. During the 8<sup>th</sup> meeting of the Steering Group held on 15<sup>th</sup> October, 2001 Shri Ajit Singh, Hon'ble Union Minister for Agriculture and also Shri Sompal, Hon'ble Member, Planning Commission met the members of the Steering Group and expressed their views with respect to problems being faced in the agriculture sector and measures required to be taken to achieve the objectives of the X Plan as laid down in the Approach Paper.

5. The draft report of the Steering Group was prepared based on the discussions held in nine meetings suggestions given by the members of the Steering Group and also considering the presentation/recommendations made in the Reports of the various Working Groups. The draft Report was circulated to all the members of the Steering and the final report is based on the suggestions/modifications made by the members.

**No.M-12043/ 11 /2000-Agri.  
Government of India  
Planning Commission  
(Agriculture Division)**

**Yojana Bhavan, Parliament Street,  
New Delhi, the 15<sup>th</sup> November, 2000.**

**O R D E R**

**Subject: Constitution of a Steering Group on Agriculture and Allied Sectors for the Tenth Five Year Plan (2002-07).**

It has been decided to set up a Steering Group on 'Agriculture and Allied Sectors' in the Planning Commission under the Chairmanship of Dr. M.S. Swaminathan, Former Member (Agriculture), Planning Commission, for the formulation of Tenth Five Year Plan.

2. The Composition of the Steering Group is as given at Annexure. The Steering Group may co-opt any other official / non-official expert/representative of an organisation as member(s), if required.

3. The Terms of Reference of the Steering Group will be as follows:

- (i) To give guidelines for various Working Groups constituted by the Planning Commission , for formulating /evolving approach, strategy and setting the objectives & targets of agricultural development including allied activities for the Tenth Five Year Plan.
- (ii) To identify specific areas/ subjects for consideration and working out the details by the Working Groups connected with the formulation of the Tenth Five Year Plan in respect of Agriculture and Allied Sectors; and
- (ii) To consider the reports of various Working Groups and wherever necessary make suggestions/ amendments and recommendations to the Planning Commission for further consideration;

4. The Steering Group will devise its own procedure and may co-opt any other official / non-official expert / representative of an organisation as member (s), if required.

5. The expenditure of official members on TA/DA in connection with the meetings of the Steering Group will be borne by the parent Department/ Ministries /Organisations. The expenditure, if any, in respect of non-official members will be borne by the Planning Commission as per the rules and regulations of TA/DA as applicable to Grade-I Officers of the Government of India.

6. The Steering Group will submit its report by 31<sup>st</sup> March,2001.

**( Suresh Pal )**

**Deputy Secretary to the Government of India**

**Copy forwarded to the Chairman and Members of Steering Group.**

Copy also forwarded to :

- P.S to Deputy Chairman
- P.S. to MOS (P&PI)
- P.S. to Member (SP)
- Sr. PPS to Secretary
- PS to Pr. Adviser (Agri.)
- PS to Adviser (PC)
- Joint Adviser (Agri.) / Joint Adviser (APS) / Directors
- Dy. Advisers / SROs / ROs in the Agriculture Division
- Pr. Advisers / Advisers of all Divisions
- PA to Deputy Secretary / SO (Admn.I)

**Composition of Steering Group on Agriculture and Allied Sectors for the Tenth  
Five Year Plan**

- |     |   |            |
|-----|---|------------|
| 1.  | Dr. M.S. Swaminathan,<br>Former Member, Planning Commission ,GOI,<br>M.S. Swaminathan, Research Foundation,<br>III Cross Road, Institutional Area,<br>Taramani, Chennai - 600113. | - Chairman |
| 2.  | Dr. Y.K. Alagh<br>Former Member, Planning Commission &<br>MOS, Ministry of Power, GOI,<br>SPIESR, Ahmedabad,  | - Member   |
| 3.  | Dr. C. H. Hanumantha Rao<br>Former Member, Planning Commission, GOI<br>240-B, Jabilee Hills, Road No.8,<br>Hyderabad-53033.   | - Member   |
| 4.  | Dr.G.V..Rao<br>former Member, Planning Commission, GOI<br>344, Jayanagar, 1 <sup>st</sup> Block, Near Ashoka Pillar,<br>Bangalore   | - Member   |
| 5.  | Secretary (A&C),<br>Deptt. of Agriculture & Cooperation,<br>Krishi Bhawan , New Delhi-1   | - Member   |
| 6.  | Secretary (DARE) & DG (ICAR)'<br>Krishi Bhawan , New Delhi-1  | - Member   |
| 7.  | Secretary,<br>Department of Animal Husbandry & Dairying<br>Krishi Bhawan, New Delhi -1  | - Member   |
| 8.  | Secretary ,<br>Department of Food Processing Industries,<br>Panchsheel Bhavan, August Kranti Marg,<br>(Near Siri Fort Auditorium), New Delhi - 110049.                            | - Member   |
| 9.  | Dr. C.M. Singh, President<br>Indian Veterinary Council<br>16/15, W.E.A., Arya Samaj Road,Karol Bagh,<br>New Delhi-110005.   | - Member   |
| 10. | Principal Adviser (Agriculture)<br>Planning Commission, Yojana Bhawan ,New Delhi-110001   | - Convener |

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Dr.G.V.K.Rao could not accept the Membership of the Steering Group due to personal reasons.

- \*\*11. Dr. Amrita Patel - Member  
Chairman, NDDDB, Anand, Gujarat
- \*12. Shri J.C. Pant, - Member  
Shardha Kunj, 159, Vasant Vihar,  
Chakrata Road, Dehradun-248006.
- \*13. Shri K. Rajan, - Member  
701 Falcon Castle Cooperative Housing Society Ltd.,  
Senapati Bapat Marg, Lower Pareil, Mumbai- 13.
- \*14. Ms. Anuradha Desai, Chairperson, - Member  
Venkateshwara Hatcheries Group, Venkateshwara,  
House No.114/A/2, Pune-Sinbagad Road, Pune-411030,
- \*15. Dr.(Mrs.) Kiran Mazumdar, Managing Director, - Member  
Helix Biotech Limited, C/o Biocon India Limited,  
20<sup>th</sup> KM, Hosur Road, Habbagoi-561229.
- \*16. Dr. M.H. Mehta, Vice Chancellor, - Member  
Gujarat Agricultural University,  
Sardar Krushinagar 385506, Dist. Banaskantha, Gujarat.
- \*17. Secretary, - Member  
Ministry of Water Resources,  
Government of India, New Delhi.
- \*18. The Chairman, - Member  
Central Groundwater Board, Government of India,  
Jamnagar House, Man Singh Road,  
New Delhi.
- @19. Dr. Y.S. Yadava, - Member  
Coordinator Bay of Bengal Programme (BOBP),  
91, St. Mary's Road, Abhiramapuram,  
Chennai.

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\*\* Included vide Order No.M-12043/11/2000-Agri dated 6.12.2000

\* Members included vide order No.M-12043/ 11 /2000-Agri. dated 7<sup>th</sup> February, 2001.

@ Included vide Order No.M-12043/11/2000-Agri dated 10<sup>th</sup> April, 2001

## CHAPTER- 2

### AGRICULTURE DEVELOPMENT : A RETROSPECTIVE

2.1 The Agriculture sector is the most important one, not only that it contributes 1/4<sup>th</sup> to nation's GDP, but the sector still provides livelihood support to about 69 % of our population. For a long time to come, the situation is estimated to change little. Besides, for a big country like India, agriculture is the source of food and nutritional security. In the interest of national security, self sufficiency has to be the goal. In order to extend its sphere of influence politically and economically, the course of development in the country has to be that of producing huge surpluses at competitive prices. The smaller the farm, the greater is the need for marketable surplus, in order to earn adequate income. The capacity has to be developed to handle the agriculture production scientifically and store and process it economically to avoid wastage's on the one hand and increase employment opportunity on the other. The issue of ecological/environmental security and national sovereignty are inter-linked and are dependent upon agriculture.

2.2 India remained a food deficit country for about two decades after its independence in 1947. The situation started gradually changing after mid 60s with the introduction of High Yielding Varieties (HYVs). High yield potential and highly input responsive varieties, especially that of wheat and rice, were introduced and attracted the attention of farmers. Besides, the infrastructure development, especially irrigation, rural roads, rural electrification and marketing spurred the farmers in achieving higher production and productivity. The Indian Agricultural Research System, ICAR-SAUs, contributed their mite by evolving appropriate HYVs with desirable traits and by developing appropriate production technologies. **The introduction of high yield potential new varieties, technology generation and infrastructural development together with opportunities for assured and remunerative marketing ushered in the era of Green Revolution.** In the early 70s India's population was about 500 million. Now it exceeds 1000 million. In spite of the doubling of population since the onset of the green revolution, the availability of food in the country has been satisfactory as a result of continued surge in production.

2.3 The Foodgrains Production increased to a record level of 208.88 million tonnes in 1999-2000. The production of oilseeds, sugarcane, vegetables and fruits etc. also increased substantially. **However, during the 90's (1989-90 to 1999-2000) a deceleration in growth of agriculture has been observed as compared to the previous decade, 80s (1979-80 to 1989-90)** <sup>1</sup> as has also been brought out in the Mid Term Appraisal (MTA) of 9<sup>th</sup> Plan of the Planning Commission. As compared to the 80s, in the 90s, the overall growth rate of crop production declined from 3.72% per annum (p.a.) to 2.29% p.a. and the productivity from 2.99% p.a. to 1.21% p.a. During the 90s the growth rate in production of foodgrains declined to 1.92% p.a. as compared to 3.54% p.a. during 80s. Similarly the growth rate of productivity decelerated to 1.32% p.a. as compared to 3.33% p.a. during 80s. The deceleration in production growth rate of foodgrains was steep as compared to non foodgrain crops from 4.02% p.a. during 80s to 2.83% p.a. during 90s. Our population is ,however, still growing at about 2% p.a. Hence, there is no time to relax in the food production front.

2.4. However, the **horticulture sector**, which seems to have remained neglected for a long time has done well. The production of fruits and vegetables which was 10 million tonnes before the first Five Year Plan, with modest efforts over the years, has increased to 87.16 million tonnes in 1991-92. A tremendous boost was given to the development of horticulture sector during Eighth plan by providing an outlay of Rs.1000 crore as against a small outlay of Rs.24 crore in the Seventh Plan. As priority to the horticulture the Ninth Plan outlay was further raised to Rs.1400 crore. The estimated production of fruits and vegetables in 1999-2000 was 136.33 million tonnes. This represents 67 percent increase in production over 1991-92 level. Now, country is the second largest producer of fruits after Brazil and also in vegetables after China.

2.5 There has also been a tremendous boost in expansion and production of **plantation crops**; tea, coffee and rubber, as evident from the data given in **table-2.1**:

2.6 **Deceleration in the growth** of agriculture during the 90s has been because of several factors. The unsustainable practices like excessive use of water together with

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<sup>1</sup> Ministry of Agriculture, GOI.

**Table-2.1. Area, Production and Productivity of Plantation Crops**

Area, productions & productivity	1980-81			1999-2000		
	Tea	Coffee	Rubber	Tea	Coffee	Rubber
Area(000 ha)	381.09	190.08	284.17	490.75 (28.8)	313.93 (65.2)	394.80 (38.9)
Production (000 tonnes)	567.56*	118.65	153.10	833.35* (46.8)	301.20 (153.9)	622.21 (306.4)
Productivity (kg/ha)	1489	624	788	1985 (33.3)	959 (53.7)	1576 (100.0)

\* Production in million Kgs. Figures in bracket indicate % change in 1999-00 over 1980-81.

imbalanced use of fertilizers especially in the Green Revolution areas of northern and northwestern parts of the country have affected the soil health adversely. The organic matter content in the soil has gone down because of less use of organic inputs; the micro nutrient deficiency has become alarming.

2.7 The sustainable management of **natural resources** like water and land has not received the attention they deserve. The sustainable management of

**Due to unsustainable practices followed :**

- micronutrient deficiency has become alarming;
- soil organic carbon has gone down;
- ground water table has fallen;
- water logging and salinisation have increased.

land and water resources becomes more important for the nation like India which shares about 16% of the global population but has only 4% of the total water resource. Scarcity of water in rainfed areas is causing serious hardship. It is estimated that our total annual renewable water resources are of the order of some 350 million hectare meter (mhm) of which around 160 mhm find their way back to the sea as river flow <sup>2</sup>. At the national level the availability of water is declining. Annual internal renewable water resources in India fell by 652 cubic meter per capita just in two years- from 1896 cubic meter in 1998 to 1244 cubic meter in 2000<sup>3</sup>. Under India's Geo-hydro-thermo regime it is important to conserve rainwater in the soil profile and through groundwater recharge of open wells and groundwater aquifers by converting surface flow to subsurface flow through promotion of appropriate vegetation, rather than merely trying or allowing the disposal of the runoff to the reservoirs and rivers respectively. Creating water bodies on the surface by constructing check dams has been the major approach to water harvesting in the past. Such water bodies suffer from the handicap of loss through

<sup>2</sup> B.B.Vohra, Managing India's Water Resources (1990)- The Intach Environmental Series.

<sup>3</sup> Human Development Report-1999 and 2000-UNDP

evapo-transpiration. Due to poor quality of construction also, these check dams do not last for more than a few years. The methodology of water harvesting hence needs careful review from the point of view of minimising losses and maximising conservation.

2.8 Due to poor **water harvesting** leading to excessive run off and poor recharging of ground water but excessive drawl/exploitation mainly to meet the requirement of growing population for drinking and other daily requirements as also new high yielding crops, the ground water potential has dwindled very fast. The number of dark Blocks/Mandals where there is over exploitation of groundwater (over 85% exploitation) is increasing in most of the states with larger rainfed areas (Andhra Pradesh, Karnataka, Rajasthan, Madhya Pradesh, Chattisgarh etc). During 1984-85 to 1998-99 the number of dark blocks has increased from 253 to 428. In Andhra Pradesh number of dark blocks has increased from zero to 30, in Gujarat from 6 to 26, in Rajasthan from 21 to 56, in Haryana from 31 to 51 and in Punjab from 61 to 97. Although the number of dark blocks has declined in some States (Bihar and Uttar Pradesh) an overall increase of 51 percent has occurred over a period of last 7-8 years. If this rate continues, the number of over exploited blocks will double over a period of every twelve and half years<sup>4</sup>. Most of the rainfed lands which have undulating topography generate huge proportion of rainfall into run-off (surface flows). This happens even in low rainfall areas. In areas with high run-off, even if the rainfall is very high, there is acute water shortage. The drinking water problem in some of the areas has persisted largely due to adoption of cropping pattern with high water demanding crops. The water resources in the country are unevenly distributed. Some regions have abundance while others suffer from acute scarcity. The hydrological challenge is: how to preserve/conservate the rainwater so that 4 months' rainwater can be utilized for 12 months for multiple uses; human and livestock needs, domestic uses and crop irrigation. The hydrological chain has been disrupted and the highest priority should go to the restoration of the ecology of "hydrologic hot spots". Effective groundwater recharging measures as also regulations for sustainable exploitation needs to be put in place on urgent basis. Ground water legislation and Regulatory Authority can only be delayed at nation's peril. Long-term concern of policy planners should be towards evolving more

sustainable rural livelihood support systems so that on the one hand, unsustainable agricultural practices do not force them to either migrate to the urban slums or on the other hand, force them to resort to unsustainable livelihood practices, which tend to destroy local natural resources.

2.9 Per capita **availability of land** in India is declining with the increase of population. It was 0.89ha/capita in 1950-51 and declined to 0.33 ha/capita in 1999-2000. India has a geographical area of 328.73 million hectares (m.ha). The reported area of 304.88 m.ha includes 142.82 m.ha net sown area of which 87.68 m.ha is rainfed, and 68.75 m.ha forest land

<b>107.4 million ha land is degraded :</b>	
Water Erosion	57.15
Wind Erosion	10.46
Ravines	2.68
Salt affected	6.32
Waterlogged	3.20
Mines & Quarry wastes, landslides & acid sulphate soils	0.25
Shifting cultivation areas	2.38
Degraded forests	24.90
Special Problems; Costal Sandy areas and other types	0.09
<b>Total</b>	<b>107.43</b>

of which 31.00 m.ha is degraded forest. About 63.8 million ha is estimated to be wastelands<sup>5</sup> which is unutilized or under- utilized. A total area of about 107 million ha is estimated to be degraded<sup>6</sup>. Under the programmes of Department of Agriculture & Cooperation (DAC), Department of Land Resources (DLR) and Ministry of Environment & Forests (MoE&F) and all other programmes, upto the end of the VIII Five Year Plan only an area of about 17.96 m. ha had been covered/treated. During the first four years of the IX Plan only an area of 7.26 m. ha could be treated/covered. The total coverage by the end of the IX Plan (2001-02) may reach 27.5 m.ha <sup>7</sup>. A sizeable area of degraded/rainfed land need soil conservation, water harvesting and vegetative cover.

2.10 The **inputs availability** and their use in agriculture have remained sub-optimal. Only about 39-40% of the net sown area of 142.8 million ha could be brought under irrigation and the remaining is dependent on rains. The larger dependence of crops on monsoon have adversely affected on the use of inputs and adoption of improved crop production technologies, because of high risk involved in crop production and low/no

<sup>4</sup> Irrigation, flood control and command area development, MTA 9<sup>th</sup> Plan, Planning Commission .

<sup>5</sup> Agricultural Statistics at Glance(MOA)/Forest Survey of India, 1997/ Wasteland Atlas of India, 2000, MoRD.

<sup>6</sup> Committee constituted by the Ministry of Agriculture,GOI, 1993

<sup>7</sup> Report of the Working Group on Watershed Development, Rainfed Farming and Natural Resources Management for the X FYP, Planning Commission.

margin of profits. The crop production under marginal lands/ rainfed areas seemed to remain a business of loss in most of the crops, as has been brought out in an study by Central Institute on Agricultural Engineering(CIAE), ICAR<sup>8</sup>.

2.11 The **seed** availability and Seed Replacement Rates (SRRs) for most of the crops remained inadequate and below the desired levels. There has also remained a varietal mismatch in seed availability and demand, especially in case of the crops / varieties specific to the problem areas. The inadequate availability of good planting material has also constrained the horticulture and plantation crops sectors. The average **fertilizer consumption** at 95.3 kg/ha remained low and imbalanced in terms of use of NP&K nutrients. The nutrient use remained very low in some of the States, especially in the North Eastern States and in the States like Himachal Pradesh (39 kg), Orissa(44 kg), Rajasthan (40 kg) and Madhya Pradesh (47 kg). Besides, the increasing deficiency of micro-nutrients in the soil have been observed in recent years. Soils have become widely deficient in some micro-nutrients like zinc, iron, etc.

2.12 With the propagation of **Integrated Pest Management (IPM)** approach and the increasing awareness about the hazards of pesticides, the consumption of such agro-chemicals in agriculture seems to has declined but the availability of quality pesticides remains a matter of concern. The infrastructure for enforcing the provisions of Insecticide Act, 1968, also remain inadequate. Failure of crops like cotton and red-gram in some areas/states has been attributed to the spurious pesticides in the markets and hence the ineffectiveness in controlling the pests by the farmers, resulting their being put to severe financial distress. Premature application of broad spectrum pesticides results in the elimination of the natural enemies of pests and thereby increases the pest damage.

2.13 Availability of quality **farm machines** and implements has remained unsatisfactory. The reservation for the manufacture of agriculture machinery and implements by the Small-Scale Industries seems to have also effected adversely the development of this sector. Although the use of tractors in agriculture has increased fast,

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<sup>8</sup> The paradox of Declining Agricultural Output Growth co-existing with declining prices of agricultural commodities (2001), by Dr. Gyanendra Singh and Hukum Chandra.

the availability of right type of machines and implements which could help adopt modern technologies and precision farming has remained grossly inadequate. Repair and maintenance sources are also inadequate. Because of inefficient farming operations the cost of production has also remained high as compared to the developed countries.

2.14. In **Animal Husbandry and Dairying** sector there has been a marked change over the years. There has been a clear shift from work animals towards milch animals because of increasing mechanization. The share of cattle & buffalo (bovine) population to total livestock population declined from approximately 68 per cent in 1951 to less than 61 per cent in 1992. But, in total livestock population, the share of buffalo has increased from 22% in 1951 to 29% in 1992. Crossbred cows have grown at a much faster rate (7.5%) than the indigenous stock (0.1%) during 1982-1992.

2.15. **Milk production** in India, which more or less remained stagnant during 1950 to 1970 with a very low growth rate of 1% p.a., is likely to reach 81 million tonnes in 2000-01 (anticipated). India has emerged as the largest producer of milk in the world. Though the per capita availability of milk has increased from 112 gm per day in 1970-71 to about 214 gm per day in 2000-01, it remained below the world average of 285 gm per day. The growth of milk production also registered a decline from 5.5% p.a. during the 80s to 4.14% p.a. during the 90s.

2.16. **Meat production**, estimated at 4.6 million tonnes in 1998, has increased with an annual growth rate of 4.1% during the last 10 years. But, the meat production is largely a byproduct of livestock production in India utilizing spent animals at the end of their productive life. Cattle and buffaloes, which contribute about 60% to total meat production, are primarily reared for milk and draught purpose and in the end utilized for meat purpose subject to many limitations. Buffalo calves generally die/allowed to die at a very young stage but are not reared for meat production as a farming activity. Salvaging buffalo calves in urban areas from early death is an important requirement as the mortality in urban buffalo calves is reported to be 60-90 per cent for various reasons. There are about 5.74 million buffalo calves that need to be saved from early death, till they reach a productive stage. Condition of many of the urban slaughter houses is far

from satisfactory. There remained constraints like livestock diseases lack of modern abattoirs and also lack of direction policy for effective utilization of livestock resources.

2.17. The Indian **poultry industry** has come a long way, from a backyard activity to an organized scientific and vibrant industry. Today India ranks 4th in egg production and 19th in broiler production in the world. It is estimated that the egg production in the country is about 32500 million and poultry meat production is about 8 million tonnes per annum. Poultry sector is providing direct and indirect employment to about 1.6 million people in the country. The significant step in poultry development has come from the initiatives taken up by the private sector for commercial pure-line breeding in the country. The pure-line breeding programme for the production of commercial hybrid broilers and layers, i.e. high-input high-output chicken, has remained confined to the private sector. However, despite of huge investment made, mostly by the private sector, the poultry-processing sector is incurring losses. The status of poultry sector; whether agriculture or industry, is somewhat ambiguous and the sector has remained deprived of various benefits entitlement either to agriculture or to industry, in spite of its social, economic and nutritional significance.

2.18. **The fisheries sector** has witnessed an impressive transformation from a traditional activity to one based on a developed and diversified infrastructure with immense potential for industrialization. During the last five decades, the fish production has increased with an annual growth rate of 4.14%. The share of inland fishery sector, which was 29% in 1950-51, has increased to about 50% in 1999-2000. However, the present level of fish production in the country is about 67% of the estimated potential of 8.4 million tonnes. While the production potential has been exploited to the extent of 72% in the case of marine fisheries, it is nearly 63% in the case of inland fisheries. There is enormous scope both for augmentation of production potential as well as enhancement of productivity in the inland fishery sector.

2.19 During 1950s – 90s, the marine fish production has increased at a rate of 3.43%, as compared to 5.27% of the Inland fisheries. In the recent years also the growth in marine fish production has been slower (an average of 2.19% in 1990s) as compared to the Inland Fisheries (average of 6.55%). Exploitation of territorial waters upto 12 nautical miles is a state subject whereas the rest of EEZ is with the union government.

The fisheries resources exploitation by the artisanal as well as the small mechanised sector has generally extended beyond the territorial waters. Similarly, the larger mechanised vessels and those operating under foreign collaboration for exploiting the off-shore resources have encroached in territorial waters disregarding demarcation of fishing zones. The over-lapping interests of competing sectors are resulting in social and political tensions. The management of fishery exploitation in the EEZ, therefore, requires close coordination between the centre and the state with identified agencies to be entrusted with specific responsibilities to regulate the activities of different sectors.

2.20 Because of the diverse agro-climatic conditions our range of products is divers and so is the country's merchandise **export** basket. Cereals, oil, oilseeds and oil meals, pulses, horticulture based products, both fresh and in processed form, jute and cotton, dairy and products, poultry, meat and products etc are regularly exported to many countries. However, over the years the share of agricultural exports in total exports has declined mainly on account of diversification of the export basket and falling international prices of agricultural products. The share of agricultural exports has declined from 30.7% in 1980-81 to 19.4% in 1990-91 and further to 13.5% in 2000-01, though the value of exports has grown from Rs.2057 crore to Rs.6317 crore and further to Rs. 27423 crore during the corresponding period. Moreover, the export earnings per unit product have also declined for agriculture in recent years. Factors like high cost of production, lack of adequate infrastructure for post harvest and processing, insufficient and inadequate storage facilities at ports of shipment, poor quality of the products and absence of certification system to conform to international requirements, etc. are affecting adversely on our agri-exports.

2.21 The availability of **institutional credit** to farm sector has remained inadequate although, the flow of agriculture credit has increased tremendously in quantitative terms. This has exerted an adverse impact on the development of On-Farm resources and capital formation in agriculture. As the modern agriculture becomes capital intensive the profits to farmers are declining because of decline generally in total factor productivity.

A review<sup>9</sup> by the Central Institute on Agricultural Engineering (CIAE), ICAR, reveals the percentage share of profit over total cost of cultivation has gone down. As compared to in 1995-96, the percentage of profit in 1997-98 in paddy has declined from 5.7% to 3.84%, in wheat from 8.04% to 0.64% and in gram from 8.08% to (-) 6.42%. Share of profit in Coarse Cereals, pigeonpea, groundnut and soybean remained negative. Causes for this state of affairs need to be identified and carefully analysed. Policy corrections need to be introduced wherever necessary.

2.22 As agriculture has a major role in alleviating the rural poverty, deceleration in its growth has affected the generation of income of rural population. This is evident from the paradox of a very substantial population below the poverty line in rural areas and increasing mountains of foodgrains stocks in the reserve pool with public agencies. The moment an over 200 million children, women and men, who are currently undernourished, start consuming their optimum requirements, the country's self sufficiency in foodgrains would be put to severe test. Access to entitlement of rural poor can only be assured by accelerating agriculture growth and generating more livelihood opportunities in the rural on-farm and non-farm sectors.

#### **AGRICULTURE IN THE IX FIVE YEAR PLAN**

2.23 The performance of agriculture during the Ninth Five Year Plan (2001-02) did not improve much (**table.2.2**). Though the **foodgrains** production reached a record level of 208.88 million tonnes, the average annual production during the first 4 years of the plan remained around 200 million tonnes. The production target of 234 million tonnes of foodgrains fixed initially for the IX Plan in view of Government's plan to double the food production by 2007-08 were quite ambitious and seemed to be unrealistic to achieve. The foodgrains production target for 2001-02 has since been revised to 218 million tonnes.

2.24 The average annual growth rate of foodgrains production during first four years of the IX Plan has been observed to be negative at (-) 1.25%. Wheat (-0.07%) and coarse cereals (-2.81%) production registered a negative average annual growth rate.

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<sup>9</sup> The paradox of Declining Agricultural Output Growth co-existing with declining prices of agricultural commodities (2001), by Dr. Gyanendra Singh and Hukum Chandra.

**Table-2.2. IX Plan Production Targets and Achievements of Foodgrains and commercial Crops.**  
(million tonnes)

Crop	8 <sup>th</sup> Plan 1996-97 achiev.	9 <sup>th</sup> Plan (2001-02) Target	1997-98		1998-99		1999--2000		2000-01		2001- 02
			Tar.	Achi.	Tar.	Achi.	Tar.	Ach.	Tar.	Ach.	Tar
Rice	81.73	99.00	83.00	82.54	86.00	86.00	86.00	89.48	90.00	85.30	92.00
Wheat	69.35	83.00	70.00	66.35	74.00	70.78	74.00	75.57	74.00	68.46	78.00
Coarse Cereals	34.11	35.50	34.00	30.40	34.50	31.46	34.50	30.47	33.00	30.25	33.00
Pulses	14.25	16.50	15.00	12.97	15.50	14.80	15.50	13.35	15.00	11.06	15.00
<b>Foodgrains</b>	<b>199.44</b>	<b>234.00</b>	<b>202.00</b>	<b>192.26</b>	<b>210.00</b>	<b>203.04</b>	<b>210.00</b>	<b>208.88</b>	<b>212.00</b>	<b>196.07</b>	<b>218.00</b>
Oilseeds	24.38	30.00	25.50	21.32	27.00	25.21	28.00	20.87	28.00	18.20	28.00
Sugarcane	277.56	336.00	280.00	279.54	300.00	295.73	305.00	299.23	325.00	300.32	325.00
Cotton *	14.23	15.70	14.80	10.85	14.80	12.18	15.00	11.64	14.50	9.39	14.50

\* Million bales ,

Source: Ministry of Agriculture / Planning Commission.

However, the rice production registered an average annual growth rate of 1.14%. The major set back was observed in case of pulses which recorded a negative average growth of (-)5.45%. The pulses production remained unsatisfactory at an annual average of about 13.04 million tonnes, lower than the average annual production of 13.35 million tonnes achieved during the VIII Plan. The creation of Technology Mission on Pulses does not seem to have made any impact, as production remained almost stagnant with wide year to year fluctuations. There was no increase in productivity either. The availability of pulses, a main source of protein for most of the India's vegetarian population, has declined from 69 gms/capita/day in 1961 to 32 gms/capita/day in 2000.

2.25. Similarly, **the oilseeds sector has also performed poorly with a negative average annual growth of (-) 6.08% during the first four years of the IX Plan.** Average annual production remained at about 21.4 million tonnes, lower than the VIII Plan average annual production of 21.89 million tonnes. Though oilseeds production reached a record level of 25.21 million tonnes in 1998-99, thereafter, it has declined. During the year 2000-01, it declined drastically to 18.20 million tonnes. The impact of Technology Mission on Oilseeds seems to have withered away.

2.26 The production of **cotton** also remained low at an average of 11.01 million bales per annum during the first four years of the Ninth Plan, with a negative growth rate of (-) 8.81%. Performance of sugarcane though remained better at an average annual growth rate of 2.01 % during the first four years of the Plan, but the production targets could

not be achieved. The production target for the terminal year of the Ninth Plan were revised downward to 325 million tonnes as against 336 million tonnes fixed initially. Production targets of most of the major crops for the terminal year of the IX Plan have been revised downwards from those fixed initially (**Table-2.2**).

2.27. The deceleration in the growth rate of production of rice and wheat, in spite of increases in area, is a matter of concern. The plateauing of yield of rice and wheat in high productivity areas under rice-wheat cropping system and low yield levels in central and north eastern parts of the country have affected the growth of production. The coarse cereals production recorded a negative growth rate (-0.52% p.a) during the 90's because of diversion of area by about 8 million hectares to other more remunerative crops.

2.28. There has been considerable expansion in area and increase in production of various **horticultural crops** during first four years of Ninth plan. The area under fruit crops increased from 35.80 lakh ha in 1996-97 to 37.97 lakh ha in 1999-2000, representing over six percent rise. The area under vegetable crops also increased to 59.93 lakh ha in 1999-2000 from 55.15 lakh ha in 1996-97. The increase was 8.67 percent during four years. The achievements of major horticultural crops during 1996-97 to 1999-2000 are given in **table 2. 3**. The Ninth Plan target for production of fruits and

**Table-2.3 The area, production and productivity of major horticulture crops**

Crop	1996-97			1999-2000		
	Area (000 ha)	Production (000 tonnes)	Productivity (tonnes/ha)	Area (000 ha)	Production (000 tonnes)	Productivity (tonnes/ha)
Fruits	3580	40458	11.3	3797 (6.06)	45496 (12.45)	12.0 (6.20)
Vegetables	5515	75074	13.6	5993 (8.67)	90831 (20.99)	15.2 (11.76)
Flowers	71	367+615*	-	89	509 +6806* (25.35)	
Coconut	1891	13061**	6907	1778 (-5.98)	12252** (-6.19)	6892@ (-0.22)
Cashew-nut	659	430	0.65	686 (4.10)	520 (20.93)	0.76 (16.92)
Mushroom	-	8	-	-	40 (400.00)	-
Honey (Bee colonies)	-	796	11.42	-	764(-4.02)	13.22(15.76)
Spices	2372	2805	1.2	2517 (6.11)	2911 (3.78)	1.2 -

Note: Figures in bracket indicate percentage change in 1999-2000 over 1996-97.

\* Lakh numbers ; \*\* Million nuts ; @ nuts per ha

vegetables was kept at 179 million tonnes. The recorded achievement up to 1999-2000 is 136.33 million tonnes representing 76 percentage of the Ninth plan target. Production of fruits and vegetable in final year of Ninth Plan is expected to improve further. However, Ninth Plan target was far too ambitious and is not likely to be fully achieved.

2.29. The development strategy for horticulture during Ninth Plan was focused at improving productivity and quality of the horticulture crops through up-gradation of production and farming technologies, supply of quality seeds and planting materials, technology transfer through demonstrations, reducing post harvest losses and improving marketability of produce, develop strong base for supply of other critical inputs and focus on human resource development.

#### **Constraints for development of horticulture products**

1. Poor quality of seeds and planting materials and their weak assessment mechanism;
2. Preponderance of old and senile orchards and their poor management practices;
3. Small and uneconomic average farm size of the orchards;
4. High order of perishability of horticulture produce, leading to high degree of post-harvest losses;
5. Lack of modern and efficient infrastructure facilities and poor post harvest management practices;
6. Underdevelopment of marketing structures;
7. Absence of adequate standards for quality produce;
8. Inadequate research and extension support to address the specific problems of horticulture crops and their linkages with farming community and industry;
9. Large scale variations in credit support and tax structures for diverse commodities;
10. Instability of prices;
11. Poor risk management, lack of authentic up-to-date data base and poor data collection and information system;
12. Inadequate information for sanitary and phytosanitary awareness and **codex alimentarius** standards.

2.30 A number of **constraints** on the growth of **horticulture** were identified during Ninth Five Year Plan. These were technological and infrastructural constraints, small size of land holdings, preponderance of old and senile trees and their poor management practices. There was acute shortage of good quality, disease free, high yielding seed and planting materials. The crop specific disorders such as disease of vegetables, root-wilt in coconut etc. were also prevalent. Processing infrastructure was weak and research and development support inadequate. There are, however, a number of constraints in raising the productivity, improving quality of the produce and increasing the overall production these important crops (see box).

2.31 The area and production of the **plantation crops** have increased during the Ninth Plan, as would be seen from the figures in table-2.4. However, the productivity of tea and rubber seems to have remained stagnant. Though there was some improvement in the productivity of coffee.

**Table-2.4 Area, Production and Productivity of Plantation Crops**

	1996-97			1999-2000		
	Tea	Coffee	Rubber (Tappable)	Tea	Coffee	Rubber (Tappable)
<b>Area(000 ha)</b>	431.20	303.82	356.44	490.75	340.30	394.80
<b>Production(000 tonnes)</b>	786.53*	205.00	549.43	833.35*	292.00	622.21
<b>Productivity (kg/ha)</b>	1896	816	1503	1985	947	1576

\* Production in million Kgs.

Note: Figures in bracket indicate percentage change in 1999-2000 over 1980-81.

2.32 The **livestock sector** has performed comparatively better than the crop husbandry during the first four years of the IX Plan but the targets set for the Plan are not likely to be achieved (Table-2.5). The milk production in the country during the first four years of the Ninth plan has increased with average annual growth rate of 4.24% against the envisaged growth rate of 7.06% p.a. The anticipated milk production of 85 million tonnes in the terminal year of Ninth Plan would be far short of the Plan target of 96.49 million tonnes. This is because of the fact that the public investment in the dairy sector has not increased. The other major reasons for low growth rate of milk production are non-remunerative price that producers are getting, difficulty of the producers to sell milk during flush season, shortage of green fodder, prevalence of diseases and lack of services for delivery of inputs.

2.33 The **egg production** has grown at an average annual growth rate of 3.56% during the first four years of the IX Plan and the anticipated production of 33.60 billion numbers during 2001-02 will be far short of the Plan target of 35 billion numbers. The poultry industry though has progressed well there remained several problems especially the availability of right type feed, prevalence of diseases and cheap imports, which affected the profit margins.

**Table-2.5 Production of Milk, Egg and Fish during the Ninth Plan**

<b>Year</b>	<b>Milk(Million tonnes)</b>	<b>Egg (Billion Nos)</b>	<b>Fish (million tonnes)</b>
9 <sup>th</sup> Plan Target	96.49	35.00	7.04
1997-98	70.8	28.57	5.39
1998-99	74.7	30.15	5.26
1999-00	78.1	31.50	5.65
2000-01 (Provisional)	81.0	32.50	5.95
2001-02 (Anticipated)	85.0	33.60	6.26

2.34 Ninth Plan had focused on an integrated approach to sustainable development of **fisheries** and aquaculture and aimed to optimise production and productivity, augment export of marine products, generate employment, improve socio-economic conditions of the fishermen and fish farmers, conserve aquatic resources and genetic diversity, increase per capita availability and consumption of fish.

2.35. **Fish production** has shown an increasing trend and has reached a level of 5.65 million tonnes in 1999-2000; is estimated to be about 5.95 million tonnes in 2000-01, and is likely to reach a level of 6.26 million tonnes by the end of the Ninth Five Year Plan (2001-02). However, the likely achievement of 6.26 million tonnes is much below the target of 7.04 million tonnes set for the IX Plan with an envisaged growth rate of 5.64 % p.a. This is mainly because of the set back in marine fish production which showed a negative growth (-)2.01%. However, the inland fish production has increased with a growth rate of 7.60% p.a. during the first three years of the ninth plan. The total fish production, both marine and inland, grew at 2.45% p.a. during the first three years of the IX Plan. The resource-wise (reservoirs/ rivers/ ponds/ tanks etc. ) availability of data on fish production and productivity remained a constraint in evaluating the performance of different kinds of resources.

2.36 The growth in fish production has suffered because of several factors. The investment in the fishery sector have remained inadequate. No major initiative has been taken during the IX Plan for strengthening infrastructure for fish seed production as well as for fish feed production.

2.37 The **Agriculture credit** and the role of cooperatives have been assigned an important place in the National Policy on Agriculture which seeks to actualise the vast

untapped growth potential of Indian agriculture. During the Ninth Five Year Plan an annual compound growth rate of 6.1 per cent in agriculture credit was envisaged. The total agriculture credit has increased from Rs. 26,411 crore during 1996-97, the terminal year of the Eighth Plan, to Rs. 44,612 crore in 1999-2000 and further to Rs. 53,504 crore (projected) during 2000-01. The projection for the terminal year of the Ninth Plan is for Rs.66,771 crore. During the 9<sup>th</sup> plan, a total credit flow of Rs. 2,29,750 crore was projected against which the target for the first three years ending march 2000 was set up at Rs. 1,16,800 crore. Against this, actual flow was Rs. 1,13,428 crore. The actual credit flow for agriculture during the year 2000-2001 was targeted at Rs. 52,108 crore leaving a balance of about Rs. 65,000 crore of credit flow to be achieved in the terminal year of the Ninth plan that is 2001-02 as against the target of 60,842 crore. Following table shows the targets set by the Working Group for agriculture and credit flow during the IX Plan:

**Table-2.6 Targets and Credit Flow during the IX Plan (Rs. crores)**

YEAR	Short Term			Investment (MT/LT)		
	Working Group Projections	Ground level credit flow	NABARD Refinance	Working Group projections	Ground level credit flow	NABARD Refinance
1997-98	22500	20640	5270	10875	11316	3305
1998-99	25650	23903	5487	12995	12957	3867
1999-2000	29250	28862	5145	15530	15750	4377
2000-01	33500	34700	NA	18608	18804	NA
2001-02	38500	42735	NA	22342	24036	NA

Source: NABARD

2.38 According to RBI report on Trends and Progress in Banking (1998-99), the target for priority sector lending by banks has been fixed at 40 per cent. Out of this, 18 per cent is for agriculture sector. Against this target, relative share of agriculture credit in the net bank credit stood at 12.8 per cent in March, 1997 and 11.7 per cent in March, 1998 as well as in March, 1999. The declining share of agriculture in the net bank credit against 18 per cent target under priority lending is a matter of concern. More credit needs to flow to agriculture for providing timely and adequate credit under simplified procedures to farmers for increasing agriculture production and productivity.

2.39 Lack of resources with most States has affected agricultural infrastructure development in general and in poorer states in particular. This has affected adversely the public investment in irrigation and roads and investment on technological up-gradation. Poor maintenance of canals and roads contributed to poor services. Besides these, the inadequate credit support, stringent market controls on foodgrains and other crop commodities have also affected the growth in agriculture.

2.40 The current production level of 200 million tonnes of foodgrains seems to be just sufficient to meet the requirement. However, the stocks of foodgrains are overflowing which indicate that a sizeable population has no economic access to required foodgrains. There are reports of hunger and malnutrition because of low purchasing capacity of sizeable portion of households. According to the National Family Health Survey 2 (NFHS-2) of 1998-99, 42.1% of the boys and 40.8% of the girls between one and five years are moderately or severely under nourished. About 30 percent of newborn babies have low birth weight due to maternal and fetal undernourishment. About 74.3% children under 3 years and 51.8% of the married women between 15-45 years suffer from anemia. The percentage of children under 3 years classified as under nourished on anthropometrics indices of nutritional status ranges from 62% to 65%. The per capita net availability of cereals and pulses the only source of protein for majority of Indians at 470.4 grams per day also leaves much to the desired. All these figures indicate that although we have a surplus stock of foodgrains in our reserve pool everything is not well and people, particularly children and pregnant and nursing women are not getting required quantity of dietary intake.

## CHAPTER-3

### MAJOR THRUSTS AND STRATEGIES FOR THE X FIVE YEAR PLAN

#### 3.1 Major Thrusts

3.1.1 The Tenth Five Year Plan Approach Paper proposes to achieve an overall growth rate of 8% per annum during the Plan. Because of resource constraints, the Tenth Plan accords high priority to identifying efficiency enhancing policies both at the macro level and also at the sector level. A radical break from past practices and new institutional arrangements has been accordingly advocated.

3.1.2 The National Agriculture Policy envisages to achieve a growth rate exceeding 4%. This is also consistent with the objective of growth rate of 8% per annum during the Plan. In agriculture sector during the first four years of the IX Plan, the average annual growth remained low at about 1.4% with wide year to year fluctuations as compared to the average annual growth of 4.0% during the VIII Plan. It is estimated that if the agriculture GDP is to grow at 4% per annum or little higher, the crop production has to increase by 3.5%, livestock sector by about 6% and fisheries sector also by about 6%p.a. In agriculture GDP, the crops share is about 69.3% followed by 23.1% of the livestock sector, about 4% of the forestry & logging and 3.6% of fisheries sector (TE 1999-2000) and for achieving the higher growth rate the production of crops has to be increased substantially. This would be possible, but it would call for massive efforts for yield enhancements and support services. The higher growth in agriculture sector would greatly enhance the overall growth rate, as the sectors contribution to GDP is about 25%.

**3.1.3 To achieve the target of more than 4% growth rate in agriculture sector, as envisaged in the National Agriculture Policy, at least 8% growth, in each of the sub-sectors, namely; horticulture, livestock products and fisheries would be required.** This is possible if concerted efforts are made and desired policy changes brought in to remove the major constraints and restrictions in agriculture sector and encourage the creation of infrastructure.

**3.1.4 For achieving the higher growth rate it would be essential to unleash the untapped potential of major farming systems through integrated packages of**

technologies, services including inputs like seeds, and public policies. While achieving new gains, we must have to defend what has already been achieved through the conservation and sustainable development of our natural resources and spread of eco-technologies (technologies which are environmentally and economically desirable.)

3.1.5 A large cropped area (62%) is still dependent on monsoon as irrigation facilities are not adequate. Because of want of irrigation facilities, a large area remains fallow especially during *Rabi*/ summer season. Some area also remains fallow during *Kharif* season but due to water logging. With the development of irrigation resources the cropping intensity could be increased. It will also lead to adoption of improved technologies raising the productivity levels. The eastern region has a large ground water potential, but it has remained unexploited (Table-3.1). **Proper measures to harness the ground water resource in the eastern region could bring an ever-green revolution as major gains are expected from this region and other hitherto less developed rainfed areas.**

3.1.6 As the pressure of population is increasing and contribution of agriculture to nation's GDP is declining, the share of farmers in total earning is also declining. This is because of the fact that there has not been any significant decrease in population's dependence on agriculture. The per capita availability of land has declined, besides our land and water resources have become severely degraded. About 107 million ha of land

**Table-3.1- Ground Water potential and potential created in Eastern & North Eastern India.**

S.No.	State	Ultimate Potential (‘000 ha)	Created Up to 1996-97	
			Potential Created (‘000 ha)	% of ultimate potential
1.	Bihar	4947	4292	83
2.	Orissa	4203	717	17
3.	Uttar Pradesh	16799	22634	129
4.	West Bengal	3318	1855	54
5.	Assam	900	207	22
6.	Manipur	359	0.6	0
7.	Meghalaya	63	10	16
8.	Arunachal Pr.	18	2.4	13
9.	Tripura	81	21	26
	All India	64050	45885	69

Source: Central Water Commission, GOI.

Including 63.8 million ha of wasteland is severely degraded needing immediate attention. Today, the good forest area having a crown cover of 40% or more is only 37.73 million ha and remaining 26 million ha is open and degraded. **The conservation of natural resources (land, water, biodiversity, forests, living aquatic resources, atmosphere) and enhancement of productivity needs to be given due attention. Besides, the income and employment potential of agriculture has to be improved by setting up agro-industrial complexes in rural areas.** The income enhancement is essential for improving the consumption. The foodgrains and other agricultural commodities produced in the country are not being utilized fully because of low purchasing capacity of a large portion of our population.

3.1.7 In the international market, the Indian agriculture produce is generally considered to be of poor quality in respect of purity, contamination with pesticide residues and mycotoxins, etc. Because of the manual handling of most of post harvest operations inert materials remain with the produce. Therefore, there is need to generate awareness about hygiene and encourage mechanical handling of produce, especially for cleaning and processing. In addition, some of produce like milk, meat, eggs and even some of the foodgrains have been found to be contaminated with pesticide residues either due to the use of pesticides on the crop or the crop getting contaminated through soil or irrigation water. This perhaps is because of lack of awareness among farmers about the doses of pesticides application and also the withholding period i.e. gap between pesticides application and harvesting of produce. Our storage conditions are also not adequate. A large quantity of foodgrains procured by the FCI is stored in the open under polythene covers. Because of high temperatures and humid conditions such stored foodgrains get infected with fungi and mycotoxins produced by the fungi make these foodgrains unfit for human consumption. The problem of mycotoxins/ aflatoxins is severe in the commodities like groundnut, jowar, maize, etc. **To overcome the problem of inert material and mycotoxin infection in the agricultural produce, the post harvest handling and processing have to be upgraded and storage conditions are improved. For storage and transportation the bulk handling facilities are also desirable. Besides, quality testing facilities, especially for pesticide residues and mycotoxins, also need to be strengthened.** Pesticide residue analysis report should indicated the

specific pesticides if their residues are found in any of the produce. **There is a need to foster a quality revolution all round; in cooking, processing, freedom from mycotoxins, etc.**

3.1.8 Off late, with the improvement of income of the people, there has been shift in the demand and consumption. The consumption of high value/ quality products has increased in the households where income has increased. Not only in the country, the demand of high value products is also increasing World over and it may be appropriate to bring in diversification in agriculture and plan the production activities, depending on the agro-climatic conditions and land and water resources, which are employment and income generating. **Based on the land capability, activities like tree farming, agro-forestry, dairy, fisheries needs to be encouraged. The diversion of agriculture from crop based activities to non-crop based activities will also encourage the non-farm/off-farm activities especially the agro-processing which will create additional employment in rural areas, help generate/increase incomes of people and create consumption demand for agri-produce.** The production of quality/high value produce and value addition would also help in increasing our exports.

3.1.9 The demand for organically produced food is increasing in the World. The India, which comparatively uses less fertilizers and agro-chemicals, has great advantage in international market. **Whereas organic farming could be promoted in any part of the country depending on the opportunities available in terms of agro-climatic conditions and infrastructure, it could especially be promoted in the North Eastern Region and in the rainfed tracts where the consumption of agro-chemicals is low or negligible particularly during the south west monsoon of Kharif season .** There are pockets where no agro-chemicals are used. For organic farming such areas having low/no use of chemicals could be identified for different crop commodities and livestock produce. There is immense scope for promoting organic farming in the North Eastern sector for rice, fruits, vegetables and medicinal and aromatic plants. Similarly, some other parts of the country could also be identified for production of specified items under organic farming.

3.1.10 **As present we have too much reliance on rice and wheat and our food security is mainly based on these two crop commodities.** Emphasis on the development and exploitation of other crops has remained much less to the desired. There are several other crops, which have the potential in terms of both production and their industrial uses and nutritional value for human and livestock but have remained unutilized or underutilized. **We must widen the food and feed security baskets, through greater attention to underutilized crops and forage grasses. It would be desirable not to classify nutritious millets as ‘coarse cereals’, since this gives a wrong impression in the minds of consumers.**

## **3.2 Policy Reforms and Framework**

### **Public Investment and Plan Allocation**

3.2.1 **The decreasing investments in agriculture in the form of Gross Capital Formation (GCF), which is affecting on the development of infrastructure, productivity, processing and value addition, is an area of great concern.** The share of agriculture in the total GCF has come down from 17.7% in 1978-79 to about 8% in 1999-2000. Earlier, during 1952-53 the share of agriculture GCF in the total GCF was 23.5%(at 1993-94 prices). Not only this, the share of public sector in the agriculture GCF has also declined from 34% in 1978-79 (at 1980-81 prices) to 24.4% in 1999-2000 (at 1993-94 prices). Although, the share of private sector in agriculture GCF is increasing it cannot substitute for the public sector investment especially in the development of infrastructure such as rural roads, electricity, irrigation, agro-industries, animal health services etc.

3.2.2 Public investment in terms of **Plan allocations to the agriculture sector** has remained at around 14%, except in the Fourth Plan when it was 17.2% of the total plan outlay; during the Fifth Plan it was **12.1%** and for the Ninth Plan **14.05%**, although 70-75% of total population has remained dependent on agriculture. **If a higher growth rate in the agriculture sector is to be achieved more investments have to be made especially for the development of infrastructure like irrigation, conservation and development of natural resources like water, land and bio-diversity together with the improvement of environment. Besides, public investment in technology,**

**training and trade facilities has also to be enhanced so as to put the agriculture sector on the fast track of growth. For the Tenth Plan the agriculture has been identified as the core sector and we recommend that the sector should get a substantial increase in the plan allocation.**

### **Subsidies**

3.2.3 **Subsidies** provided to the farmers has helped in propagation of improved production technologies and development of on farm resources. However, **some of the subsidies like free electricity for ground water use and canal irrigation water have affected adversely on natural resources.** As stated above, over exploitation of groundwater in some areas have affected the ground water availability; number of dark blocks have increased, ground water table has declined and some good land has become saline/ alkaline. In the canal command areas the excessive use of water has created water logged conditions in some pockets and a sizeable area has become less productive/ alkaline/ saline. **Such subsidies have also affected on the resources of States** with the result the maintenance of public irrigation system have remained poor, which in turn has affected on area coverage and efficiency of various irrigation projects. Therefore, **whereas subsidies to the farmers may be desirable to help them adopt the improved production technologies and promote entrepreneur-ship, the ones which are affecting adversely on the natural resources need to be redeployed** and diverted for other activities which may have direct beneficial effect on technology transfer, developing the on-farm resources, diversification, generating employment and income to the rural poor and sustainability of natural resources levying of user charges to at least recover the cost of operation and maintenance could help increase the use of efficiency of inputs/resources. Similarly the use of MSP operation could help bring diversification to crops/cropping systems suitable under an agroclimatic condition and land and water resources.

### **Extension**

3.2.4 The **extension services** for propagation of improved crop production technologies, input support, market prices, etc. are very important for the farmers to plan for their production activities. The T&V extension system introduced with the

assistance of World Bank has some useful features, but under the changed situations it has become less effective and seems to have become outmoded. The system also could not address adequately the problems of farming system concept, animal husbandry and dairy sector and information with regards to markets, input testing, etc. **The system needs to be the broad based one with reliance on the information and communication technology.**

#### SATELLITE KRUSHI GOSTHI

The Gujarat Agriculture University (GAU) is a multi-campus and one of the largest agricultural Universities in Asia. The GAU has prepared a major plan to apply new modern tools like Satellite Linkages for agriculture sector and for transfer of technology. A satellite based distance interactive education system normally consists of a number of remote classrooms spread over the state and a teaching end, which is centrally located. The Gujarat SATCOM Network has full capability for one-way video and two-way audio. RESECO has established SATCOM Network consisting of TV Studio at Gandhinagar. The video & audio from teaching end is digitally transmitted to the classroom end. The return audio is available through STD lines. At present, 78 DRS (Direct Reception Station) to receive transmission are already established throughout the state with different departments. It is expected to establish a total of 300 such DRS by various departments of Government of Gujarat by the end of year 2001 and GAUSATKRU will form vital linkages with all these.

Through such a Satellite Krushi Gosthi programme, within a year of starting this programme, several programmes such as bio-control, new fruit and vegetable varieties, Agriculture Rehabilitation for Kutchh, Water Management, Animal Nutrition etc. have been a great deal of participation by scientists and farmers to cover at the DRS for direct dialogue with the scientists. Even project implementation of all the experimental farms of water recharging, check dams etc. were finalized through such programmes and plan and implementation for all the farmers were finalised through this system.

**Source:** GAU

3.2.5 It is becoming increasingly evident that public extension by itself can no longer respond to the multifarious demands of farming systems. Public funding for sustaining the vast extension infrastructure is also under considerable strain. In response to market demand the existing public extension network is being complemented, supplemented and being replaced by private extension. As the nature and scope of agricultural extension undergoes fundamental changes, the outlook is for a whole new policy mix nurturing a plurality of institutions. User driven and controlled systems are the most effective, as is evident from the experience of sugar and dairy cooperatives.

3.2.6 The ICAR is also associated in agriculture extension activities through its 314 KVKs (including 53 Zonal Research Stations functioning as KVKs), Institute Village Linkage Programme (IVLP) and also its institutes / centres in the local areas. The ultimate plan is to have one KVK in every district. However, there seems hardly any interaction of its KVKs activities with the State / district extension Machinery. Therefore, there seems a need to review the role of KVKs in direct extension support and to forge the strong linkages with district/state extension machinery, if not, bringing them under the direct control of DAC or States.

#### **Information Village Research Project of MSSRF**

While selecting the Information Village project of the M S Swaminathan Research Foundation as the winner for 2001, the jury of the Stockholm Challenge Award observed:

"The Information Village Project is an outstanding embodiment of the spirit of the Stockholm Challenge to promote inclusion through the use of information and communication technologies. Today, thanks to InformationVillage Project, ten villages near Pondicherry, India, are linked with computers, providing information on such aspects as health, crops, weather, and fishing conditions. These new technology tools are bridging the economic and social divide between the haves and have nots. They are empowering everyone with knowledge and opportunity by an inclusive use of local languages and a multimedia format that allows all to participate. Because of this project, some traditional barriers have fallen. For example, a temple that formerly excluded low-caste people now opens its doors to everyone so they may use computers. This project is a wonderful example of the benefits of IT, and of the power of information and opportunity."

In an experiment in electronic knowledge delivery to the poor, MSSRF has connected ten villages near Pondicherry in southern India by a hybrid wired and wireless network -- consisting of PCs, telephones, VHF duplex radio devices and email connectivity through dial-up telephone lines - that facilitates both voice and data transfer, and have enabled the villagers to get information that they need and can use to improve their lot. The entire project draws its sustenance from the holistic philosophy of Swaminathan, which emphasises an integrated pro-poor, pro-women, pro-Nature orientation to development and community ownership of technological tools against personal or family ownership, and encourages collective action for spread of technology. The bottom up exercise involves local volunteers to gather information, feed it into an Intranet and provide access through nodes in different villages. Value addition to the raw information, use of the local language (Tamil) and multimedia (to facilitate illiterate users) and participation by local people right from the beginning are the noteworthy features of the project. Most of the operators and volunteers providing primary information are women, thus giving them status and influence. All centres came up because of demands made by the community.

Source: MSSRF

### **Seeds**

3.2.7 Besides the strong and effective extension system, the service support in terms of information and input supply also is important. The use of various inputs in agriculture has remained sub optimal. Although the availability of certified/ quality seeds over the time has increased substantially to 109 lakh quintals the seed replacement rate (SRR) for most of the crops have remained much below the desired level. In case of major cereals namely rice and wheat the SRR is about 9% against the recommended level of 20%. In

case of pulses the situation is very poor as in most of the pulse crops, especially where the seed rate is high, the SRR is very low. The reasons for lower SRR could be (1) high prices of certified seeds; and (2) marginal gains with the use of certified seeds over the farmers own farm produced seed. **As the seed is a very critical component in enhancing the productivity the SRR has to be improved.**

3.2.8 To even talk about the availability of seeds of the right quality and at the right time of the varieties sought by the farmers is a cliché. Nevertheless, often seeds become a bottleneck in the efforts to raise productivity and production. The role of the state governments in ensuring availability of seeds of the specific varieties demanded by the farmers is pivotal. For long policy of providing subsidies supplied by the state undertaking has meant that in respect of self pollinated crops it is only the state/ central PSUs or the Agriculture departments of the states as have become the suppliers of seeds. **May be a time has come to associate even the private seed industry as in the case of hybrid varieties of crops or vegetables.** With the enactment of the Plant Varieties Protection and Farmers' Rights Act, it is likely that research by the private sector may be given a fillip. **While ensuring that the quality of the seeds conform to both genetic and physical purity and germination it may be necessary to build a conducive climate for all the players to come out aggressively to meeting the farmers' requirements of seeds. Apart from quality aspects the markets should be allowed to determine the prices and distribution arrangements, rather than this being dictated by state interventions.**

### **Credit**

3.2.9 Perhaps, the most critical area for ensuring better productivity and production will rest on our ability to meet satisfactorily the institutional credit requirements of the farmers. The situation in most states is grim. In several states the average credit disbursed per hectare of gross cropped area is abysmally low in the range of couple of hundred rupees at best. Promotion and financing Self-help groups by the Banks cannot be the solution for crop production credit. Whatever may be their performance in the non-farm sector. There are basic issues in this sector, which have been examined by several Expert Committees. Here again, we may have to take steps not strictly in accord

with fundamental theories, but then the past role of the state in intervening in the operations of the banking sector may have resulted in the present mess. This is particularly true in the case of co-operative financial institutions, which have been treated as limbs of the government for all intents and purposes. **Co-operatives have the largest network of grass root institutions and ignoring them or allowing these bodies to wither away will create an unbridgeable vacuum.** In putting the co-operative financial institutions on a sounder footing would require an approach and amendments of the legislation, which can also inform on the performance on other kind of co-operative institutions dealing with a host of functions. **These co-operatives should be allowed to function as purely commercial bodies and decide and secure their own fate.** About a decade back, a decision to waive the farmer's debt up to Rs.10,000 was implemented. Commercial banks were compensated for the resultant liability. Co-operatives are still waiting. Their large scale sickness is on account of this reason too. A one time capitalisation consistent to the principles of natural justice seems to be the only solution.

3.2.10 The Kisan Credit Card (KCC) scheme was introduced in 1998-99 for providing adequate and timely support from the banking system to the farmers for their cultivation needs including the purchase of inputs in a flexible and cost effective manner. Till 31<sup>st</sup> March 2001 only 14.5 million KCC were issued. By and large, one disbursement per person has been observed in the KCC. Various stipulations prescribed seem to inhibit elasticity of transactions in the account. Besides, the rate of interest charged by cooperatives is higher than the rates charged by other institutions. The higher stamp duty on account of registered Mortgage hinder large size loans under the KCC. The operation of the KCC seems to be limited to only fertilizers from fixed shops. Thus, none of the objectives of the KCC seem to materialize. It seems to be a poor substitute of old crop loan scheme. The credit entitlement for each crop has to be decided by a district committee in the beginning of the year. Like earlier system, the district committees are hardly functional. Thus, the adequacy and timely component is completely lost. Moreover, the scheme has not been implemented in all the States. In some states like Andhra Pradesh, Maharashtra, Rajasthan and UP have issued more than 10 lakhs of KCCS (each state) while the states of Karnataka, Orissa and Tamil Nadu issued only 5 to 10 lakh KCCs each during the same period. Some other states like

Bihar, Assam, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Kerala, Madhya Pradesh, Punjab and West Bengal have issued hardly 1 lakh KCCs each. The progress of this scheme in the NE States is very dismal. Reports received so far indicate that it has just become a poor copy of old Crop Loan system. Flexibility and many other features of the scheme have not been operationalized. There is need to be rectified and a more farmer friendly credit card system should be operated so as to realise the objectives of the scheme. For promoting the entrepreneurship in agriculture, readymade projects on shelf for credit support and schematic lending should be made available for different activities like animal husbandry, dairying, fisheries, agro-forestry, agro-processing, etc. **As capital assets of farmers are limited, community/group collateral and the trees on a farmer's land could also be considered as collateral in granting the credit.** Self Help Groups (SHGs) need to be integrated into the scheme. A massive credit linked subsidy programme with a reasonable contribution from the farmers could be initiated through NABARD for the reclamation/development of degraded/rainfed/wastelands and also other activities like livestock production, fisheries, agro-forestry, tree farming, agro-processing, etc.

### **Plant Nutrient Management**

3.2.11 There are large variations in the use of synthetic fertilisers across the states and crops. Even in respect of crops, which respond well to fertiliser use and raised under irrigated conditions like in the case of paddy or wheat with matching differences in the levels of productivity. **Clearly there is case for promoting a more optimum level of application of fertilisers as an integral part of balanced application of plant nutrients and soil conditioners.** This is a must if our average level of yields has to go up, particularly in the select focus crops. At the same time we also need to examine the kind of responses ratio to incremental fertiliser use in areas where the current levels of application are high. Part of the problem may be arising from deficiencies in the presence of micronutrients inhibiting the achievement of desired fertiliser response ratio and impacting on the application of the major plant nutrients like nitrogen or phosphates. It appears to be necessary for a far more pro-active approach to study the issue relating to yields, fertiliser response ratio and micronutrients availability. Corrective measures should not wait for the widespread expression of deficiencies on crops and yields.

3.2.12 **The fertilizer use efficiency in the country is very low** especially in the problem soils and in the areas affected with soil moisture stress and excess soil moisture/water situations. Whereas the technologies developed by the ICAR-SAUs research systems with regards to fortification and placement of fertiliser in such areas needs to be propagated, **there is also need for carrying out further research on this aspect so as to find out better and efficient materials and application techniques.**

3.2.13 The present soil testing capacity is only for about 6.5 million samples annually. This seems to be grossly inadequate considering that we have over 106 million operational holdings covering over 142 million hectares of net sown area. It is unfortunate that even the existing capacity, which is grossly inadequate, is not being utilized fully in some of the States. This calls for providing adequate support for required equipment, chemicals and manpower so as to facilitate the utilization of existing capacity. Besides, adequate support is required for creation of additional infrastructure so as to provide services to the farmers, which could help them in correcting the deficiency of micronutrients in the soil and adopting the balanced use of fertilisers. **Private soil clinics along with diagnostic centres for soil and water health need to be actively promoted.** Public sector agents have not delivered; alternative is a must. Agri-clinics/agri-business centres could also be encouraged in the private to augment the soil testing and advisory support services. **The Government may also consider for providing soil health cards to each of the farm holding indicating the fertility status and soil reaction of each plot of his holding.** The programme may be chalked out to take-up soil analyses in a systematic manner so as to encourage the balanced and efficient use of fertilisers, recycling of crop residues, farm & city waste and use of soil amendments.

### **Pest Management and S&PS Measures**

3.2.14 Similarly the emphasis in Integrated Pest Management (IPM) should not boil down to one of reduced use or in fact non-use of agro-chemicals as the only focus of the programme. A far more scientific approach to the entire issue appears critical to the success of this approach. In the more recent years crop damages due to pest incidence have been fairly extensive with serious repercussions on the financial conditions of the farmers. Either these have been attributed to spurious quality of pesticides used or to the

fact that pests have developed resistance to the kind of pesticides being used. IPM based on cultural, agronomic, natural balance between pests and their predators / parasites, or other means of controlling pest population should definitely precede the use of agrochemicals as the means of last resort. There is critical and felt need for a more rigorously scientifically researched and tested protocols for IPM for different crops and different areas, if one is to ensure that crop losses would not be severe. Equally, **IPM will make little sense without effective surveillance of the pests, parasites & predators and their population dynamics and timely and regular forecasts of likely outbreaks/pest buildup.** Farmers need to be advised as to how the pest situation can develop in the light of the initial population, the agro-climatic factors based on scientific prognostications and forecasts, if possible. Research on the entire question of crop pests and resultant damages would need to be augmented to develop meaningful farm advisories becoming available.

3.2.15 Another area, which will become extremely important, would be one relating to all aspects of quality of the commodity coming to the market. With integration of commodity markets globally there will be increasing pressure on commodities produced in the country also to conform to standards so that it is internationally tradable. **Amongst the pressing requirements is the need to enforce pesticide residue standard statutorily from health angle.** There is lack of systematic data as to where from and what stage is pesticide getting into food chain and to in what extent. **Given the importance from the SPS guidelines and the Agreement on Agriculture our exports may face serious problems unless we take systematic steps. High level of pesticide residues are threat to even our own biological and ecosystems. Testing facilities/ infrastructure for quality control and pesticide residue testing in farm produce are required to be strengthened at central level as well in the States where these are lacking.**

### **Agriculture Marketing**

3.2.16 Efficient agriculture marketing system is indispensable for overall development of the country's economy. It creates healthy environment, smooth channels for transfer of produce, physical infrastructure to support marketing activities, easy cash support to

large family of scattered producers and also promotes market orientation among the farmers. There is a multiplicity of interaction and involvement of a large number of market functionaries/intermediaries with conflicting interests.

3.2.17 The prevalent market system is traditionally dominated by the traders. The appropriate and effective linkages between the producers and sellers continue to be weak in the chain of the marketing structures. Absence of infrastructure and improper management, coupled with lack of market intelligence and inadequate credit support has made the system unfavourable to the farmers. The adverse impact of all these is more pronounced on the economy of smaller and marginal farmers, who constitute about 78 percent of the total farming community in the country. The overall position of types and number of agricultural markets is given in Table- 3.2.

**Table-3.2 Status of agricultural markets. (as in August 2001)**

<b>Markets</b>	<b>Type</b>	<b>Numbers</b>
Agricultural Markets	Wholesale Markets	7304
	Rural Primary Markets	27294
	Total	34598
Regulated Markets	Principal Markets	2355
	Sub-yards	4822
	Total	7177

3.2.18 The primary rural markets are a first contact point for the rural producers and sellers. These are 27000 scattered across the country. These are, however not equipped with basic facilities like platforms for the sale and auction, electricity, drinking water, link roads, traders' premises, facilities for post harvest management etc. These markets, therefore, require attention for price competitive marketing and attract more and more buyers.

3.2.19 APMCs and the marketing boards have accumulated substantial amount of savings in the form of market development funds, which were supposed to be ploughed back for development of infrastructure and services in the regulated market. However, the development has remained entirely unsatisfactory. Infrastructure facilities and services in these markets are essential. Efforts, therefore, are needed to involve these agencies for upgradation of infrastructure facilities with their resources.

3.2.20 The quantum of market arrivals of agricultural products and trade volume has been enormously increasing in and around cities and metropolis. Therefore, it is time now to promote alternate and mega markets, especially near big cities and metro-poly. These markets should be given encouragement and allowed to function outside the purview of APMC Act.

<b>Fruit &amp; Vegetables Auction Market</b>
At present, the State Governments alone are empowered to set up markets for agricultural commodities which are regulated.
Though such markets have achieved limited success, monopolistic practices have prevented the development of efficient and transparent agri-marketing, the use of modern pre- and post-harvest technologies, the setting up of quality standards and their enforcement.
The Government of Karnataka has taken the lead in amending the Agriculture Produce Market Act (APMA) to facilitate NDDDB to establish, own and operate auction markets in Karnataka.
The market would have backward linkages with farmers and forward linkages with consumers.
The objective is to modernize horticulture produce marketing to make the entire chain from farmers to consumers more transparent and efficient.
Source: NDDDB-Anand

3.2.21 The basic objective of setting up of the network of markets is to ensure reasonable gain to the farmers by creating conducive environment for fair play of supply and demand forces, regulate market practices and attain transparency in the transactions. Apart from dealing with current imperfections and shortcomings, Government has recognized the importance of liberalizing agriculture marketing in the wake of World Trade Organization regime and SPS Agreement. A number of economic reforms have been taken up to promote market orientation in the economic activities by the private sector. An Expert Committee under the chairmanship of Shri Shankarlal Guru was constituted for recommending, strengthening and development of agriculture marketing system in the country. The Committee has since given the Report and made a large number of observations and recommendations for reforming the current market structures and the practices (See box).

3.2.22 The recommendations made by the committee are quite comprehensive and cover the entire gamut of prevalent marketing structures and deficiencies in terms of policy measures, regulatory framework and infrastructure requirements. The suggested

package is sound to provide for introducing necessary changes in policy and modalities for development of required infrastructure.

**Recommendations on marketing by the committee headed by Shri Shankarlal Guru**

1. Physical markets with facilities and services would attract the farmers and the buyers which will create a competitive trade environment and result in offering best of the prices to the producers and sellers.
2. The institution of regulatory market has achieved a limited success and acted more as a restrictive structures.
3. Marketing liberalization and overcoming the constraints faced by the various organizations , including private sector is necessary.
4. There is a need to establish vibrant, dynamic and assimilative marketing structures and systems in the wake of domestic and global liberalized scenario.
5. There is a need for a thorough overhaul of existing policies, rules, regulations, legal provisions inhibiting free marketing system.
6. Private sector, corporate, joint ventures need to be encouraged with suitable policies and incentives to set up markets for free and competitive trade.
7. Modernization of infrastructure is essential for development and operational efficiency of the markets.
8. Commodity exchanges have to be institutionalized and their scope increased to instill confidence and awareness among market players.
9. Managerially competent and administratively viable organizations are required to administer marketing structures. The functions of APMCs and Marketing Boards have to be remodelled towards this end.
10. Regulations such as registration/licensing, traded commodity coverage, control on packaging and labeling, laws affecting market places and control on movement of produce, volume of commodities traded, laws relating to access to credit and capital dispute resolution mechanism need to be reviewed and a framework worked out , keeping in view the current domestic and global scenario..
11. Direct marketing is one of the alternative marketing structures that needs to be promoted. This will economize upon transportation cost and improve price realization. The role of the private sector may be encouraged outside the purview of Agriculture Produce Marketing Committee (APMC) Act.
12. Cooperatives will have to be freed from the shackles of politicians and bureaucrats.
13. Information system in terms of portal websites, data bases, information packages and other software generic as well as customized on agriculture marketing has become indispensable. All these need upgradation and promotion.
14. The commodity coverage under Forward Contracts may be enlarged to facilitate competitive and free marketing system, which will also minimize price fluctuations across the regions and during the seasons.
15. Pledge financing enables the usage of inventories of graded produce as collateral. The and the existing limit on priority sector credit should be revised upwards. A full-fledged agriculture marketing credit policy needs to be re-designed. All financial institutions : RBI, NABARD, commercial and cooperative banks may work out a detailed exercise.
16. Public sector to play important role in remote and difficult areas for marketing.
17. Specialized market for fruits, vegetables and other horticulture products may be promoted with comprehensive and efficient infrastructure facilities.
18. Mega markets and/or alternate marketing structures with the involvement of private, public, cooperative or joint ventures may be promoted on a large scale for efficient marketing of perishable and other agriculture products. These need to be encouraged outside the purview of APMC Act.
19. Professionalization of the personnel in the marketing structures and their training modules and facilities need upgradation and improvement.
20. Infrastructure for quality assurance specially for perishables, standardization, grading and quality control infrastructure needs to be promoted with the Government support.

## **Exports**

3.2.23 Agricultural Exports are prominent in the country's merchandise export basket. The range of the products is as diverse as the prevalent agro-climatic conditions of the country. Cereals, oil, oilseeds and oil meals, pulses, horticulture based products, both fresh and in processed form, jute and cotton, dairy and products, poultry, meat and products etc are regularly exported to many countries. Over the years however, the share of agricultural exports in total exports has been declining on account of diversification of the country's export basket and falling international prices of agricultural products (Table-3.3).

**Table-3.3: Agricultural Exports and Share in Country's Total Export**

(Rs. in crore / US\$ in Million)

Year	Value of Agri-Export		Country's Total Export		Percentage of Agri-Export in Total Export
1960-61	284	(596)	642	(1346)	44.24
1970-71	487	(644)	1535	(2031)	31.73
1980-81	2057	(2601)	6711	(8486)	30.65
1990-91	6317	(3521)	32553	(18143)	19.41
1991-92	8228	(3338)	44041	(17865)	18.68
1992-93	9457	(3265)	53688	(18537)	17.62
1993-94	13021	(4151)	69751	(22238)	18.67
1994-95	13712	(4367)	82674	(26330)	16.59
1995-96	21138	(6320)	106353	(31797)	19.88
1996-97	24239	(6828)	118817	(33470)	20.40
1997-98	25419	(6840)	130101	(35006)	19.54
1998-99	26104	(6205)	139753	(33218)	18.68
1999-00	24576	(5671)	162925	(37599)	15.08
2000-01	27423		202509		13.54

( ) Figures in parentheses indicate value in US\$.

Source: Economic Surveys.

3.2.24 The most important aspect of the agriculture export is that majority of the agricultural products are net foreign exchange earners in that the import content is either nil or negligible, unlike many manufactured and industrial products, where import content in terms of raw materials and machinery use to be very high. World Trade Organization (WTO) regime has opened new opportunities for developing countries and India can hope to have substantial growth of exports in coming years.

3.2.25 The relative share of agricultural exports in the country's total exports has been declining as may be seen from the following **table-3.4**. The share of agricultural exports declined from 20.40 percent in 1996-97 to 13.54 percent in 2000-01. Such a situation is unavoidable as the share of non-agricultural export grows faster. Moreover, the export earnings per unit product have also been declining for agriculture in recent years. The value of agricultural exports during 1996-97 was Rs. 24239 crore. There was, however, a set back in 1999-2000 and agriculture exports declined by more than 9 percent over previous years. During 2000-01 exports stood at Rs 27423 crore. There was thus, a rise of 13.14 percent in four years.

**Table-3.4: Agricultural Exports and Share in Country's Total Export**

( Rs. in crore / US\$ in Million)

Year	Value of Agri-Export	Country's Total Export	Percentage of Agri-Export in Total Export	% change over previous year	
				Agri. exports	Country's total exports
1996-97	24239 (6828)	118817 (33470)	20.40	-	-
1997-98	25419 (6840)	130101 (35006)	19.54	4.87	9.50
1998-99	26104 (6205)	139753 (33218)	18.68	2.70	7.42
1999-2000	24576 (5671)	162925 (37599)	15.08	- 9.06	16.58
2000-01	27423	202509	13.54	11.59	24.30

Source: Economic Surveys.

3.2.26 Some of the constraints inhibiting growth of agricultural exports are given in box.

<b>Common constraints on exports of agricultural exports</b>	
1.	Restrictive and ad hoc trade policy regime towards agricultural products;
2.	High cost of production and export transactions;
3.	Lack of sound and efficient infrastructure for post harvest;
4.	management such as storage, cold storage and bottlenecks at mandis;
5.	Insufficient and inadequate storage and handling facilities at ports of shipment;
6.	Absence of adequate and timely market intelligence for the producers and exporters;
7.	Poor quality of the products and absence of standard, presence of high level of pesticide residues;
8.	Poor quality assurance system and absence of certification system to conform to international requirements;
9.	Lack of modern and technologically sound certification agencies and laboratories;
10.	Absence of appropriate technology protocols for handling, storage, transportation;
11.	Inadequate efforts in market development and brand building;
12.	Over-dependence on few markets.

3.2.27 Many of the issues concerning increasing production, improving quality and productivity and expanding state-of-art, modern infrastructure have been dealt with separately elsewhere in preceding chapters. However, roadmap of product specific export strategy is necessary, keeping in view the potential and international requirement for each product or its derivatives. The recommendations for major product groups are discussed in the following paragraphs.

3.2.28 There is a large potential for **organic farming** in India due to large cropped area and wide range of agro-climatic conditions. Many products are grown without application of fertilizers or pesticides in rainfed areas. International demand for organic food is burgeoning. However, international regulations require certification of organic farms by accredited agencies. Presently cost of certification is prohibitive and out of reach of small farmers. Therefore urgent efforts are needed to establish a certification system, which conforms to, internationally prescribed norms, guidelines and quality

system etc. Enforcement mechanism, through appropriate schemes, should be evolved as soon as possible. Collaborative institutions must be identified immediately, which can undertake certification.

3.2.29 Because of higher cost of production, India has no competitive advantage in **cereals** in the international market. However, it has competitive advantage in export of basmati rice, and possibly organic rice. There is tough competition from South East Asian countries in export of non-basmati rice. Some quantity of wheat and non-basmati rice has also been exported. There is good demand for Indian maize in neighboring countries, but as at present the domestic demand prevents a thrust in this regard. Exports of cereals suffer from infrastructure constraints and quality parameters. Even if physically available, the poor infrastructures have stood in the way of timely delivery of commodities, which require bulk handling. Therefore, efforts may be made on priority to set up modern storage and bulk handling facilities at producing centers and at the ports of shipment. Research and development support may be given to reduce breakage of rice and improve upon whole rice recovery and other quality parameters.

3.2.30 **Oilseeds** such as Groundnut and sesame seeds are regularly exported. Hand picked and selected (HPS) groundnut fetch high price. Presence of aflatoxins has posed serious threat to country's groundnut export to Europe. Effort therefore, are needed for introducing strict quality control regime and inspection system with a focus on cleaning, grading, developing, drying system and suitable storage structures to control and maintain safe moisture levels in the products.

3.2.31 Export earning of **fruits and vegetables** was Rs 647.22 crore and that of processed fruits and vegetables was Rs.993.64 crore in 2000-01. Export earnings from floriculture was Rs 132.65 crore during 2000-01. There has been consistent buoyancy in export of these products over the years. Apart from developing and modernizing infrastructure like storage, cold storage, etc, immediate steps must be taken to establish Agri-Export Zones in high potential producing regions. Product specific protocols such as Controlled Atmospheric protocol (CAP), Modified Atmospheric Packaging protocol (MAP), etc. should be evolved with the involvement of trade and industry. Common

facilities like collection centers, sorting, cleaning, grading, pack houses auction platforms etc must be created on a large scale to meet demand in domestic markets as well as overseas market.

3.2.32 India is a largest producer, consumer and exporter of **spices**. Spices are the traditionally exported products. There is tremendous scope to provide a boost to spices export, especially in value added form. Establishment of drying yards at producing centers with the facilities like cleaning, grading, processing, dehydration etc is essential to assure quality of the products. Spices processing facilities may be promoted at Agri-Export Zones, wherever they exist. Strict quality control measures with inspection system are required to maintain country's traditional image in international market.

3.2.33 India is largest producer, processor and exporter of **cashew**. A large quantity of raw cashew is being currently imported, because of inadequate domestic production to meet internal and export demand. Although, cashew production in Maharashtra has increased substantially in recent years but processing facilities are inadequate. There are 1098 processing units in the country and mostly located in southern states. However, the level of technology of the processing units has been very poor and needs upgradation. Promotional efforts, therefore, are called for to set up processing units with current quality trend in international market.

3.2.34 There are major constraints in development of trade of **meat and poultry products**, although vast potential exists in international market. These are (i) prevalence of disease in animal, (ii) unhygienic abattoirs, (iii) lack of inspection system, etc. Efforts, therefore, are needed to overcome these constraints to the extent possible. Tenth plan strategy therefore has to focus on ;

- Setting up of new modern abattoirs exclusively for export,
- Upgrading the existing abattoirs with hygienic facilities,
- Upgrading quality control and inspection system,
- Strengthening laboratories and infrastructure for quality control checks and inspections,
- Exploring new markets, and
- Promoting value added products.

3.2.35 The value of export of **marine products** was Rs. 6368 crore in 2000-01 and accounted for 23.2 percent in the total value of agricultural exports. Special efforts are required to provide further boost to this sector in the form of (i) upgrading standards to meet new standards of EU and USA, (ii) development of cold storage and cold chain, (iii) development of fish handling and processing infrastructure, (iv) R.& D. thrust on tackling white spot virus disease on shrimp, (v) use of remote sensing facility to get the idea of optimum catch, (vi) adoption of modern methods of fishing and (vii) promotion of value addition in fish products like surimi, sausages, pickles etc. These issues must be addressed on priority.

3.2.36 **Guar gum** has wider industrial application such as binding, thickening, film forming, lubricating agent in oil drilling, textiles, printing, human and pet food, paper, explosives, water treatment etc. The value of export of guar gum was Rs 53 crore in 1999-2000, which increased by more than 9 percent to Rs 590 crore in 2000-01. Domestic guar gum industry suffers from many problems. These are : speculative and unpredictable raw material prices, absence of forward trading mechanism, lack of R. & D. facilities and information system, absence of testing laboratories and arrangement for issuance of phyto-sanitary certificate. Therefore, promotional measures for export should be undertaken to overcome these problem areas. Testing laboratories are required in guar gum producing states like Rajasthan. Gujrat and Haryana. Adequate support therefore, may be provided for establishing the testing laboratories in these states.

3.2.37 India is immensely rich in **medicinal and aromatic plants**, occurring in diverse eco-systems. A resurgence in the study and usage of medicinal plants has been observed in recent past. The production, consumption and international trade in medicinal plants and phyto-medicines are growing. India has a good opportunity in expanding trade of these products. However, there are many constraints in growth and systematic exploitation of this important sub-sector. These are : (i) absence of scientific system of collection, (ii) unorganized trade, manipulative and exploitative practices, (iii) Indian industry focuses more on primary processing, (iv) industry also faces a problem of availability of adequate and timely raw material (v) limited industrial research and clinical trials.

3.2.38 Since, there is tremendous demand, both internally and internationally, more focused attention is required towards these group of plants. A long term plan is also essential for fuller utilization of potential and expansion on a large scale. To begin with, focus should be given on the following broad aspects.

- (i) Preparation of plant specific CD-ROMs, cultivation practices, post harvest protocols,
- (ii) Undertake clinical trials and formation of national level association of practitioners,
- (iii) Selection of locations of plantations, research in high yielding and short duration varieties,
- (iv) Development of nurseries, promotion of tissue culture practices, training and extension support to the farmers,
- (v) Promotion of community level processing, standardization, grading and marketing through regulated markets,
- (vi) Providing fiscal incentives in terms of lower or zero taxes of all types and subsidization of various programmes of activities,
- (vii) Improvement of data base with regard to area, production, usage, export, import etc.

### **Removal of all restrictions**

3.2.39 The Central Government decided to treat the entire country as a single food zone for inter-state and intra-state movement of foodgrains and advised the State/UTs to take necessary action accordingly. However, almost all the states, except Manipur have issued control orders, most of which are in respect of regulation of trade in foodgrains and other agricultural products and matters related to. However, almost all the States/UTs have issued Licensing Orders which prescribed that any dealer (wholesaler or retailer) requires to take a license if dealing in specified commodities and in quantities in excess of those prescribed. The commodities covered by such licensing requirements are mostly foodgrains including rice/paddy, wheat, pulses, oilseeds, edible oils and sugar. Under the licensing orders, some of the States/UTs have also prescribed maximum stock limits for other dealers, the limits varying from State to State and within the State from commodity to commodity. Some of the States/UTs have issued paddy/rice Levy orders. Under these orders, licensed dealers and millers are required to give a prescribed

percentage of the paddy/rice to the State/UT at notified prices. Under the paddy/rice Levy Orders, some of the States/UTs have also imposed restrictions on movement of paddy/rice. They can be transported only on the strength of permits/release orders which were issued after the levy obligation has been complied with. Market distorting orders issued under Essential Commodities Act depict the mindset of 1950s. A clean break from the past is what should be attempted. We need to move forward. Farmers will produce more and adopt technologies to improve productivities when there are sufficient incentives for them to do so.

3.2.40 In the context of demand of farmers and also keeping in view the facts that we have a sizable stock of foodgrains **there should be no restrictions on movement not only on foodgrains but on any of the agricultural produce.** The National Agricultural Policy has also referred to liberalizing the domestic agricultural market and all controls and regulations hindering increase in farmers' income as to be reviewed and abolished to ensure that agriculturists receive prices commensurate with their efforts, investment. The Policy also mentions about progressively dismantling the restrictions on the movement of agricultural commodities throughout the country. The Expert Committee on Strengthening and Developing of Agricultural Marketing (Shankarlal Guru Committee, June, 2001) has also given various recommendations in this regard. The free movement in the domestic markets would lead to movement of commodities from surplus regions and provide farmers access to bigger market and remunerative prices of their produce. **There is a need to remove restrictions on the movement of foodgrains and other agricultural commodities within the country through a central act so that farmers could get the right price for their produce and consumers benefit in terms of cost and quality.**

#### **Forest and natural resource management.**

3.2.41 Enabling environment should be created to involve rural people to prevent, arrest and reverse degradation of life support systems, particularly land and water, so as to produce biomass in a sustainable and equitable manner. Capacity building of grass root organizations in planning, monitoring, implementation and marketing should be the

future strategy. At present the three life support systems i.e. land, water and forests remain un-integrated administratively and management-wise.

3.2.42 Panchayats should be involved and their involvement should include transfer of funds to such village level bodies, including user groups, who should handle funds and the job of Government agencies should be to facilitate and train rather than to control funds. Where Panchayats represent several villages, single village organizations, as sub-units of panchayats should be created, where the land in question is appurtenant to one village only. If many villages are sharing a resource, conflict management may be difficult.

3.2.43 The ownership and control over revenue wastelands should be transferred to PRIs and village organizations to ensure certainty of tenure. In ex-ryotwari states, transfer of revenue lands to Panchayats has still not been done, which makes it problematic to the Village Panchayats to 'own up' efforts on such lands. Besides, there should be a common programme with common guidelines for all watershed development programmes and efforts should be made to integrate similar programmes of all Ministries of the Government of India. The watershed development programme should be implemented as a 'single initiative' as a perspective plan to treat/cover entire degraded/rainfed land in a time bound manner.

**3.2.44 The other important area to consider is the development of agro-forestry/tree farming which has not received the attention it should have been paid.** The Government's present policies with respect to import of timber are also discouraging the development of farm forestry. If proper policy initiatives are taken it would be possible to develop the agro-forestry in the country which will not only help in conservation of forests and soil and water resources but also provide livelihood support to farmers, especially to resource poor landless farmers. If proactive policies are implemented to develop wastelands which are either unutilized or underutilized it could be covered under agro-forestry in addition to other uses. By initiating appropriate measures and policy changes all the grey areas, wastelands or rainfed lands has to be converted into 'green areas' so as to help generate the income of rural population and

also increase the productivity of such lands. India has vast areas which are though unfit for growing crops, are good for growing trees/forests. A pro-active policy to utilize them with vastly improved productivity can convert these areas into useful community assets. They will provide tree cover, yield food, feed & fodder and timber. Environmentalists say that water is the primary produce of forests. Aggressive afforestation would help in restoration of hydrological cycles disrupted in many of our ecosystems.

3.2.45 The sustainable development and use of water resources would be essential for the development of agriculture including the activities like agro-forestry, tree farming, etc. About 60% of the net sown area is still dependent on rainfall and it would be difficult to bring the entire agriculture under irrigation as the water resources limited and the ultimate irrigation potential assessed is only for 139 million ha. Therefore, **the rainwater harvesting and conservation and judicious utilization of ground water would be necessary for the sustainable development of agriculture and providing water to people for other activities including for drinking purposes.** The practices adopted in utilization of ground water does not seem to be sustainable. Whereas in Eastern India, the utilization of ground water has remained sub-optimal, there has been over-exploitation of ground water in North Western India. The numbers of dark blocks have been increasing in most of the states where the rainfall is low. The Government policies in providing free electricity for harnessing the ground water is very flawed as it has resulted in mis-utilization of the energy and over-exploitation of valuable natural resource. Therefore, **in the areas where the ground water potential has remained untapped its harnessing has to be encouraged through proper support and policies. But in the areas of over exploitation, regulatory measures are overdue in the interest of sustainable use and development.** The rainwater harvesting besides helping the rainfed farming could also increase the recharging of ground water table. There is need to bring in convergence among the various Watershed Development Programmes being implemented by the different organizations in the country. Besides, the programme could be taken up at much larger scale with massive investment, so that a sea change could be brought in the rainfed farming development.

### **Enhancing the consumption capacity of poor**

3.2.46 In spite of the embarrassing stocks of foodgrains in the reserve pool, there is hunger and malnutrition in the country. As stated earlier, about 42.1% of boys and 40.8% of girls between 1 and 5 years are moderately or severely undernourished. About 74.3% children under 3 years and 51.8% of the married women between 15-45 years suffers from anemia. All these figures indicate that although we had a surplus stock of foodgrains, a large section of people have no access to it. This is obviously because of their low purchasing capacity. Unless the purchasing capacity of the BPL families is increased, the unconsumed stocks would be a bottleneck in faster development of agriculture. Procurement at Minimum Support Price (MSP) and allowing the stocks to decay is hardly sustainable. It has the potential of wrecking the country's banking/financial system. The remedy lies in transfer of income to poor through employment generation programmes to step up their purchasing power and also diversification of agriculture to horticulture, agro-forestry, tree cropping, dairying, fisheries, etc. which will generate more demand for labour. Besides, the wastelands could also be allotted to the BPL families to enable them to take up livelihood support activities. According to latest estimates, number of poor families in the rural areas of the country are about 35 million. What is needed is **an asset reform**, which in addition to land, includes livestock, fish pond and market-driven skills . Land distribution should be done wherever this is feasible. A condition can be incorporated that at least 50% of allotted land will be put under tree cover to achieve yet another larger socio-economic goal.

### **3.3 Convergence and Synergy**

3.3.1 For the agricultural development as well as for research in agriculture Ministry of Agriculture is implementing a large number of programmes. Besides, the State Governments under their State Plan also implement various programmes depending on the needs and problems. The private sector, especially the seed industry, fertilizer industry and agro-chemical industries have also been involved in the agricultural development besides their products specific research. Off late, the Non-government Organizations (NGOs) have also entered in the field of agriculture and are implementing various developmental programme for the uplift of the farmers and natural resource

development. The NGOs are mostly operating with the financial support from external agencies and also with the support of Government of India in some cases. However, most of the programmes are being implemented in isolation without much interaction or coordination. In the case of land resource development programmes are being implemented by three different ministries namely Ministry of Rural Development, Ministry of Agriculture and Ministry of Environment and Forests, at Centre. There is need to forge the linkages for implementation of similar developmental programme in an area.

3.3.2 Besides, many times different/ separate programmes are implemented by the State Government under the State Plan and by the Central Government in the form of Central Sector or Centrally Sponsored Schemes for similar objectives. This results in spread of resources very thinly and achieving little. It would, therefore, be desirable if the State Governments design their programmes, which would of course be based on the local needs, considering the resources being made available by the Central Government through their CSS/ CS schemes so as to plan for better management of resources and achieving a synergistic impact.

3.3.3 There seems a multiplicity of schemes implemented by the different divisions of a Departments for achieving similar objectives. This results in thin spread of resources and also adoption of different norms under different schemes. The Department of Agriculture & Cooperation have shifted from individual scheme approach to 'macro management' mode which will give more flexibility to States and also an opportunity in planning the programmes and strategy based on their local needs and situations. This approach could be adopted by all the departments in the centre with respect to implementation of most programmes for agriculture and rural development. However, in case of activities concerning natural resources management and food security where planning at country or regional level is required, should be implemented by the Government of India through CSS/CS Schemes.

### **3.4 Maximising the benefits of the existing infrastructure**

3.4.1 The present infrastructure to facilitate the development of agriculture in the wake of globalization is inadequate. It, however, seems that even the available infrastructure

is not being utilized to its full capacity. Irrigation potential for an area of about 94.73 million ha have been created. But, the utilization of the potential is only about 89.4%. Both under medium & major and minor irrigation schemes about 4.95 million ha and 5.15 million ha respectively of created potential is not being utilized. The non utilization of the created potential could be due to the lack of maintenance of the irrigation schemes and water distribution problems which are affecting the water use efficiency. Besides, a large number of irrigation projects which were started several years back have not yet been completed and there has been cost overruns. Over and above this, new projects have been taken up which too have not been completed. Therefore, priority of the Government should be to first complete all the uncompleted irrigation projects so that the benefits of investment made could be realised.

3.4.2 The storage and cold storage facilities in the country are limited. These facilities besides private sector are being run and maintained by different organizations of the Government of India/ State Governments. However, the overall capacity is far short of requirement. Wastages are the consequence, be it foodgrains, vegetables or fruits. Unless the post-harvest infrastructures of the agriculture system are provided, the agriculture growth will be hampered. Diversification will just not take off. Government should devote itself to these aspects too on priority.

3.4.3 We have only a rough idea that our land resources are severely degraded. However, there are no exact figures available that how much area is actually degraded and needs immediate attention. The estimates made by different agencies vary widely from 53 million ha to 239 million ha. The Soil and Land Survey is being looked after both by the DAC and DLR. Besides, the Ministry of Environment & Forests looks after the forests resources. There seems lack of coordination with respect to data generation and field implementation of programmes. It is estimated that there are over 500 field units including that of States working for land survey and land use planning but there is no complete scientific data base on survey of land and water resources. It would, therefore, be necessary to coordinate and forge the working linkages between different organizations in the country, both under Central Government and State Government so as to utilize their information and human resource optimally. Similar coordination may

be required in several other areas for utilizing the existing infrastructure to its full capacity so it can help develop the Indian agriculture.

### **3.5 Blending traditional and frontier technology.**

3.5.1 Frontier technologies like tissue culture, genetic engineering have created an unlimited scope for the development of agriculture by providing very high productivity potential material/organisms. These technologies will help improve the productivity by changing agriculture activities as a factory produce as has been happening in some developed countries. However, traditional wisdom which has been developed over the centuries cannot be abandoned/given up and will still remain relevant. Especially the traditional technologies in the field of rainwater harvesting and management, recycling of organic waste for plant nutrient supply, grain storage, preservation of fruits and other commodities, pest management, etc. have been found to be useful and relevant. Such technologies may have to be blended with the modern frontier technologies so as to have synergistic impact.

### **3.6 Integrated Natural Resource Management**

3.6.1 Sustainable development and utilization is necessary for accelerating the growth in agriculture sector. Presently the natural resources like land, water, forests, bio-diversity are being looked after by the different departments at the national level as well as the State level. The land resources management is the mandate of Department of Land Resources and water resources management is the mandate of Ministry of Water Resources. The agriculture development including land development and production is the responsibility of Ministry of Agriculture. Whereas the soil and water conservation and reclamation of problem areas is being taken up by the Department of Agriculture & Cooperation, waste land development is the responsibility of Department of Land Resources. The Watershed Development Programme for the development of degraded land, rainfed areas, waste lands and forests are being taken up by 3 different ministries. Although some common guidelines for the implementation of different programmes have been formulated norms under these programmes still differ and their seems lack of coordination, especially amongst the line departments of the State Governments. Priorities for activities of each department also differ. Such operational problems are

affecting the management and development programmes of natural resources at the field level. There is need to adopt the integrated approach for the development of natural resources. Unless the integrated concept is adopted, developmental programmes in isolation for different resources and by different departments may not bring desired results.

### **3.7 Disease free zones in Animal Husbandry**

3.7.1 In the post-WTO global scenario and World Trade Organization's SPS Agreement, the country is facing several constraints in international trade owing to the presence of various contagious and infectious diseases of livestock like FMD in animals, which acts as a non-tariff barrier. Office International des Epizooties (OIE) has approved the concept of Disease Free Zones, where diseases in the List A of OIE are not reported. The livestock and their products originating from such zones are accepted in the international trade, even if the country is not free from these diseases. The country is now provisionally free from Rinderpest disease. The Contagious Bovine Pluro-pneumonia is not a national problem as it is mainly restricted in Assam. If country has to make a dent into the export market for livestock products, there is necessity to create some zones that are free from FMD, Rinderpest and Contagious Bovine Pleuro – pneumonia.

3.7.2 This concept was conceived in 6<sup>th</sup> Five Year Plan (1980-85) to create such zones in the southern most and northern most region of the country. Subsequently, the FMD control project implemented initially in the Nilgiri Hills and later in the the States of Karnataka, Tamil Nadu and Kerala, controlled the incidence of the disease due to extensive coverage during the period when as per the project proposal, three rounds of vaccination were provided free of cost by the NDDB. There after, the farmers had to share the cost of the vaccination and this resulted in reduced vaccination coverage and increase in the incidence of the disease. However, the project was discontinued after the expiry of the project period. The Disease Free Zone scheme has been again taken up as a new scheme during 9<sup>th</sup> Plan period. A pilot project to create Disease Free Areas has been proposed for implementation during the last year of the 9<sup>th</sup> plan to generate scientific

information/data, which would be utilized in the formulation of the new scheme during 10<sup>th</sup> plan.

3.7.3 In order to make the programme successful in India, it would be pertinent that geographical boundaries like (rivers, mountains, deserts, difficult terrains and created boundaries) rather than political boundaries of the state are initiated in the first phase. The zone concept should be focused to the areas where there is export potential for meat, milk, skin/hide and other livestock products or the area from where the disease could be easily controlled and animals and animal products could be exported. While considering these factors, the movement of animals needs to be kept in mind. Proper planning and identification of zone would be the key factor for the successful control of Foot & Mouth Disease. Initial steps in this direction would be

- Formation of commission/authority or central command for the control of Foot and Mouth Disease; and
- Establishment / creation of National or International Center on Foot and Mouth disease as a nodal agency to coordinate and control FMD with adequate staff funded by the Ministry of AH & Dairying.

### **3.8 Organic Farming Zones.**

3.8.1 The demand of organic foods is increasing in the world and India must avail this emerging opportunity to utilize its vast and varied resources for the development and export of such foods. However, it would not be possible to make a dent if the organic food production continues in the isolated pockets. Specific areas/organic zones need to be identified to encourage the production of different crop commodities and livestock produce depending on the advantages in terms of agro-climatic conditions and land and water resources. The other factor which is the consumption level of agro-chemicals in agriculture in the different regions should also be considered while identifying the organic zones. The entire North-Eastern Region and most of the rainfed areas in the country have very low use of agro-chemicals. This status needs to be exploited. Such areas can be used for the production of different crops/livestock produce with the adoption of organic farming practices for export purpose as well as for our internal consumption. This approach will help increase the income of the farmers in these areas who have hitherto remain deprived of the benefits of Green Revolution.

3.8.2 However, to encourage the organic farming in a systematic manner, it would require to develop requisite infrastructure for production technologies, post harvest handling and certification. If fertilizers and pesticides are to be replaced by organic manures and bio-pesticides, the infrastructure for production of organic manure, bio-fertilizer, bio-pesticides and natural bio-control agents has to be put in place so as to ensure the adequate availability of organic nutrients and natural pesticides. Besides, special post-harvest and processing facilities has also to be created to support the organic farming practices in different zones of the country. The other important support that will be required for organic farming is the certification system. At present, except for spices and cotton, there seems no agency accredited by any international organization to certify the organic foods in the country. Unless such facilities are developed, the export of organic products will not be possible and the organic farming as such could not be developed.

### 3.9 Animal Husbandry & Dairying

3.9.1 Livestock production is an important source of income for the rural poor. It enables poor and landless farmers to earn income using common-property resources. The sector provides large self-employment to millions of households in rural areas.

Employment in Animal Husbandry sector was 9.8 million in Principal status, out of which 7.90 million

Livestock and Livelihood				
Holding size	% of total holdings	% of total area operated	% of total livestock owned *	
			Cattle & Buffalo	Sheep & Goat
Marginal	59.4	15	35.9	40.3
Small	18.8	17.4	21.8	27.8
Semi-medium	13.1	23.2	20.7	18.1
Medium	7.1	27.0	16.5	13.2
Large	1.6	17.3	5.1	6.7
<b>Total</b>	106.64 Million nos.	165.51 million ha	329.14 million nos.	132.55 million nos.

Source: Agriculture Census, 1990-91/ \* Input Survey, 1986-87

were in rural areas and 8.6 million in subsidiary status. Women constitute 71% of the labour force in livestock farming. In dairying, 75 million women are engaged as against 15 million men, while in case of small ruminants, the sharing of work with men is almost equal. The addition of milk and meat provides protein, calcium, vitamins, and other nutrients that are lacking in their usual diets. Besides providing food, the driving

force behind increased livestock production, they have other valuable uses. The poor, in particular, use fertilizer from livestock operations, especially when organic farming is getting importance. Livestock also store value and provide insurance for people who have no other financial market available to them.

3.9.2 The contribution of livestock sector to agricultural GDP has gone up over the years and was 22.6% in 1998-99. This is excluding the draught animal power; which in terms of Electrical Power equivalent would be Rs.31.50 billion. The contribution of milk alone (Rs.82, 624 crore) was higher than paddy (Rs.68, 230 crore), wheat (Rs.40, 323 crore) and sugarcane (Rs.23,314 crore). Against this, the investments of the Government of India including share of States in Animal Husbandry and

**Animal Husbandry and Dairying sector contributes about 22 percent of the value of the output from total Agriculture and allied sector.**

**Employment (1993-94) in animal husbandry sector was 9.8 million in principle status and 8.6 million in subsidiary status.**

**Women constitute 71% of the labour force in livestock farming. In dairying, 75 million women are engaged as against 15 million men, while in case of small ruminants, the sharing of work with men is almost equal**

Dairying Sector was extremely low and varied between 0.4% and 1.0%. The investments in Animal Husbandry & Dairying (AH&D) as a percentage to total investment of Government of India in 9<sup>th</sup> Plan was 0.4% only.

3.9.3. The rapid growth in livestock production is critical to designing policies that promote the incorporation of the rural poor into economically and environmentally sustainable growth patterns. Technology supported and demand driven livestock growth should be

**Technology supported and demand driven livestock growth will be the future engine for growth**

**A transition from subsistent livestock farming to sustainable and financially viable livestock farming, which will generate wealth and self-employment through entrepreneurship, is need of the day**

**External markets, an extremely important source of demand should be tapped aggressively**

**Abysmally low Public sector lending leads to poor capital formation**

the future engine for growth in this sector that ensures nutritional security, livelihood of rural poor and women empowerment. Population growth, urbanization and income growth both in India and developing countries are fueling a massive increase in internal and external demand for food of animal origin. Even for the rural poor, a significant portion of total energy and protein intake comes from animal products and this is

increasing over the years. The demand-driven growth should be used for food security and livelihoods of rural poor, and for environmental sustainability. Use of technological and marketing interventions in production, processing, and distribution of livestock products should be central theme of the future livestock growth. Technology support is imperative not only for enhancement of productivity but also for reduction of per unit cost.

3.9.4 Sustainable and financially viable livestock and poultry farming, which will generate wealth and self-employment through entrepreneurship, is need of the day. Creating an enabling environment in which farmers will increase investment in ways to improve productivity of livestock and building participatory institutions that allow livestock farmers to get vertically integrated with processors of livestock products and input suppliers/service providers are the nuts and bolts for such transition.

3.9.5. Broad frame-work of cattle and buffalo breeding policy recommended for the country since mid-sixties envisaged selective breeding of indigenous breeds in their breeding tracts and use of such improved breeds for upgrading of the non-descript stock. While the States accepted the framework, appropriate implementation of the same through field level programmes could not be done. Lack of interest in promoting Breed Organization/Societies and related farmers' bodies contributed to gradual deterioration of indigenous breeds. Majority of owners having indigenous breeds were not willing to accept AI, which was the major Government intervention for breed improvement. Eventually, the availability of good quality bulls needed for natural mating in the breeding tracts became scarce, leading to further deterioration of indigenous breeds in these tracts. That there had been large deviation from the laid breeding policy is quite obvious from the fact that crossbreeding which was to be taken up in a restricted manner and in areas of low producing cattle has now spread indiscriminately all over the country including in the breeding tracts of some of the established indigenous cattle breeds. Keeping in view the current concerns for sustainability, maintaining environment and bio-diversity and conservation of energy, there is a need for rethinking on the development and use of indigenous breeds for milk and draught. A breeding policy focused on improvement of draught power is crucial for the regeneration of the rainfed

areas as well as the hilly terrains. Considering that over 60% of the total arable land in India is rainfed, which would constitute the Organic Farming Zone, appropriate breeding programme for enhancement of draught power is crucial for maintaining future self-sufficiency in foodgrain production. The country has advanced in the area of newer reproductive technologies, which can be of tremendous advantage for progeny testing and rapid multiplication of elite germplasm. The future policy needs to be dynamic and consider *inter alia* demand for milk, requirement of draught animal power for agricultural and transportation purposes, necessity to conserve breeds in their breeding tracts, farming systems, production environments and availability of inputs as well as marketing channels.

3.9.6. It is desirable that the government should initiate steps to create incentives for breeding indigenous elite breeds and improve them through selection. A Central Cell for certification of sperm station and bulls should be established in the DoA&D, GOI. Regional inspection and evaluation Cells consisting of technical experts should be established in the regions to assist the Central Cell in the inspection and certification of sperm stations and AI bulls. Advance technologies like ETT and OPU-IVF should be used to support this programme.

3.9.7. Conservation of threatened breeds of livestock should be a national priority to maintain diversity of breeds. A national livestock conservation act needs to be enacted. The Department of Animal Husbandry and Dairying has not so far evolved an accreditation system of breeds of various species of livestock in this country so that registration programme of accredited breeds could be translated into development of breeders' societies which would undertake breed improvement as well as in-situ conservation. Beside in-situ conservation, modern reproductive techniques utilizing genetic engineering should be used for ex-situ conservation of livestock. Some of these are now being commercially used e.g. embryo transfer technologies including splitting, cryo-preservation and cloning. This would call for building up institutional structure and human resource development in advanced reproductive technology.

3.9.8. Ever since draught power was allocated to Ministry of Non-Conventional Energy Sources ((MNES), very little developmental work has been done. For the development and efficient utilization of draught animal power in the country, the Ministry of Agriculture should work as a nodal ministry. A National Center for Animal Energy Development can be established under the Department of Animal husbandry and Dairying as a Central Sector Scheme to coordinate all the activities related to the efficient utilization of DAP in collaboration with other Ministries/Departments. A new programme focused exclusively on improvement and conservation of draught breeds of livestock may be initiated during Xth Plan.

3.9.9. Most of the livestock services like A.I, vaccination, deworming etc. are time sensitive which Government institutions at times are not able to deliver due to financial as well as bureaucratic constraints. This necessitates the need for providing efficient and effective decentralized services in tune with the demands emanating from the users. Such services should be delivered at farmers door and linked with cost recovery for economic viability. However limited Government involvement should be continued for people below poverty line who are vulnerable, illiterate and unable to integrate with the main stream by only providing funds to the Service providers.

3.9.10. The importance of feed and fodder in livestock production hardly needs to be emphasized. Mid Term Appraisal of Ninth Five Plan says ‘ Attention is needed for cultivation of fodder crops and fodder trees to improve animal nutrition. The area under permanent pasture and grazing land has been estimated at 11.06 million ha. However, actual availability appears to be much less. An integrated approach for regeneration of the grazing lands need to be evolved.’ Due to improper management of common property resources and lack of coordination between different agencies involved, the productivity as well as carrying capacity of the present public and forestland are decreasing. This problem needs to be addressed on priority for sustainable and economic livestock production. Serious efforts should be made for green fodder production and conversion of crop residues into energy and oil meals into usable protein by animals. Availability of quality fodder seed has been identified as a major constraint for fodder production and needs to be addressed. A separate distinct feed and fodder development

authority be established within the department of animal husbandry with necessary technical manpower to undertake inter-agency coordination in fodder production, fodder seed production, conservation and regulate the quality of feed.

3.9.11. The three major sources of fodder supply are crop residues (paddy straw, wheat bhusa), cultivated fodder and fodder from common property resources like forests, permanent pastures and grazing land. The inadequacy in fodder availability, both dry and green fodder has been one of the major problem in development of animal husbandry and dairying sector. It is estimated that during years 2000, the availability of fodder remained in short supply by about 47%. The shortage remained acute/deficit that of dry fodder by 22%. Due to the extensive use of combine harvesters, especially in states like Punjab and Haryana a large portion of the paddy and wheat straw is either left in the field and burnt or becomes unfit for fodder purpose. In the coming years, the use of machinery is projected to increase which will further affect the availability of crop residues. The area under cultivated fodder crops has almost remained static for the last 3-4 decades except the areas that have developed intensive dairy production where production of fodder crops has increased. The area under permanent pastures has been declining over the years and the trend could well continue in the future. Due to overgrazing, the productivity of the pastures has been declining too.

3.9.12. In order to meet this gaping deficit, intensive efforts are required for increasing the production and efficiency of supply. The niches to be targeted for increasing the production and the corresponding potential are expansion of area under Joint Forest Management from the present level of about 10 million ha to 15 million ha, treatment of culturable wastelands (about 14 million ha) and area under problem soils (about 11 million ha), promotion of intensive/improved fodder production technologies in cultivated fodder areas, scientific utilization of traditional pastures. In addition some strategies like establishment of fodder banks, conversion of fodder into feed blocks, enrichment of straw/stover with urea, use of chaff cutters, hay/silage demonstrations, production of fodder seed and emphasis on fodder production in the watershed programme are required to increase the supply of fodder in the various regions of the country.

3.9.13. At present very small portion of the total grains (hardly 3%) produced in our country is utilized for livestock and poultry feeding. Rice bran, rice polish, wheat bran, maize bran etc. largely used at farm level as well as commercial ingredients in feeds. Their availability is directly related to the production levels of main cereals. Rainfed and arid zone areas present enormous prospects for production of feed grains. Oil meals play a very important role as excellent protein cum energy supplements in livestock feeding. The availability of oil meals for livestock feeding is related to the enhancement of oil seed production and the availability of the residual meals for domestic consumption. The mustard cake is substantially used in the northern and eastern parts of the country, but the quality of the cake varies widely and in many cases adulterated with rapeseed meal or taramira cake. Groundnut cake is also exported from the country. The oil seed cakes/meals must be made available introducing strict export import regulatory measures.

3.9.14. India produces 500 million tonnes of crop residues but this has not been properly used to feed 400 million livestock. An effort is needed to use biotechnology in breaking lignocelluloses ring in the plant cell wall to produce lignin and cellulose. The major problem with majority of oil cakes is that besides containing proteins, it contains large number of incriminating factors like toxins, anti-growth factors and many oxidants, which bind the protein and make it unavailable for the animals. We need investment for the development of technology so that crop residues (mainly straw) and oil cakes could be used by animal efficiently. The Department of Animal Husbandry and Dairying should have a special R&D fund to encourage institutions (both in public and private sector) to undertake result oriented and time bound projects in these area. Inadequate information is available on what feed and fodder livestock (cattle, buffalo, goat, sheep, pigs and poultry) consume daily under various field conditions in villages/towns/metro cities in different regions. In the absence of this information all kinds of estimates about feed grain intake, nature of feed grains used or its quality can at best treated as informed guesses. There is thus a need of a central sector scheme for establishing a database on various feeds and fodder resources, feeding practices and consumption patterns in various agro-climatic zones and these data updated every two years. This also needs to be linked through input and output profiles of various animal products as cost benefit studies.

3.9.15. A legislation need to be enacted to regulate the quality of compounded feed sold in the market be put in place.

As a start, all the bags of feed should exhibit the composition and the ingredients should be displayed on the packaging material. It is also suggested

**Quality fodder seed, a major constraint for fodder production**

**Legislation to regulate the quality of compounded feed.**

**Use of biotechnology in breaking lignocelluloses ring in straw to produce lignin and cellulose.**

**Development of technology for effective use of oil cakes.**

**A database on various feeds and fodder resources, feeding practices and consumption patterns in various agro-climatic zones**

that feed grain be separately allocated by Food Corporation of India at reduced rate to the feed compounded industry for producing good quality compounded feed( in pellet form).

3.9.16. The issue of reduction of surplus cattle was dealt in the Second Five Year Plan. It noted that the fodder and other resources of the country were grossly inadequate even for maintaining the existing cattle population. A complete ban on the slaughter of all cattle would tend to increase their number further and to jeopardize the well being of the limited number of good cattle, which the country possesses. In defining the scope of bans on the slaughter of cattle, states should take a realistic view of the fodder resources available and the extent to which they can get the cooperation of voluntary organizations to bear the main responsibility for maintaining unserviceable and unproductive cattle with a measure of assistance from the Government and general support from the people. The above recommendations made in the Second Plan are valid even today.

3.9.17. So far, the Government policy in dairy sector has been to give preference to the establishment of milk processing plants selling liquid milk particularly in urban areas. This policy was guided by an overall shortage of milk and the national milk production falling short of nutritional requirement during the earlier years of planning era. But the scenario has changed from milk shortage environment

India is currently the largest producer of milk in the world.

Investment in the dairy sector has been reduced drastically in the Ninth Plan

Out of 168 Milk Unions, 105 Milk Unions were running in loss as on 31.3.2000. These loss making unions handled about 35% of the milk of the cooperative sector.

Appropriate policy measures would need to be worked out to give a fillip to unorganized sector involved in the production of Indian dairy products like ghee, paneer, channa, khoa etc.

to a conducive environment that will enhance demand so that growth rate of milk production is stimulated and the farmers get remuneration price. Appropriate policy measures would need to be worked out to give a fillip to the organized industries as well as unorganized sector involved in the production of Indian dairy products like ghee, paneer, chhena, khoa etc. Use of information technology in village dairy cooperative societies would enable the farmers to capitalize on opportunities and protect them from exploitation.

3.9.18. The discretionary power for registration/licensing needed for setting up of new dairy plants under Milk and Milk Products Order (MMPO) has become irrelevant in the new economic policy framework. This should be deleted and the MMPO should concentrate on its mandate of quality and food safety only. The reasons for regional disparity in milk procurement and growing number of sick milk unions created during OF programme are to be identified and corrective actions are to be taken immediately. Although the milk industry under organized sector has shown fast growth in the last

three decades, it handles only about 30-35% of the milk marketed whereas 65-70% of the market share is still in the hands of unorganized sector. Innumerable vendors, small processors, merchants, manufacturers and retailers of indigenous milk products characterize the unorganized sector. Time has come to bring about structural changes

The discretionary power for registration/licensing needed for setting up of new dairy plants under Milk and Milk Products Order (MMPO) has become irrelevant in the new economic policy framework

NDDDB should zero in on the dairy development activities all over the country both in organized and unorganized dairy sectors.

The private poultry industry has now come into **its own and poised to become a major export oriented industry**

in the unorganized sector; programme should be designed and implemented to. NDDDB should zero in on the dairy development activities all over the country both in organized and unorganized dairy sectors.

3.9.19. In India, meat production is largely a byproduct system of livestock production utilizing spent animals at the end of their productive life. Cattle and buffaloes, which contribute about 60 % of total meat production, are primarily reared for milk and draught purpose and in the end utilized for meat purpose subject to many limitations. At current prices (1998-99) meat group contributed Rs 21900 crore and meat products Rs 828 crore

while byproducts comprising largely hide and skins contributed Rs 2232 crore. Meat production was estimated at 4.6 metric ton (1998) with an annual growth rate of 4.1% during the last 10 years. Salvaging buffalo calves in urban areas from early death is an important requirement as the mortality in urban buffalo calves is reported to be 60-90 per cent for various reasons. There are about 5.74 million buffalo calves that need to be saved from early death.

3.9.20. India has over 2000 markets where livestock are traded which are not developed on scientific lines. Wholesale marketing margins amount to about 30% of the consumer price. Market facilities are generally inadequate and if available are poorly maintained. There are 2702 slaughterhouses in the country, which are recognized or authorized by local bodies. In addition a considerable number of animals are slaughtered in unauthorized places. A rough estimate indicates up to 50 percent of animals slaughtered in any urban center are from unauthorized slaughter. Compared to 1951, livestock population increased by about 62 percent and human population increased by 134 percent but the number of authorized slaughterhouses have not increased to meet the demand for meat production. Condition of many of the urban slaughterhouses is far from satisfactory. Establishment of rural abattoir linked with consumption centers at cities and towns could be an alternative with many added advantages. Government should recognize that culling and utilization of surplus animals is an established norm for animal production and improvement. Animal preservation acts of the states need to be reviewed so that constraints, if any, affecting proper utilization of livestock could be removed. Registration of the all slaughterhouses in the city/town is must for clean meat production and protection of the environment. Establishing Rural Based Abattoirs (RBA) in animal tracts would drastically reduce the need for transportation of live animals to urban areas for slaughter. During 10<sup>th</sup> Plan at least one carcass utilization plant be established in each district so that dead and fall animals are processed and farmers are paid for hide and bone and no aircraft are destroyed due to bird hits. The buffalo male calf mortality is exceptionally high due to starvation and negligence of the owners in city dairies. These buffalo calves could be saved and reared for meat production and other purposes like breeding and draught power.

3.9.21. Indian meat exports started with as small a quantity as 2000 tonnes in the year 1973-74 and increased to about 60,000 MT by 1987-88 valued at Rs.88 crore. During last decade (1991-2000) buffalo meat export was 93% of total meat export in quantity terms and 88% in value terms. The number of countries to which Indian meat is exported has increased from about 30 in 1994-95 to 50 in 1999-2000. The potential advantages of Indian meat exports include: large raw material resource, price competitiveness, cheap labor costs, proximity to importing countries, and preference for Indian lean meat produced on natural grazing and liberalized economic policies. Major constraints affecting Indian meat exports include: livestock disease situation (prevalence of foot and mouth disease), inadequate modern abattoir facilities, propaganda against meat exports and lack of direction policy for effective utilization of livestock resources. Culling and utilization of surplus animals need to be recognized as an established norm for scientific animal production.

3.9.22. Goat population in India during last two decades has increased at fastest rate among all major livestock species, in spite of the fact that nearly 41 percent of goats are slaughtered annually with about 15.5 percent natural death in the rural areas. The current goat population is estimated to be around 128 millions in 1999-2000. Combining the annual rate of population growth (around 3.6 per cent) with mean slaughter rate (41%) and mortality rates (15.5%), the goats have shown the potential of population growth of about 60.1 per cent per year. This is the single most important factor that makes goats as most desired species of animals for meat production. The sheep population is around 50.8 million. About 36% of the total sheep population is slaughtered every year for meat purposes. During last 4 decades there has not been much increase in sheep population. The fine wool production in the country is around 4 million kg and the demand from the industry is around 35 to 40 million kg of fine wool, which is mainly imported from countries like Australia. The current practice is to purchase of sheep or goat kids, a year ahead of birth by the traders. Consequently, the shepherds have no control on what price they get for their stock and at what age they are required to sell them. Invariably most stock is sold by the time they are six months and weigh around 10 to 12 kg while the standard weight for sale should not be less than 25 to 30 kgs. if these animals have to be commercially viable. The required credit should be

made available so that farmers are not at the mercy of the traders and are able to raise their stock to a body weight of 25 to 30 kg.

3.9.23. Pig husbandry is the most important activity in the Animal Husbandry sector in North Eastern Region inhabited by tribal people. Pork is an important item in the daily food habit of these people with little exception in Assam. A very high consumption rate of pork has been reported in this area, which is roughly around 15% of the country's total pork production of 469000 metric tones. The region also has a substantial pig population, which constitutes around 25% of the country's pig population. The bulk of the population is however indigenous type whose growth and productivity is very low. The region however, has a type of pig called "Pigmy Hog", the meat of which is highly preferred.

3.9.24. Central Sponsored Schemes related to small animals are National Ram/Buck Production Programme and Preservation and Assistance to States for Integrated Piggery Development. The total expenditure in the two schemes would be Rs.22.62 crore against the total outlay of Rs.65.05 crore. Although small animals are reared by the poorest of the poor, this sector is being neglected since First Five Year Plan. Central assistance/intervention is needed mainly for improvement of pasture land (common property resources) and health coverage against sheep and goat pox. PPR, blue tongue and swine fever.

3.9.25. The Indian Poultry Industry has come a long way. The private sector has played major role in developing the sector. However, the Government's intervention by way of various support mechanisms is still necessary for promoting poultry in rural areas. The attention of Government farms may be turned towards breeding and upgrading of birds like Quail, Turkey, Guinea fowl and Duck and conservation of indigenous poultry stock. In India poultry neither enjoys the status of agriculture nor does it enjoy the status of industry. This uncertainty does not auger well for consistent development of the sector. Poultry establishments having less than 10,000 birds should be treated as agricultural activity for the benefit of the poultry farmer and extend the same benefit/incentives/concessions to this sector, as applicable to agriculture. The private

poultry industry has now come into its own and poised to become a major export oriented industry. It is therefore necessary that rules and regulations, tax structure be so modified that the export growth gets a flip. One of the important areas of government intervention are infrastructure for cold storage, pressured air cargo capacity, establishment of Reference Laboratory for certification of health and products in conformation to the international standards, tax relief for creating facilities like grading, candling, washing and packing. The Government should also give assistance for propagation of birds like Quail, Guinea fowl and Duck in those parts of the country where they are popular. Government also encourage formation of Small Farmers Poultry Business Consortium to help the unemployed youth to take poultry farming as a vocation.

Declaring the Department Dairying, as a Department and dovetailing the Animal R Institutes of ICAR with the Departmen improve its efficiency and provide an delivery machinery to work as a regulatory bo

Conservation of threatened breeds of livestock and improvement of breeds used for draught and pack.

Livestock extension based on providing services and goods needs to be treated differently from crop related extension activities.

Need for an integrated approach for regeneration of the grazing lands.

3.9.26. Since animal disease eradication and quarantine is critical to exports, animal health system should be strengthened and disease free zones created. Conservation of threatened breeds of livestock and improvement of breeds used for draught and pack should be the major goal of the Tenth Plan. During second plan the efforts were provided to control diseases namely, Rinderpest, Foot & Mouth Disease, Hemorrhagic Septicemia, Black quarter and Anthrax. However, during the successive plans especially 6<sup>th</sup> plan (1980-85) special effort was directed on the control of Rinderpest, Foot & Mouth disease and contagious bovine *pleuro pneumonia* in cattle, Marek's and pullorum disease in poultry and rabies in dogs and this trend has been continued till 9<sup>th</sup> plan. Hemorrhagic Septicemia is still continues to be the major problem in the cattle production programme inspite of the fact that good vaccine against Pasteurellosis is available since 1955. *Brucellosis*, Bovine Tuberculosis and Anthrax are well known in the country for major economic losses. During Tenth Plan Foot and Mouth Disease, which incurs heavy economic losses to the farmers needs priority; followed by other diseases namely *Peste des petits ruminants* (PPR), Bluetongue, Sheep pox and Goat Pox,

Classical Swine Fever, Contagious Bovine Pleuropneumonia, New Castle Disease (Ranikhet Disease).

3.9.27. In 1977 FAO/IAEA recommended accreditation of veterinary laboratories for disease diagnosis and for surveillance data to control diseases. In spite of the fact, India controlled African Horse Sickness, equine influenza and equine infectious anemia and recently rinderpest, but international authorities have not yet accepted our assessment that India is free from diseases. In order to bring transparency OIE certification is becoming mandatory with authenticated data to support our claim for the freedom from the diseases. Use of quality assured diagnostic system, surveillance and monitoring would assist regional or national control and eradication programme of diseases. Presently India is producing 21 viral, 13 bacterial and 1 protozoa vaccine and 11 diagnostic reagents. These immuno-biologicals are being produced in about 27 biological production units. Most of the biologicals produced in the state unit lack consistency for quality products and suffer from appropriate technical input and inspection system. No vaccine production unit in the country should be without following Good Manufacturing Practices (GMP). There is need for a position of Controller Veterinary Vaccines, Biological and Drugs, who would be responsible for the harmonization of veterinary vaccines, drugs and diagnostic reagents.

Diseases causing heavy economic losses are Foot and Mouth Disease (FMD), Hemorrhagic Septicemia, Peste des petits ruminants (PPR), Bluetongue, Sheep pox and Goat Pox, Classical Swine Fever, Contagious Bovine Pleuro pneumonia and Ranikhet Disease.

Most of the biologicals produced in the state unit lack consistency for quality products.

Need for a position of Controller Veterinary Vaccines, Biological and Drugs.

Creation of Animal Quarantine, Certification and Enforcement Authority.

3.9.28. Due to lack of effective quarantine measure many exotic diseases entered into the country from time to time like African Horse Sickness, Swine fever, Avian Infectious Bronchitis, Marek's disease and Avian encephalomyelitis, Infectious bovine rhinotracheitis and Blue tongue, Reo viral arthritis, Gumboro disease and Egg drop syndrome, Equine Influenza, Equine Infectious Anemia. Therefore, Animal Quarantine Certification Station (AQCS) needs update in the country. The Animal Quarantine, Certification and Enforcement Authority should be created and necessary autonomy,

authority to function as an independent body should be empowered with legislative authority so that the movement of animals risking infection/ disease could be adequately controlled through important airport, seaport, international land routes and movement within the states.

3.9.29. The country is now free from Rinderpest, but it is still prevalent in neighboring countries. It would be more rational to eradicate the disease from these countries than to control trans-border movement of animals. Government should initiate action to transfer the technology and management skills learnt from this programme to the countries neighboring our border starting with Nepal, Bhutan, Bangladesh in that order. It is therefore recommend that the scope of the present scheme National Project on Rinderpest Eradication is enlarged and given a revised mandate to complete the leftover work on sero-surveillance in the country and to finalize the documentation for final declaration of eradication of Rinderpest and transfer the technology and help implement programmes in all these countries. Enactment of a central ‘ Prevention of Infectious and Contagious Diseases in Animals Bill’. The draft bill is pending with the Department of AH&D for quite some time. It should be enacted on priority. It has been observed that most of the firms (both public and private) producing veterinary biological products like vaccine, diagnostic kits etc. are not following Good Manufacturing Practices (GMP) and meeting Good Laboratory Practice (GLP) requirements. Ideally the production of veterinary biological should be in the private sector. All the state biological units, which are not in a position to produce quality vaccines as per the standards, should be closed forthwith.

Enactment of ‘Prevention of Infectious and Contagious Diseases in Animals Bill’ is pending

State biological units, which are not in a position to produce quality vaccines as per the standards, should be closed forthwith.

3.9.30. External markets are an extremely important source of demand and these should be tapped much more aggressively. In order to encourage exports, all licensing control for processing of livestock products/bye-products should be repealed and all restrictions on the export of livestock and its products need to be removed. The immediate focus should be on export of Indian dairy products, buffalo meat and poultry products to Asian and African countries. The minimum requirements for sustainable export are creation of

disease free zone, organic farming and potable water; these should be made available in selected areas having large marketable surplus. Creation of a permanent institution in the line of Commission on Agricultural Costs and Prices (CACP) could be formed which will estimate the cost of production of various livestock products and suggest remunerative price so that farmers are not exploited.

3.9.31. Export earnings from livestock sector and related products rose from Rs. 1241 crore in 1993-94 to Rs. 2073 crore in 1998-99 showing an average annual growth of about 10.8 per cent. Leather and leather products accounted for as high as 54 per cent and meat and meat products for 37 per cent of the total export. Exports of milk and milk products accounted for less than 1 per cent. The potential for export of livestock products is immense but it depends upon how India adjust effectively to the open trade regime under the WTO particularly SPS regime. Taking advantage of SPS provisions, some countries have adopted regulations that include unjustified, stringent SPS measures, which are difficult for most of the developing countries including India to comply. As a part of commitment under WTO and domestic market reforms all quantitative restrictions and other non-tariff barriers on the import and export of livestock products were removed and most of livestock products were put under Open General License (OGL) by April 1, 2001 and the Indian markets have been opened up to the world markets.

3.9.32. Most of the developed countries provide heavy export subsidies under their export subsidy programmes to increase their exports, which creates unhealthy competition in the world market. India does not provide any product specific subsidy to any livestock product. Some support measures like subsidies for milch animals, small farmer development assistance and assistance to small holders for easy access to inputs provided by the government are also exempted from any reduction commitment for developing countries. India does not provide any of the export subsidies listed for reduction commitments in the Agreement. The only subsidies available to exporters are in the form of (a) exemption of profits from export sales in income tax (under section 80-HHC) and (b) subsidies on costs of freight, marketing and international and internal transport on export shipments of livestock products.

3.9.33. Thus, both in global and its domestic markets, Indian livestock industry faces basically two challenges (i) to be price competitive and (ii) to produce products conforming to international quality and safety standards. A comprehensive strategy is required to be formulated and implemented with suitable legal backup and appropriate government support and action. The DAHD should evolve a mechanism to monitor the international prices and other developments in the world market and take corrective actions such as anti dumping duties and suitable tariff rates, to protect domestic industry from unfair competition. Indian livestock industry should take a lead role in studying and monitoring the trends in the global market (especially related to domestic support, export subsidy levels and international prices) and provide the relevant information to help the government in formulating strategies for the negotiation.

3.9.34. Problems of livestock sector are compounded by non-remunerative prices of livestock products, an issue which has not received the attention of the government. Development of marketing network and remunerative price support to the producers will be a great incentive for higher animal productivity both in quantity and quality. Creation of a permanent institution in the line of Commission on Agricultural Costs and Prices (CACP) should be formed which will estimate the cost of production of various livestock products and suggest remunerative price so that farmers are not exploited.

3.9.35. Public sector lending in livestock sector is abysmally low and such inadequate credit support leads to poor capital formation. As the organized financial sector is unwilling to finance livestock programmes that are not in their interest especially after the initiation of financial sector reform, the livestock farmers are mainly dependent on the financial intermediaries and they end up bearing a higher interest rate than that would be available otherwise. NABARD should ensure that at least 20% of the total agriculture sector lending is reserved for Animal Husbandry and Dairying Sector for both short term and long term capital requirement. Financing should be done against model projects that have demonstrated their economic viability.

3.9.36 The Government should endeavor to create a favorable economic environment for increasing capital formation and private investment by removing distortions in the

incentive regime for livestock production and bringing about external and domestic market reforms and backed by rationalization of tax structure. Resource Mobilization has to come through, institutional financing, capital market and private investments, which are to be tapped as a major drive to put the infrastructure in place.

3.9.37. The perception of bankers is that the financing of animal husbandry activities is a risky proposition and many loans are likely to become bad. It is this factor, which forces the financial institutions to go in for collateral security either in the form of mortgage of land or third party guarantee. Such units will be security oriented rather than commercially designed. In case of commercial units, where technology plays an important role and the size of land holding need not be large, the collateral becomes insufficient in the bankers perception. Removal of collateral security (wherever warranted) will prove to be of great help to qualified and skilled entrepreneurs to establish financially viable units.

3.9.38. The share of animal husbandry and dairying sector was only 5.7% of total ground level credit offered through NABARD for agriculture and allied activities during 1999-2000. Only term loan to the tune of Rs.2366 crore was given to animal Husbandry and dairying; no production credit or short-term credit was given. NABARD should ensure that at least 20 percent of the total ground level credit becomes available to animal husbandry sector. Financing should be done against model projects that have demonstrated their economic viability. A reasonable unit size depending upon the capacity of an individual is to be determined and necessary schematic lending has to be provided to establish the same.

3.9.39. The venture capital fund should be created in the Department of Animal Husbandry and Dairying (in collaboration with NABARD) for establishment of infrastructure by private entrepreneurs like veterinary hospitals, vaccine production units, feed plants, fodder seed production facilities, processing plants for western and indigenous dairy, meat and egg products, semen production units including bull mother farms and network for delivery of semen to the farmers. These activities should also get credit under the head of Priority Sector Lending from commercial and co-operative

banks. The concept of working capital loan is not in operation in the livestock sector. Like in small-scale sector, this sector requires a provision of working capital loan to enable the entrepreneurs to use it judiciously. Such provision will help the entrepreneur to avoid rushing to the bank for further financial help and make a long wait by which time the activity might suffer irreparable loss. Introduction of Dairy and Poultry Farmers Credit Card (Like Kisan Credit Card) would solve the problem of working capital. Under this programme the farmer will get credit against the future production and he will be free to purchase the inputs at a competitive price from his selected shop. Government should come out with a margin money scheme on the lines of KVIC's Margin Money Scheme where entrepreneurs are required to contribute only a sum equal to 5 or 10% of the cost of the project from their own sources. Alternatively, a soft loan scheme with concessional rate of interest to meet the margin money should be formulated with the help of NABARD.

3.9.40. A comprehensive insurance policy covering almost every risk of livestock at reasonable amount of premium is necessary to help retrieve the unit in case of disasters. Instead of going for uniform insurance policy, a scheme at a concession rate of premium may be allowed in case of small and medium sized units to reduce the burden of premium and at the same time get the full benefit in case of loss of asset.

3.9.41. Sustainable rapid growth and development in this sector can only be ensured if the livestock owners, service providers, veterinarians and planners become knowledge based and acquire the ability to absorb, assimilate and adopt the spectacular development in the veterinary sciences and related technologies. A massive programme encompassing village schools, veterinary colleges and universities should be taken up in collaboration with ICAR to improve the skills and competence of all the stakeholders.

3.9.42. Presently livestock extension is attached with agriculture extension. Livestock extension is primarily based on delivery of services and input. It needs to be treated differently from crop related extension activities because livestock are kept with multiple objectives ranging from income generation, food, fuel and fertilizer production to socio-cultural linkage, which makes change process much more difficult. In livestock

production it takes much longer time for impact of technological intervention or change in management to be visible compared to crops. Involvement of women is more in

**Use of IT village Dairy Cooperative Societies (DCS)**

Village cooperative (DCS) and small milk producers are facing the enormous challenges brought about by globalization and need information to react with speed to changes in their market environment and to capitalize on opportunities.

An Information & Communication Technology (ICT) project for the cooperative dairy sector, has been formulated. It would encompass not only the written-text format for information alone but voice-data, greater visual representation through use of locally relevant icons and use of hybrid voice-text technologies. The objective would be to transform generic knowledge into locale specific knowledge that can be acted upon.

The applications in this project consisting of Dairy Information Service Kiosks (DISK) at village societies and Dairy Portal (DP), at the District Union have been piloted tested at Kheda.

The DP consists of some illustrative contents under various sections such as good dairying practices, edutainment, services from Union, market prices, window to the world etc. The DISK has been built upon the core computer based milk procurement and payment module, which is already in operation in many societies. It maintains a database of dairy farmers and their cattle and generates various services related messages (veterinary, animal husbandry, cattlefeed and other services provided) on the daily milk pay slip besides generating several useful MIS reports to DCSs. The user interfaces to the DISK & DP will be bilingual (English & local vernacular languages) which work in tandem to make a whole and deliver value to the Union as well as to the grass root level dairy farmers.

Source: NDDDB-Anand

livestock keeping, compared to crop production. Most training and TOT programmes are men oriented, so is the extension material and these do not suit women in view of different perceptions, priorities, other duties and higher illiteracy amongst them. For livestock extension to be effective, we need more sustained effort, greater interaction with farmers with participatory and systems approach and due consideration of socio cultural aspects. Gender issue acquires much more importance in livestock development processes and inclusion of women in the extension team is necessary for faster impact.

3.9.43. Livestock extension, which is primarily based on providing services and goods, needs to be treated differently from crop related extension activities that based on transfer of knowledge. Extension in the livestock sector should be driven by technology underwriting in addition to technology transfer. Animal husbandry extension worker is basically a service provider. Panchayats, Cooperatives and NGO'S should play a leading role in generating dedicated band of service providers at the farmers doorstep in their respective areas. There is a need for establishment of a fully operational Directorate of Extension in the Department and a National Institute of Livestock Extension (NILE) in the country during the X Plan Livestock extension is presently a part of agriculture extension. But livestock extension, which is primarily based on providing services and goods, needs to be treated differently from crop related extension activities that based on

transfer of knowledge. Animal husbandry extension worker is basically a service provider.

3.9.44. Issue of animal management and welfare during natural calamities and disaster will require attention and suitable programme need to be developed since such asset loss can drive the poor into destitution. It is proposed to establish a separate Central Animal Disaster Management Cell in the Department of Animal Husbandry with adequate central funding to meet the expenditure like salvaging and rescuing animals, temporary animal shelter, feeding and medication of animals, formulating a comprehensive insurance scheme for compensation of lost animals (both scheme and non-scheme) belong to people under poverty line. The welfare of animals is severely hampered especially in the animal market where livestock are generally used as commodity like other inanimate article. The conditions of animal markets in the country are pathetic and need to be improved on priority.

3.9.45. The educational system in veterinary and dairy science should be made autonomous by implementing the Swaminathan Committee's recommendation in letter and spirit. Following

veterinary council of India notification on regulation of veterinary

Veterinary colleges are to follow the "minimum standards of veterinary education – Degree Course – BVSc and AH - Regulation 1993".

A programme encompassing village schools, veterinary colleges and universities to improve the skills and competence of stakeholders.

education which came in force in 1994, the existing veterinary colleges were supposed to strictly follow the "minimum standards of veterinary education – Degree Course – BVSc and AH - Regulation 1993". At the present moment, majority of the veterinary colleges are not following the regulations. The situation is so bad that deregulations of these colleges both under SAUs as well as under State Veterinary Universities is imminent. It is therefore needed that each Veterinary and Dairy College should upgrade its facilities and faculties to be at par with the government regulations. A massive programme encompassing village schools, veterinary colleges and universities should be taken up in collaboration with ICAR to improve the skills and competence of all the stakeholders.

3.9.46 This export surplus should be used to develop the infrastructure. Presently, country is exporting leather and leather goods worth Rs.17,000 crore a year. None of these are ploughed back into improvements of livestock so that quality skins and hides are produced nor in creating environmental friendly carcass utilization centers for dead and fallen animals. Similarly, country exports carpets worth Rs.1,500 crore a year and none of these goes back to growth of indigenous sheep industry. A cess on leather, leather goods and carpet should be imposed and this would be ploughed back to improve the related industries at the level of farmers. The delivery and input cost of all the services provided by State Veterinary Department should be recovered on commercial basis except for those farmers who are identified as being below the poverty line. Removal of collateral security wherever warranted will prove to be of great help to qualified and skilled entrepreneurs to establish financially viable units.

3.9.47 The current scenario demands that the present educational system should be able to meet the knowledge needs of the commercial farmers besides small and marginal farmers. It is necessary that the future veterinarians should be able to be knowledge intensive and practical oriented in order to effectively service three arms of livestock sector (Animal Production, Animal health and Livestock Product Technology). He should be able to utilize the knowledge for meeting the needs of the two livestock production systems viz. (i) large commercial dairy farms and (ii) small holder dairy farms. In order to obtain these, the educational system in veterinary and dairy science should be made autonomous by implementing the Swaminathan Committee's recommendation in letter and spirit. Following veterinary council of India notification on regulation of veterinary education which came in force in 1994, the existing veterinary colleges were supposed to strictly follow the "minimum standards of veterinary education – Degree Course – BVSc and AH - Regulation 1993". At the present moment, majority of the veterinary colleges are not following the regulations. The situation is so bad that deregulations of these colleges both under SAUs as well as under State Veterinary Universities is imminent. It is therefore needed that each veterinary college should upgrade its facilities and faculties to be at par with the government regulations. The Post Graduate Educational programme needs to be completely revamped and broken up into two streams viz. the current stream which

prepares candidates for research and teaching; and the second stream which caters to the clinical and para-clinical aspects of the veterinary profession. It will be necessary to develop this second stream as the primary stream for training at postgraduate level. This stream will be based on hospital/clinic/diagnostic center focused programme.

3.9.48. The Livestock Census Scheme suffers from timeliness and quantitative as well as qualitative problems. The present arrangements for conducting the Livestock Census in the States and Union Territories are not found satisfactory. National Statistical Commission has recommended the livestock and agricultural censuses be integrated and taken together in a 20 percent sample villages. But such census based on sampling will not be able to provide breed, sex and age group wise profile of each livestock species that are needed to formulate breeding as well as conservation programme. Further, with the 20% sampling, it is not possible to estimate livestock population at the village level.

The sampling design of Integrated Sample Survey, developed by IASRI, requires the village wise population of cattle, buffaloes, fowls, goat and sheep of the last Livestock census for arriving at the current population of livestock in the district. Considering the limitation of 20% sampling as suggested by

Conducting livestock census based on cent percent coverage of all households in the country on a specific date.

The existing Animal Husbandry Statistics unit may be upgraded into a Livestock Statistics and Economics Division

Large number of data gaps relating to estimates of mutton, pork, poultry meat and meat by-products

National Statistical Commission, Working Group on Animal Husbandry and Dairying has advocated for conducting livestock census based on cent percent coverage of all households in the country on a specific date through the State Animal Husbandry Directorate and the Department of Animal Husbandry & Dairying at the Central level. The existing Animal Husbandry Statistics unit may be upgraded into a Livestock Statistics and Economics Division. There are at present a large number of data gaps relating to estimates of mutton, pork, poultry meat and meat by-products. The existing methodology needs to be modified by incorporating following information like distribution of livestock by the size of land holding, breed-wise milk yield of different species viz. cattle buffaloes and goats, information of egg and meat production from commercial poultry farms, cost of production of milk and eggs, and estimates for livestock by-products.

3.9.49. The country needs a computer based 'National Animal Health and Production Information System' with active involvement of Institutions, Government Departments, Private industries, Cooperative, and NGO's.

3.9.50. Issue of animal management and welfare during natural calamities and disaster will require attention and suitable programmes need to be developed since such asset loss can drive the poor into destitution. Animal welfare is also related directly with the productivity of the animal. The well-being of animal is hampered during management under intensive production system, in the animal market, during handling and transportation

in animal market, rearing of newly born male calves in urban areas etc. There is a great deal of wastage and losses, as well

**National dairy industry database with GIS support**

It is widely accepted that for estimating the potential impact of dairy development initiatives, the major bottleneck is non-availability of data with necessary geographic and time details. A national dairy industry database is proposed to be created by NDDDB with detailed **cross-sectional** and **time series** nature of data sets, making it suitable for any comprehensive study on dairy development. Various data sets pertaining to dairying, livestock, animal husbandry, agriculture, climate and geographical variables can be collated over a period of say, 10 years from 1990-91 onwards. The aim would be to hold this comprehensive information in one single place and in an easily accessible form, namely the world wide web (WWW) on the internet. For easy access, a simple and interactive user interface to the database would be created. These data sets can be seen in their related geographical map locations also. The extensive information would be invaluable to potential researchers, policy analysts, government officials as well as Cooperative Milk Unions & Federations.

Source: NDDDB-Anand

as animal suffering due to ill designed agri-implements, carts and implements attached to animal. Veterinary universities/ colleges and other institutions like veterinary hospital, dispensary, NGOs working on livestock care system need to be strengthened so that they can ensure and promote animal care and well-being

3.9.51. Besides the Ministry of Agriculture, schemes relating to animal husbandry and dairying are also being implemented by other ministries viz. Ministry of Rural development, Ministry of Non-conventional Energy Resources, Ministry of Culture (Animal Welfare Department) etc. Many schemes operated by these ministries have similar and overlapping objectives targeting the same population. Generic components like extension, training, and infrastructure get repeated in most of such schemes and are not complementary. Thus, there is a need for consolidation and convergence of all such

activities, schemes and funds. Department of Animal Husbandry & Dairying being the nodal department should address all the issues in totality.

3.9.52. The Department of Animal Husbandry and Dairying should play a role of regulatory authority rather than disbursement of central kitty, which is the current focus. It should have legal authority for certification and enforcement of quality / standards of veterinary biological, feeds, pharmaceutical products and livestock and livestock products

3.9.53. Capacity of the Department of AH&D to do effective monitoring of central schemes (both CS and CSS), which are highly technical in nature is limited and often does not exist. In view of the fact that entire sector programmes are needed to be handled by the technical person from inception to monitoring, the present staffing pattern is highly distorted and ineffective. Declaring the Department of Animal Husbandry and Dairying as a Science Department and dovetailing the Animal Research Institutes of ICAR with the Department should not only improve its efficiency but also provide a effective delivery machinery to the Department enabling it to work as a regulatory body in post-liberalized era.

### **3.10 Inland and Marine Fisheries**

3.10.1 The fisheries sector has been one of the income and employment generator sectors as it stimulates growth of a number of subsidiary industries and is a source of cheap and nutritious food. At the same time, it is an instrument of livelihood for a large section of economically backward population of the country. More than six million fishers in the country depend on fisheries and aquaculture for their livelihood. The fishery resources are diverse, as are the fishery technologies and systems. The sector has been one of the major contributors of foreign exchange earnings through export. The sector contributes about 1.4% of the total GDP.

3.10.2 Although potential of 4.5 million tonnes of fish has been estimated from the inland sector, but in true sense this has little meaning. Other than natural resources, such as rivers, estuaries and floodplain and natural lakes, area under man-made water bodies

such as reservoirs, ponds and tanks etc. is fast increasing and as such the potential would also increase. Present production

- Enhancing Productivity and Production from Inland Waters.
- R & D programmes for Enhancing Production of quality Fish/ Shrimp Seed and Feed.
- Diversification of Activities for Development of Fisheries and Aquaculture.

level of about 2.2 tonnes/ha./year from freshwater ponds /tanks should be raised to 4-5 tonnes/ha/annum by adopting advance technologies. Programmes should also be devised to develop fisheries in fallow derelict water bodies, water-logged areas, saline waters, lakes, beels, etc. for enhancing fish production. Aquaculture activities should also be taken up for development of cold water fisheries in the hill areas of the ecologically fragile zone.

3.10.3 In respect of brackishwater sector, the Aquaculture Authority of India of the Ministry of Agriculture should also play an active role and promote the sector by enacting the legislation to regulate the brackishwater aquaculture and to overcome the legal intervention (Supreme Court judgement of December 1996) affecting the production and productivity. The matter is currently *sub-judice*. Aquaculture Authority legislation to take care of legal disabilities has been hanging fire since 1997. It needs to be taken to logical ends expeditiously in the interest of optimum exploitation of resources while safeguarding the environmental concerns.

3.10.4 Reservoirs, one of the major inland fishery resources, offer great potential for fisheries development in our country. These form one of the most important untapped fishery resources. On the basis of experience of pilot projects taken up for fisheries development in reservoirs during the terminal year of the Ninth Plan, programme should be formulated on large scale during the Tenth Plan to enhance fish production. Development of reservoir fisheries may lead to improvement in the socio-economic status of the poor fishers.

### ***Marine Fisheries***

3.10.5 During 1950s – 90s, the marine fish production has increased at a rate of 3.43%, which is slow as compared to 5.27% of the Inland fisheries during this period. Moreover,

the growth in marine fish production in the recent years has been slower (an average of 2.19% in 1990s) as compared to the Inland Fisheries (average of 6.55%) during the corresponding period. Exploitation of territorial waters upto 12 nautical miles is a state subject whereas the rest of EEZ is with the union government. The fisheries resources exploitation by the artisanal as well as the small mechanised sector has generally extended beyond the territorial waters. Similarly, the larger mechanised vessels and those operating under foreign collaboration for exploiting the off-shore resources have encroached in territorial waters disregarding demarcation of fishing zones. The overlapping interests of competing sectors are resulting in social and political tensions. The management of fishery exploitation in the EEZ, therefore, requires close coordination between the centre and the state with identified agencies to be entrusted with specific responsibilities to regulate the activities of different sectors.

3.10.6 The fish production from near-shore waters (0-50 meter) has been stagnant for some years having reached optimum yield levels. To sustain this production, improved management measures, based on community participatory approach have to be put in place without further loss of time.

3.10.7 Exploitation of off-shore resources in the EEZ will have to be reconsidered in terms of not only the resources available, but also in terms of infrastructure. To avoid over-capitalisation and ensure a cautious growth of the infrastructure and investments, a rationalised approach will be essential in determining the number and size of fishing vessels, their resource specific gear as well as technology, to be made available either indigenously or through foreign collaborations. The development of deep sea fishery industry is of concern to the entire marine fishery sector because it would have considerable impact on the management of near-shore fisheries, shore-based infrastructure utilisation and post-harvest activities, both for domestic marketing and export. Similarly, up-gradation of the small mechanised sector should be given high priority to facilitate their entry into the deep sea sector.

3.10.8 Major emphasis should be placed on positive and purposeful check on over exploitation of resources in the near shore areas through appropriate regulations on the

number of fishing vessels, their operational areas, ban on monsoon fishing/close season, mesh size, use of the right type of fishing gear and other such restrictions to prevent economic and oversize fishing.

3.10.9 Formulation and introduction of new deep sea fishing policy consistent with national interest to exploit fishery resources in the Exclusive Economic Zone (EEZ) should be given a top priority. The present vacuum is having several repercussions, more important of which is leaving the EEZ open to other neighbouring countries and owners of foreign fishing vessels who may take advantage of the situation for their benefit. Even land locked neighbouring States may stake their claim legally if we do not put our act together on under-exploited marine resources in the Indian EEZ.

3.10.10 The existing regulatory policies also restrict fishing season, fishing areas and the mesh size of gear. However, there is no monitoring and surveillance system available with the concerned implementing organizations. Voluntary compliance by the fishermen to operate in the areas allotted to them, is totally absent and encroachment by the larger mechanized vessels in the areas demarcated for the artisanal craft continues. The Union Government has now proposed to introduce a vessel monitoring system, which is expected to resolve the problem. Similarly, the Union Government should also consider providing a fresh model bill to the States/Union Territories to enable them to revive their MFRAs on the basis of their present requirements and also global initiatives to which India is a signatory.

3.10.11 Basic data on various aspects of inland fisheries such as surface water spread, fish stocks, fishers and their socio-economic status, production, marketing and distribution etc. is a pre-requisite for formulating sound development plans. In the marine sector, the existing methodologies need a revision and also a subsequent re-orientation of the Department of Fisheries on collection and estimation of methodologies. To strengthen the efforts in this direction, the use of remote sensing and Geographical Information System (GIS) in estimation of resource size and productivity also needs to be integrated in the existing programmes of fisheries catch statistics. Notwithstanding the existing efforts made by several agencies, the fisheries database is poor and needs

considerable strengthening. Real time series data on the resource, its levels and patterns of exploitation are needed for effective planning. There is need for greater emphasis on data and information that give timely information on the economic attributes of the industry such as regular costs and earnings surveys. Increased use of the Internet facilities is highly desirable.

3.10.12 Diseases did not pose a serious threat to traditional fish culture that was so far typically extensive. With intensification of aquaculture involving high stocking densities coupled with external inputs of feed and fertilizer, sometimes of doubtful quality, the fish farmer is now face to face with disease of various kinds. India suffered the worst disaster regularly for consecutive years beginning mid eighties when certain species of food fish suffered heavy mortality in ponds, tanks, rivers and reservoirs. Taken unawares by this mysterious disease known as Epizootic Ulcerative Syndrome (EUS), a panic situation was created leading to a scare regarding the effects of consuming the dead or diseased fish.

3.10.13 The country suffered a further set back that was far more serious than the EUS and involved the brackishwater sector when the highly valuable shrimp crops meant for exports were lost in almost all maritime states and especially in Andhra Pradesh. This was a world phenomenon which was afflicted by shell-fish diseases, especially the White Spot Syndrome (WSS). Under the circumstances each state should have adequate officers trained in disease management. Disease laboratories should be established in each state and properly equipped too where the trained officers would be able to conduct necessary preliminary investigations. A serious country-wide drive to create an awareness in respect of fish diseases and health management is urgently necessary.

3.10.14 Quarantine is unknown to Indian fisheries and aquaculture and introduction of exotic fishes goes unchallenged. A strict watch needs to be kept on such illegal introductions and the legal ones allowed only through quarantine regulations. The application of these regulations in itself would considerably reduce the severity of the disease problems. The research institutions should enlarge the scope of their studies and

initiate work on disease-resistant varieties and develop protocols for quarantine and seed certification.

3.10.15 The existing fisheries policies and programmes in most of the States and Union Territories revolve around populistic welfare measures and a large part of the annual Plan budget goes towards the welfare programmes. Though welfare measures are obligatory to sustain the artisanal sector, parallel development and regulatory measures also need to be implemented. Welfare programmes have to be reoriented in a manner which provides long-term gains to the fishers. Future welfare programmes should be oriented towards sea-safety measures, especially for the artisanal and small scale fishers.

3.10.16 Given the continued poverty of the fishing communities and the extreme risk in the occupation, more promotional and social security measures at the national level are required. Besides, housing and insurance of fishermen safety at sea of fishers is also essential. This has been a neglected aspect in the country, so far. All the fishing boards should adopt the use of simple communication and navigation equipments and sea safety measures. The aspect of sea safety should be given greater priority both during the normal operation and during times of unpredictable weather.

3.10.17 Traditionally, women have played an important role in the fishery sector, and in the emerging scenario of fisheries and aquaculture development, they have a much larger role to play. One of the important ways to improve the status of fisher-women in a community is to train them to improve their participation in their own development. Training for production skills to improve income is of little use unless the access to markets is also improved. Credit schemes for fisher-women through group formation and liaison with banks have also enjoyed success in improving their condition and need to be implemented.

3.10.18 To support the development of fisheries and aquaculture, the country needs adequate infrastructure in the form of fish seed hatcheries/farms, fishing vessels, shore based facilities(harbours/landing centres) along with basic facilities as per the present need and requirement. Programmes for human resource development with emphasis on training and skill development in post-harvest/processing and marketing

activities particularly for fisherwomen besides other income generating revenues should be taken up on expanded scale. Strengthening of infrastructure such as storage facilities, ice plants, cold chains, roads and transportation, etc. as well as effective marketing system in identified areas should be taken up for the development of fishery sector.

3.10.19 To sustain fisheries in the new millennium, the quality, technical skills and management of fisheries manpower in the country will have to improve to keep pace with the rapidly changing needs of our society, both nationally and internationally.

Human resources development (HRD) for raising a cadre of experts at various levels to support research and vindicate a sustained development of the fishery sector is

- | <b>Thrust Areas</b>  |
|--|
| <ul style="list-style-type: none"> <li>• Riverine Fisheries Development;</li> <li>• Development of Reservoir Fisheries ;</li> <li>• Low external input sustainable aquaculture;</li> <li>• Habitat Restoration and Productivity of Upland Waters;</li> <li>• Management of Coastal Fisheries ;</li> <li>• Management of Deep-Sea Fisheries;</li> <li>• Infrastructure and Post-harvest;</li> <li>• Management and Policy Intervention;</li> <li>• Aquaculture at par with Agriculture;</li> <li>• Gender Concern .</li> <li>• Strengthening of Database and Information Networking.</li> </ul> |

important. Moreover, to maintain the pace of growth witnessed by the fisheries sector in the recent past, the efforts may have to be probably bigger and faster. Adequate funding to strengthen and streamline organisations, infrastructure and manpower would be the basic requirement.

3.10.20 An adequate investment in fisheries sector is essential for envisaged growth during the tenth plan. Government has a role in not only raising public investment but also inducing private investment. Efforts will be made to increase public investment for strengthening infrastructure for diversifying fisheries and aquaculture activities enhancing fish production and productivity. Enhanced public investment is also required in research programmes, strengthening infrastructures for training, post-harvest, marketing etc. Private sector investment in fisheries will also be encouraged more particularly in seed production, adopting existing technologies for higher production, human resource development, post-harvest management and marketing. Readymade schemes/ programmes for schematic lending for development of fisheries and aquaculture should be evolved for the benefit of fishers. Investment needs to be made to double the existing productivity all over the country in the interest of more fish

production and, more importantly, on increasing the nutrition status of the people and making a big dent on the poverty profile as most of the fishers belong to the bottom decile of income.

### **3.11 Agro-climatic Focus on land and water use planning:**

3.11.1 Current land and water use practices in the country are unsustainable, less productive and impact adversely on regeneration of natural resources. Scant regard is being paid to the consideration of eco-systems while exploiting them. We need to adopt the agro-climatic planning concept based on agro-climatic conditions and land and water resources for promotion and cultivation of different crops/ activities. For example, in eastern part of the country rice, is cultivated even on upland terrains. But farmers are forced to continue such cultivation because of food security requirements. Sugarcane has actively been promoted in water stress areas. Besides, subsidies aggravate the problem by wasteful use of scarce resources. If not checked, such practices will put the food security system into peril. Therefore, it would be necessary to encourage various cropping/ farming systems based on the agro-climatic conditions and land and water resources. Promotion of this concept would require a radical shift from the existing mindset. It is the duty of political system to realise the perniciousness of the present system and adopt a statesman like approach to promote the use of natural resources in harmony with nature.

### **3.12 Climate and monsoon management :**

3.12.1 Over the past few decades, the man-induced changes in the climate of the earth due to multifarious human activities linked to development have become the focus of scientific and social attention. The most imminent of the

#### **Diminishing Yield**

The harvest of some of the World's most crucial staple food crops could fall by as much as one-third as a result of global warming, according to a report released by the United Nations Environment Programme. The diminished yield comes at a time of urgent need to feed a burgeoning worldwide population. Scientists stated in the report that crops such as rice, corn and wheat will resist flowering and setting seed in warmer temperatures. Dr. John Sheehy, a crop ecologist at the International Rice Research Institute at Manila, said that many crops grown in the tropics were at, or near, their thermal limits. He said, "In rice, wheat and maize, grain yields are likely to decline by 10 per cent for every one degree Celsius increase in temperature."

climatic changes of the earth is the increase in the atmospheric temperatures due to the

increased levels of CO<sub>2</sub> and other greenhouse gases. The Inter-governmental Panel on climate change (IPCC) has warned that there are now real dangers of adverse changes in temperature precipitation and sea level. These global changes are primarily due to the increased emissions from the combustion of fossil fuels and land use changes. The 1990s were, on an average, the warmest decade of the earth since instrument measured records of weather have been maintained since 1860's and the 1900s has been the warmest century during the last 1000 years. At least seven warmest years globally have occurred in 1990s. The global mean annual temperatures at the end of the 20<sup>th</sup> century are almost 0.7<sup>o</sup>C above those observed a century ago. Diurnal temperature range has also decreased, with night time temperature increasing at twice the rate of day time maximum temperature.

3.12.2 Such global climatic changes are bound to impact agricultural growth through their direct and indirect effects on crops, soils, livestock and pests. While increases in carbon dioxide content in the atmosphere have a fertilization effect on C3 crops and thus promotes their growth and productivity, CO<sub>2</sub> induced temperature increase can reduce crop duration, increase crops' respiration rates, effect the survival and distribution of pest populations thus developing a new equilibrium between crops and pests, hasten nutrient mineralisation in soils, decrease fertilizer use efficiencies due to increased gaseous losses and increase evapo-transpiration. Indirectly, these may considerably effect land use due to snow melt, availability of irrigation, frequency and intensity of inter- and intra-seasonal droughts and floods, and availability of energy. All of those climatic events can have tremendous impact on agricultural production and hence food security of any region.

3.12.3 The possible impacts of global climatic changes on the quality of life of human beings, could be alarming and therefore, is a matter of serious concern all over the world in understanding the possible effects for development strategies to mitigate the negative effects. Developed countries have been in the forefront of this concern and have invested considerable sums for research and management initiatives to understand the implications of global climatic change on their agro-ecologies and have developed frontline strategies to mitigate its adverse impacts. International pressure cartels have evolved over-time to

safeguard the interests of the vested groups. At the same time, agricultural research World over has been boosted to increase the understanding of the effects of climatic change, carbon cycle and its sequestration in biosphere and of late in carbon trading.

3.12.4 The rising temperatures and carbon dioxide and uncertainties in rainfall associated with global climatic change are bound to have serious direct and indirect consequences on crop production and hence food security. It is, therefore, important to have a firm data based assessment of the direct and indirect consequences of global climatic changes on different crops contributing to our food security. It is also necessary to develop a policy response to address in future such concerns with a more mature scientific understanding and also to provide back-up support for our negotiations in the international fora. Future agricultural planning thus has to take note of the overall goal of attaining congruence in productivity, stability, sustainability, profitability and equity in Indian agriculture in the coming decades.

**3.12.5 It would be useful for State governments to establish professional ‘Monsoon Management Boards’, which can help to increase productivity and production during favourable seasons and to minimize the adverse impact of aberrant monsoon through contingency plans and crop life saving technologies. At the Panchayat level , it would be useful to train a women and a man Monsoon manager, who can help to implement the monsoon management strategies and mitigation measures in times of drought and floods. Also, anticipatory research to meet potential threats to agriculture from global climate changes, should be stepped up.**

## CHAPTER-4

### INSTITUTIONAL REFORMS

4.1 Our agriculture is at the crossroads. We have been successful in increasing the production of basic staples like rice and wheat. But consumption level of the economically underprivileged sections of the society has not gone up. Though the growth of foodgrain production during the Ninth Plan period has been lower than the population, procurement of grains was going up suggesting a decline in people's consumption or in the purchasing power of the bottom deciles of the population. The food consumption of the poor in India seems to have gone down in the last 10 years and is assessed to be at least 33% below as compared to per capita consumption of the top 10%. This is a very serious matter. Structural imbalances in the economy like rising capital intensity, lack of land reforms, failure of poverty alleviation programmes etc. are the identified reasons for this. The coming into force of the WTO Agreement on Agriculture has brought out pointedly to our poor competitiveness on account of low productivity of most of the crops. On the productivity ladder we are decelerating and losing our position internationally. In order that Indian agriculture becomes economically rewarding and intellectually stimulating so that the migration of educated youth is prevented, the following four Revolutions have to be accomplished:-

- *Productivity Revolution;*
- *Quality Revolution;*
- *Income and Livelihood Revolution; and*
- *Management and Marketing Revolution,*

The first three are obvious to need any elucidation. The last, 'Management and Marketing Revolution' confers on small producers the advantages of scale both in the production and post-harvest phases of agriculture. It is this that has taken India to a position of leadership in the Dairy and Poultry sectors.

4.2 In the above context, we should review how our vast research, educational and extension infrastructure and restructure it to meet the challenges of today and tomorrow. The most urgent tasks today are enhancement of quality of products and improvement of productivity per units of land and water. Without improvement on marketing and storage

front, Indian agriculture, which was christened as a **gamble in the monsoon** is fast becoming a **gamble in the market**.

### **4.3 Research – National Agricultural Research System**

4.3.1 India has a very strong Indian Council of Agricultural Research (ICAR) – State Agricultural Universities (SAUs). ICAR has under its umbrella 47 national institutes, 158 regional research stations, 11 project directorates, 37 national research centers, 5 bureaux, 81 All India Coordinated Research Projects with about 1300 centres. Besides, there are 314 Krishi Vigyan Kendras (including 53 ZARSs which have taken up the functions of KVKs also) operating at district level for the refinement and dissemination of technology. There are 30 State Agriculture Universities and 1 central university. The entire system together makes a very strong and huge agricultural research system of the World.

4.3.2 The ICAR – SAUs research system has contributed significantly to the Indian agriculture in terms of varieties/ material and production technologies. The high yielding varieties/ hybrids and technologies developed ushered in green revolution in the country and made the India self-sufficient in foodgrains and also in many other items. The country also became one of the largest milk producer in the World. Besides, today the country is second in production of wheat, rice, onion, fruits & vegetables and sugarcane. However, fast proliferation of the agricultural research institutes has pushed up the establishment costs significantly leaving very little for effective R&D work. This has placed scientists in water tight compartments leading to sub-optimal utilization of manpower and equipment. **The results of research activities are not commensurate with the huge infrastructure set up. There is inadequate synergy between the users of research and the research activities of ICAR-SAUs systems. Also, the challenge now is the conversion of 'green revolution' into an 'evergreen revolution' which can help to increase productivity in perpetuity without associated ecological or social harm.** Also the needed match between production and post-harvest technologies is yet to emerge.

4.3.3 Off late the tempo of research seems to have slowed down as no major break through has been achieved in critical areas with which country is concerned. China has increased its rice production many fold mainly on account of introduction of hybrid rice for commercial cultivation. Quite a few numbers of hybrids have been released in India too; but their adoption at farmers level has remained poor. Lately, the area under hybrid rice is reported to have declined. Not very high production potential of Indian hybrids and their poor grain quality seem to be the reasons for poor acceptance by the farmers. Besides, the weak seed production programme for the multiplication of hybrid seed of rice also seems to have affected their spread. The causes of failure need to be analysed dispassionately. The country has to win the productivity battle.

4.3.4 Similar is the story of pulses. **Inspite of the Technology Mission, the import of pulses is going up.** In cotton the problem of insect, pests and diseases has affected the production. There seems no effective pest management technology or the resistant cotton varieties developed. Many farmers have been put under financial distress because of frequent crop failures for want of appropriate technologies to manage insect-pests and diseases. Integrated Pest Management (IPM) and Integrated Nutrient Management (INM) efforts have remained confined to research establishment only. Very little effort has been made to link the field with lab. Similarly, enough has not been done to educate the farmers in cost reducing technologies although the ICAR system has more than 300 KVKs in addition to a large network of extension agencies of government departments.

4.3.5 **Proliferation of new research establishment in ICAR, sometimes on extraneous and not on consideration of felt-need has starved many existing institutes/ research centers of adequate resources. Effective Zero Based Budgeting (ZBB) which is now the stated policy of the Government of India needs to be undertaken.** Therefore, ICAR needs to review its activities for convergence and strong linkages amongst its own institutes, research establishments of other departments, SAUs, etc. to make the research system more efficient, cost effective and accountable. The ICAR has also been demanding for raising its allocation to 1% of agricultural GDP and gradually raising it to 3% of agriculture GDP. But the Steering Group was informed that even the present allocation which roughly comes to 0.3% to AGDP (including non-plan

allocation) does not seem to have been utilized fully. Moreover, the merit of the proposal needs a very careful consideration in the light of the following paragraph.

### **Organisation and Management**

4.3.6 The Working Group on 'Agriculture Research & Education' has made several suggestions for achieving a proper match between current and emerging challenges and the capacity of our R&D system to respond to them. The suggestions relating to decentralisation according to agro-climatic zones, establishment of Eco-regional S&T consortia comprising SAUs, ICAR institutions and rural and women's universities, a UGC type of organisation for SAUs and the organisation of a India International Centre for Agricultural Research and Education, need to be reviewed in consultation with the concerned organisations and scientists. **It would be useful to set up an 'Agricultural Science Commission' to go into such recommendations and suggest the way forward. Such a Commission should also go into the proliferation of SAUs and the division of SAUs into Agricultural and Veterinary Universities.** However, Dr. C..M. Singh , a member of the Steering Group has emphasised for the establishment of Indian Council of Veterinary Research .

### **Research Priorities**

4.3.7 In the wake of globalization and WTO coming into being, the ICAR-SAUs research system should identify the priority research areas- some of which are listed below:-

- Conservation and enhancement of the ecological foundations of farming (land, water, biodiversity, forests, oceans and the atmosphere), through an integrated natural resources management strategy involving *Panchayati Raj* institutions.
- Organisation of Multi-disciplinary Monsoon and Climate Management Centres in different agro-climatic zones, in order to help in maximising the benefits of good monsoons and minimising the adverse impact of aberrant monsoons. Another aim is to take proactive action against potential adverse changes in temperature, precipitation and sea levels as a result of global warming.
- Dryland farming through appropriate land use and water conservation measures.
- Special attention to hill areas, coastal regions, islands and to Jammu and Kashmir and NE region.
- Diversification of cropping and farming systems and greater attention to crop-livestock integration, taking note of the current trends and changes in the relative consumption of cereals and other food products. Also, livestock and livelihoods are intimately intertwined in dry farming and arid and semi-arid areas.
- Intensification of research on underutilised crops, thereby expanding the food basket changing the nomenclature "*coarse cereals*" into "*nutritious cereals*".

- Intensification of research on sustainable captive culture fisheries and development of a strategy for the optimum utilisation of the 2 million sq km of sea surface available under the Exclusive Economic Zone.

### **Research Strategies**

- *Strategic research* involving frontier technologies, such as bio, information, space, nuclear and renewable energy technologies needs considerable intensification.
- *Anticipatory research* for mitigating the potential impact of climate change and ultraviolet-B radiation.
- *Participatory research* with farm women and men in order to develop location specific technologies which are environmentally sustainable and socially acceptable.
- *Cooperative research* with private sector R&D institutions.
- *National Challenge Projects: Inter-organisational Scientific Implementation Consortia:* A few *National Challenge* projects such as pulses and oilseeds production, post-harvest technology, establishment of Biotech and Food Parks, organisation of Poultry and Aquaculture Estates for promoting decentralised production supported by a few key centralised services, water technology in the NE Region and horticultural and agricultural transformation of Jammu and Kashmir (with particular attention to crops like saffron and to sheep and goats in Ladakh) need to be identified. Such National Challenge projects can be implemented by appropriate consortia of institutions belonging to ICAR, CSIR, DST, DBT, ICMR, ICSSR, UGC, Departments of Atomic Energy, Space and Ocean Development and the Ministry of Non-Conventional Energy. Genuine partnership should be developed and progress monitored by Joint Spearhead Teams. CGIAR institutions like ICRISAT, IWMI, IRRI, CIMMYT, IPGRI and ICLARM may be associated in the consortia, where appropriate.

### **International Conventions**

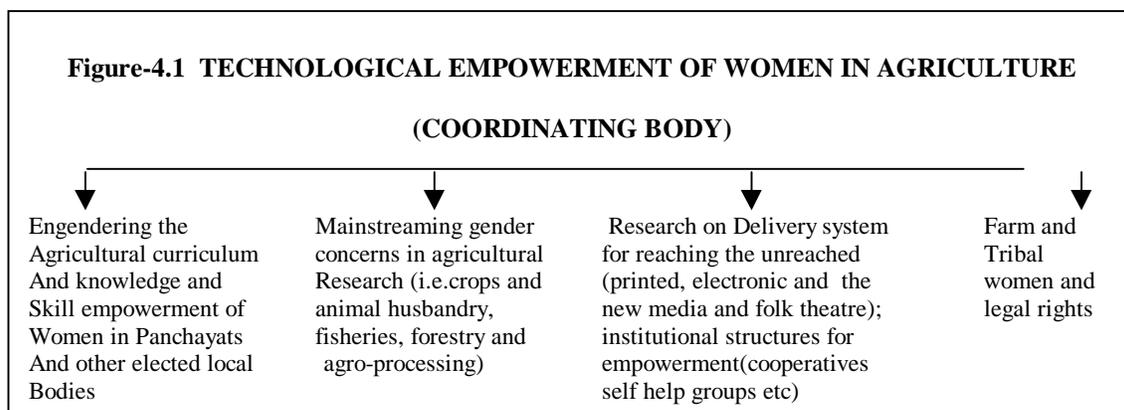
4.3.8 Expertise will have to be developed in dealing with the scientific aspects of the Conventions on Climate, Biodiversity, Desertification and Law of the Sea. The impact of the WTO Agreement in Agriculture will have to be monitored and capacity building in areas like IPR and Sanitary and Phytosanitary Measures and Codex Alimentarius Standards needs strengthening.

4.3.9 Enaction of National Legislation on the Protection of Plant Varieties and Farmers' Rights is in process. **An Autonomous Crop Variety Testing Institute needs to be set up to inspire confidence in the varietal evaluation process. Similarly, a 'National Commission on Genetic Modification for Food Security' with multi-stakeholder representations needs to be setup soon to inspire public confidence in**

the assessment of risks and benefits in relation to genetically modified crop varieties (GMOs).

### Gender Dimensions of Agricultural Research Education

4.3.10 Following organogram (Figure-4.1) gives some suggestions on mainstreaming gender considerations in agricultural research and curricula.



## 4.4 Education

4.4.1 There are 30 State Agriculture Universities, at least one in each State, except the North Eastern Region where there is one central university. In addition, there are 4 deemed to be universities namely (i) Indian Agricultural Research Institute, New Delhi; (ii) Indian Veterinary Research Institute, Izzatnagar; (iii) National Dairy Research Institute, Karnal; and (iv) Indian Institute of Fisheries Education, Mumbai. The present infrastructure is adequate to address our education needs and human resource development. However, there seems lack of financial support to SAUs because of resources problem with most of the states. In view of this more support from the centre should be made available to SAUs as education is backbone for the future development of the Nation. **The main concern of agriculture education to be addressed by the Tenth Five Year Plan relate to globalisation, changing mix of the food and ensuring sustainability.** Ensuring quality of products and services and ability to undertake and adopt to change should hold key to strategy that will allow the configuration of agricultural education. **For a country of India's size, one IARI is not enough.** There seems to be requirement of at least one in each of the major ecological zones of the country. **If there are many IITs/IIMs, there should be several IARIs because**

**agriculture is conditioned by agro-climatic diversity.** India's march to its rightful position of an agricultural superpower demands more attention to agriculture of small/marginal farmers viz horticulture, floriculture, animal husbandry, fisheries etc. which have received relatively less attention all these years. There have been suggestions for creating separate Indian Council for Veterinary Sciences, Animal Husbandry and Dairying Development and even separate universities a few of which have already sprung on the national scene. **We need a Farming System's Approach (i.e. crop-livestock-fish-tree) in research and education, and not a fragmented approach. Agricultural Universities (SAUs) need to be diversified into Agricultural and Veterinary Universities (AVUs).**

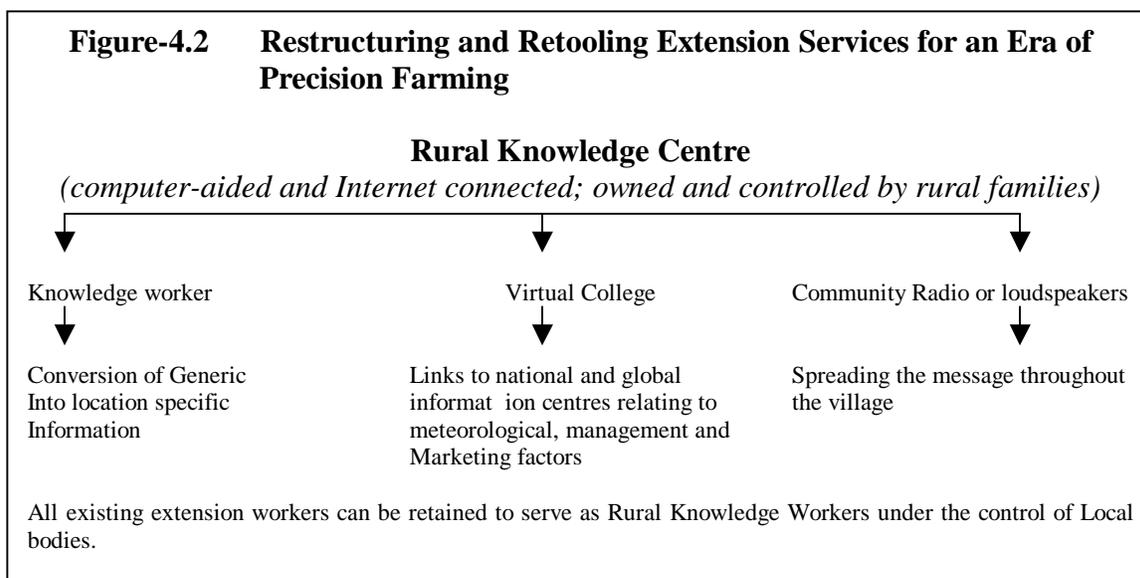
#### **4.5 Extension Services**

4.5.1 In the country the agriculture extension system has been strengthened under the World Bank Training and Visit package. There are around one lakh extension workers in different States. However, the lack of resources with States have affected the extension machinery/ transfer of technology at field level. The T&V system seems to have become out moded and ineffective. Besides, the present extension system has not been able to address the varied information needs of various farming systems.

4.5.2 Farmers' need for information is far more complex and dynamic than ever before, particularly from the marketability of the produce, from the points of view of efficiency, price, quality and other factors. If indications could become available to the farmers on the likely supply scenario on continual basis founded on the areas being under crops, especially the more perishable ones, it could assist the farmers to take a more rational decision on the crop production programme. Another area of major concern to the farmers is the availability of various inputs with the retail outlets close to their place of cultivation, which will mitigate from unproductive travel in sourcing of the inputs.

4.5.3 The extension system required to be broad based providing information with input support services. Private sector has to be encouraged to establish agri-clinics which besides information, would also provide input and technology support services.

In addition, **rural knowledge information centres** on the model adopted by MSSRF, could be established with Gram Panchayats or individuals. For re-organization and re-tooling of extension system some suggestions are given in figure-4.2.



## 4.6 State Land Use Boards (SLUBs)

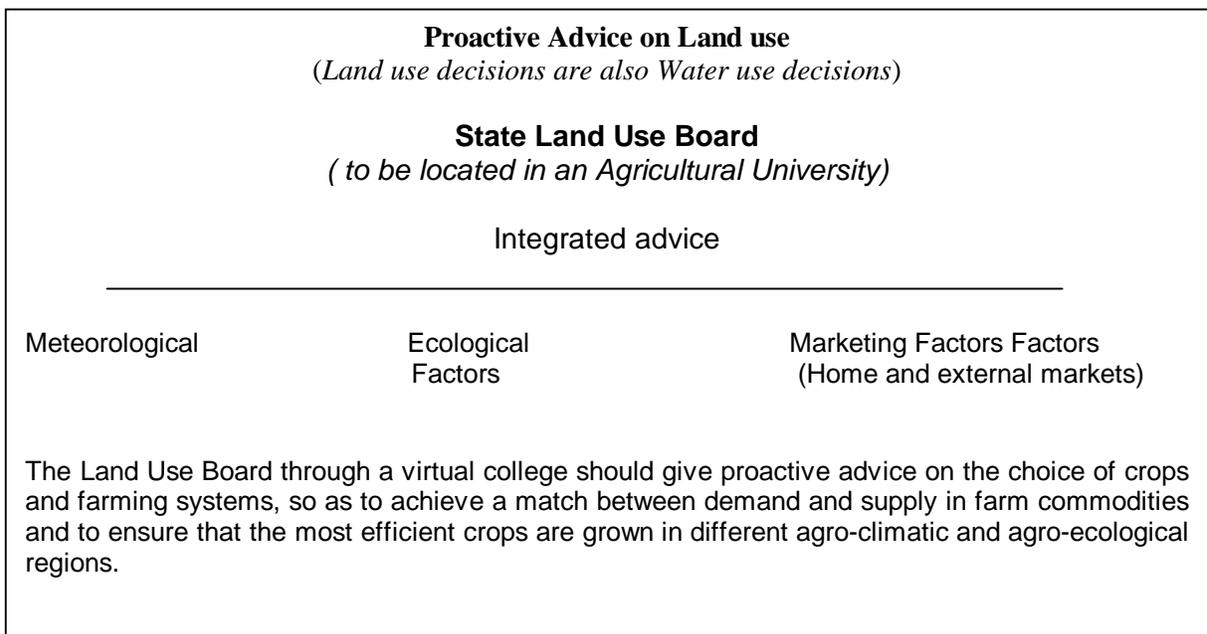
4.6.1 India's spatial planning has till now continued in the absence of a clear and comprehensive land use policy that takes into account all natural resources like water, forests, bio-diversity and mineral wealth as well as the inter-linkages between them. As a result, developmental programmes such as ports, mining, industry etc. which have a serious adverse impact on the surroundings including livelihoods, often come in areas where they should not, resulting in the loss of the habitat and conflicts between the residents, habitation and proponents of these initiatives. Even in the rural areas, that are devoid of such industrial and infrastructural developments, clarity on land use would benefit natural resource based planning such as grazing land development, rainfed farming, irrigated farming, forests development etc. This implies the need to device location specific interventions. The measures to be taken must essentially depend on the fragility and sensitivity of the eco-system to a particular form of land use vis-à-vis the type of socio-economic dependence on the concerned commodities.

4.6.2 Though, the need for integrated land use planning has been identified as a need in the Approach Paper to the X Five Year Plan, reviving the National Land Use planning Board and State Land Use Planning Board is long overdue. It is in fact, within the such

over arching planning and regulated authority that our sectoral policies on agriculture, industry and infrastructure should be nested. Its integration with principles of equity and distributive justice would form the basis for drawing long term perspectives.

4.6.3 The ecological security is the foundation of equitable and sustainable development. Proactive advice on land use based on ecological, climate, economic and marketing factors is becoming an urgent necessity. Some suggestions are given in **figure-4.3**. *Virtuals Colleges* linking scientists and farm women and men are becoming essential for promoting precision farming techniques.

**Figure 4.3 Structure and functions of proposed State Land Use Boards**



**4.7 Technology Missions**

4.7.1 For the development of different areas in agriculture, some Technology Missions have been created. The Technology Mission on Oilseeds contributed considerably and resulted in increase of production of oilseeds in the country, which reached a level of 25.21 million tonnes during 1998-99. The spectacular results have been because of integration of various activities like technology up-gradation and coordination with seed producing agencies for ensuring the availability of seeds. These have helped in improving the productivity of oilseed crops. However, the major contribution seems to have come from the increase in area from 19.02 million hectares in 1985-86 to 26.23 million hectares in 1998-99, especially under soybean and sunflower. During the same

period the productivity also registered a increase from 570 kg/ha to 944 kg/ha. The remunerative market prices also attracted the farmers to put in more area under oilseeds. **However, the tempo of Technology Mission on Oilseeds seems to have been slowed down as is evident from the stagnation in the production of oilseeds and corresponding increase in imports.**

4.7.2 The Technology Mission on Pulses, started after the Technology Mission on Oilseeds, seems to have remain ineffective. The production of pulses has remained stagnant with wide year to year fluctuations. In fact, the average annual production of pulses during the first four years of the Ninth Plan has declined as compared to the average annual production achieved during the 8<sup>th</sup> Plan.

4.7.3 Later on, the Technology Mission on Cotton was also launched. Besides the 'Technology Mission on Jute and Technology Mission on Horticulture for North-Eastern Region have also been launched. The Technology Mission on Oilseeds and Pulses are still continuing. These need to be reviewed. **The Technology Missions should be for a specific period to achieve the desired objectives and after that or even if these fails to deliver the results should be terminated. Also, they should be functionally linked to the watershed management and water harvesting programmes, in the form of an integrated technology session for farmers' well being..**

#### **4.8 Multi-State Cooperative Act**

4.8.1 The need to bring reforms in the cooperative sector has been felt since long. A Bill on Multi-State Cooperative Societies with the objective to remove the restrictive Provisions in the existing Multi-State Cooperative Societies Act, 1984 (51 of 1984) in order to provide functional autonomy and democratic management of Multi-State Cooperative Societies has already been approved by the Cabinet on 27<sup>th</sup> September, 2000. It has been proposed to delete the provisions of the existing Act relating to Restrictions on the term of office bearers of Multi-State Cooperative Societies, prior approval of Central Registrar for amalgamation and for transfer of assets and liabilities or division of multi-State co-operative societies. The Central Government's power to give direction to and/or supersession of the Boards of multi-State cooperative societies

have been restricted to such societies in which not less than 51% equity is held by the Central Government. The co-operative societies have also been permitted to raise resources by receiving deposits, raising loans and grants etc. without previous approval of Central Registrar. Provision has also been made in the Bill for the active participation of the members in the management of cooperative societies and disqualification for membership on account of non-attendance of three consecutive general body meetings or failure to use services provided in a multi-State co-operative society to the minimum level as provided in the bye-laws of such society. However, the Parliamentary Standing Committee, after holding discussion with experts in the fields of co-operatives and Secretary and other officers of the DAC, presented its report to Lok Sabha on 28.8.2001 has made several suggestions for incorporating in the Bill. It is hoped that the enactment of the Bill on Multi-State Cooperative Societies will help improve the efficiency of cooperatives.

#### **4.9 Water Users' Associations**

4.9.1 The irrigation potential created in the country has not been utilized fully. There are several problems like projects which started long ago have not yet completed; potential created have not been utilized; and the irrigation projects remained poorly maintained. The participatory irrigation management being emphasised since long can help improve the utilization of created potential and in increasing the water use efficiency. The participatory irrigation management approach is from part to whole that is from down to top management where the bureaucracy shares the responsibility of management along with the users. The basic element of operation is through an institutional structure that develops the participatory process by the bureaucracy and the user and evolves upward. The Ministry of Water Resources, Govt. of India has been urging the State Govt. for constitution of CADA boards, CADA councils and farmers Associations. The Farmers Water Users Association could (i) help develop irrigation infrastructure by availing institutional finance; (ii) procure water in bulk on volumetric basis from the source (also rainwater harvested in a watershed) and distribute to the land holders in accordance with the principle laid down by the general body for the equitable distribution of water; (iii) to operate and maintain canals situated within the jurisdiction of an association; (iv) to educate and train the beneficiaries in the field of efficient and

economic use of water and adoption of improved water management practices. Besides, such associations could also resolve the disputes that may arise amongst the land holders. In all the association can play a very important role in conservation and utilization of water resource and also in maintenance of irrigation infrastructure. It has been estimated that water efficiency in agriculture can be improved by 30%-80%. Even if a modest improvement of 30% is achieved, an additional area of 7 million hectares can be brought under irrigation. Along with optimum utilization of already created irrigation potential in major/medium irrigation system, an additional area of 5 million hectares can be brought under assured irrigation. Optimum exploitation of minor irrigation potential having very short gestation period would bring yet another 5.5 million hectare area under irrigation. Under no single Plan, so much area has been brought under irrigation. This target is easily achievable. In terms of additions foodgrains it means an extra 40-50 million tonnes, investment in this vital sector should therefore be given top priority. It will banish poverty from the country for all times to come.

#### **4.10 Inter -Agency Action Council for Rural Technologies.**

4.10.1 CAPART has not been successful in bringing about a revolution in the technological empowerment of rural families. **There is an urgent need to fill the gap between the extensive know-how available with research institutions and the field level do-how to bring about a technological revolution in rural professions –both farm and non-farm. It would be useful to establish an Inter-Agency Action Council Technological Empowerment of Rural Families.** Such a Board should consist of representation of all major scientific organizations like ICAR, CSIR, ICMR, DBT, DST, DOD, MNES, and Departments of Atomic Energy, Space and Electronics and representatives of Producers/ Rural Organizations. We should not lose further time in taking the benefits of frontier technologies to the rural poor. Access to appropriate technologies should be included in the Minimum Needs Programme. ICAR, with its vast network institutes, SAUs and Krishi Vigyan Kendras could be the nodal point for the Inter-Agency Action Council.

## CHAPTER-5

### NATIONAL CHALLENGE PROJECTS AND NEW DEAL FOR SELF EMPLOYED

#### 5.1 National Challenge Projects

5.1.1 A large number of agricultural programmes and schemes are being implemented by different departments at Central level and at State Level. These have contributed immensely in increasing the production and productivity of crops and also livestock produce, besides increasing the income of rural households. India has covered sufficient ground on road to self-sufficiency in foodgrains. In the field of dairy sector, there has been a tremendous progress and the country has become the largest milk producer in the world. The production of fisheries has also increased which albeit off late has shown some sluggishness especially in case of marine fisheries.

5.1.2 Now in the 21<sup>st</sup> Century the challenges are tough but the opportunities are immense. Economic and Information globalization and World Trade Agreement in Agriculture have opened up several new opportunities to increase our exports for foreign earnings or to compensate for the imports which we are obliged to do because of WTO led trade regulations. To face the new challenges, our strategy for the development of agriculture has to be based on sustainable higher growth rate; which is more remunerative to the farmers by applying cost reducing productivity improving and environment friendly technologies. Keeping these considerations in view, **there is need to identify and launch ‘National Challenge Projects’ which should be implemented in a mission mode, with concurrent attention in the production, processing, marketing items.**

#### **1. Waste land development using Sampoorna Gramin Rozgar Yojana:**

Because of the increasing population pressure, the per capita availability of land is declining. Many households have unviable holdings and increasing number of households are becoming landless or may become so in coming years. Therefore, the available land resource should be utilized fully and sustainably. Besides fallow lands, it

is estimated that about 63.85 million ha<sup>10</sup> wastelands in the country are lying unutilized or underutilized. These waste lands have been main support system to the landless and rural poor as these provide their bio-mass needs. Most of these wastelands are under the control of Central or State Government and in some states are controlled by the Gram Panchayats. There is need to make all the wastelands green and productive by utilizing them to produce bio-mass. All the wastelands under public ownership could be allotted to the landless/poor households for development in viable units of 2 ha each. The participant families should be supported by the Central and State Govt. in terms of loan and subsidy facilities and technical help. A credit linked subsidy programme could be chalked out for assisting the participants to help develop the allotted land and utilize it for agricultural activities of their choice like crop raising, horticulture, agro-forestry, dairying, fisheries etc. provided 50% of the land is put under useful tree cover appropriate to the ecosystem. The Planning Commission seems to favour supporting such a programme on the pattern of 20% participants' contribution, 50% loan and 30% subsidy. The participants' contribution could be provided under one of the poverty alleviation programmes. Carefully designed shelf of projects for development/reclamation with technological and financial support will help to accelerate progress in wasteland reclamation. The choice of tree species should be based on likely market demand, as for making furniture or for use as raw material in paper, rayon and other industry.

## 2. Agro-aqua Farms along coastal region (linking ecological with livelihood security):

India has a coastline over 7500 Kms, in addition to the Andaman, Nicobar and Lakshadweep group of islands. In addition, India is

### Integrated Aqua-Agro Complexes for Coastal Area

Integrated aqua-agro complexes of coastal could be a very promising land and water use system. Concept of integrated aquaculture and agriculture can be a boon for large coastal area of the country. Shrimp farming in the coastal area is a profitable proposition but often effluent discharge is a problem. Experiments of integrated aquaculture with seawater growing Halophytes like *Salicornia* can be doubly advantageous. The vegetation can make use of the effluent discharge from shrimp cultivation and ponds with integrated farming can bring good profits from *Salicornia* seeds (high quality edible oil), vegetables and biomass for animal feed. This has been demonstrated in Mexico, Arizona, Eritria and other countries. Dr.Swaminathan, (MSSRF, Chennai) and Dr.M.H.Mehta (Vice-Chancellor, GAU) have further proposed to have a larger integration starting with mangroves in the sea water, shrimp farming in the coastal land, *Salicornia* and other Halophytes and new varieties of salt tolerant fruit trees including Amla, Ber, date palm etc. Pilot plant experimental farms at Mundra, Kutchh have been taken up and once successfully demonstrated can become a model for many other locations.

M.H.Mehta and M.S.Swaminathan July GAU; 2001."Agricultural Rehabilitation Programme for Earthquake Affected Gujarat, GAU in Service of the Quake hit-to convert a problem in to an opportunity"-

<sup>10</sup> NARSA, 2000

entitled to over 2 million square Km of ocean surface under its Exclusive Economic Zone. There is great scope in coastal areas to introduce an integrated strategy for the use of land and ocean surface. Agro-aqua farms can be established along the coast, which involve concurrent attention to culture and capture fisheries and forestry and agro-forestry. Among tree species, Mangroves, *Salicornia* and *Casuarina* confer both ecological and economic benefits. Sustainable coastal aquaculture can enhance nutrition and income security. During the X Plan period, coastal States could plan to establish Agro-Aqua Estates, which provide key centralized services to decentralized production by farm and fisher communities. Coastal aquaculturists should conform to a code of conduct which ensures the environmental safety of the operations carried out.

These farms should be provided with basic infrastructure such as hatcheries and grow out facilities for endangered species of animals, fish, mangroves, etc. Coastal biodiversity should be conserved. Such Agro-Aqua estates could provide to their members with key centralized services to support *decentralized production*. A micro-survey of the coastal regions could be essential to identify suitable locations for such agro-aqua farms, it may however, be ensured that the traditional rights of coastal fishers to fish for subsistence and livelihood is not obstructed. Besides, conservation of the fishery resources such farms should also be used for demonstration for diversifying activities of different techniques to be used for fishing operations. This type of demonstration in the coastal region may encourage the fishers to go for exploitation of different type fishery resources in a sustainable manner, thereby providing them livelihood.

### **3. Deep Sea Fishing:**

Formulation and introduction of new deep sea fishing policy consistent with national interest to exploit fishery resources in the Exclusive Economic Zone (EEZ) should be given top priority. The present vacuum is having several repercussions, more important of which is leaving the EEZ open to other neighbouring countries and owners of foreign fishing vessels who are taking advantage of the situation for their benefit. Even land locked neighbouring States may stake their claim legally if we do not put our act together on under-exploited marine resources in the Indian EEZ.

As of today, the deep-sea fishing industry is almost 100% shrimp oriented enterprise, faced with over exploitation of the available shrimp resources as well as the competition from the smaller class of vessels. The programme should be aimed at suitable intervention to exploit the deep-sea fishery resources in the EEZ and beyond through introduction of resource specific deep-sea fishing vessels. It is also felt that any successful introduction of a larger fleet fishing in the deeper waters would have to be complemented with an affective mechanism of monitoring, control and surveillance, including the coverage through Vessel Monitoring System (VMS) in the Indian EEZ.

The existing regulatory policies also restrict fishing season, fishing areas and the mesh size of gear. However, there is no monitoring and surveillance system available with the concerned implementing organizations. Voluntary compliance by the fishermen to operate in the areas allotted to them, is totally absent and encroachment by the larger mechanized vessels in the areas demarcated for the artisanal craft continues. The Union Government has now proposed to introduce a vessel monitoring system, which is expected to resolve the problem. Similarly, the Union Government should also consider providing a fresh model bill to the States/Union Territories to enable them to revive their MFRA on the basis of their present requirements and also global initiatives to which India is a signatory.

#### **4. Minor irrigation in Eastern India:**

The development of HYVs and production technologies by the ICAR/SAUs Research System helped usher in Green Revolution in the country but the benefits of the Green Revolution have mainly been confined to the well endowed areas having irrigation and other infrastructure for agriculture development. The areas like eastern part of the country, North Eastern Region, Central and some Western part of the country and also Eco-fragile Hilly and Coastal areas could not realise the benefits of productivity advances associated with the Green Revolution. This has been mainly because of poor water management techniques/practices. In Eastern Regions of the country, the twin problem of excess moisture during rainy season and moisture stress during *Rabi* summer season have affected the development of agriculture as the improved production technologies could not be adopted by the farmers owing to high risks of crop failure. High rainfall and lack of water harvesting structures are endemic to the area. In spite of

this, the ground water potential of the region is immense. Because of high ground water table, the soil is not able to absorb the rain water which quite often results in floods. It is estimated that only about 20% of the existing ground water potential have been utilized in the region. The states like West Bengal and Eastern UP where the utilization of ground water potential is higher have been able to develop their agriculture. The recent example is that of Assam State where the development of ground water resource through shallow tube wells has resulted in a large market surplus of paddy in a very short period of two years. For the development of agriculture in the region it would be necessary to harness the ground water potential in a scientific manner. This will help in increasing additional crop area through multiple cropping and increase in productivity by enabling the adoption of improved production technologies. Besides, it could also help reduce the frequent floods/water stagnation in the region by enabling more absorption of rain water/vertical drainage. Also, the South West Monsoon/ flood prone season is suitable for the cultivation of organic rice and vegetables.

Although, the Department of Agriculture & Cooperation has initiated a new scheme "On-Farm Water Management for Increasing Crop Production in Eastern Region", the programme is very small considering the magnitude of opportunities and scope to harness the potential. If the overall level of 20% exploitation of ground water has to be taken to permissible level of 85% it will need massive effort/investment during the X<sup>th</sup> Five Year Plan so as to make a major dent on productivity and in alleviating the rural poverty in the region.

##### **5. Gender Dimensions of Agricultural Research, Extension and Development:**

National Agriculture Policy, 2000 states that mainstreaming gender concerns in agriculture will receive special attention of the Government. Appropriate structural, functional and institutional measures have been promised to empower women and build their capabilities and improve their access to inputs, technology and other farming resources. Approach paper to the Tenth Five Year Plan stipulates the continuing need to supplement the normal growth process with special programmes aimed at special target groups like women. Women are the most vulnerable group within every section of the population. There is, thus an urgent need to review the outcomes and impacts of on-going programmes on them and redesign if necessary to advance gender equality goals.

In some of the areas of the country like hill areas, women are the main force behind the development of agriculture. However, their participation in policy decision making, in research and extension and also in the development of agriculture at National, State, District and Panchayat level is still insignificant. Bringing about a change in this situation will require engendering the agricultural curriculum, knowledge and skill improvement of women in panchayats and other local bodies. The gender concerns in agriculture have also to be addressed through research activities by focussing on those activities in which women play a key role. Women's participation in technology and input delivery system will be important to reach the unreached. Besides, the legal rights of farm and tribal women have also to be protected. **A 'National Project on the Technical Empowerment of Women in Agriculture' with provision for engendering the basic curriculum of Agricultural, Veterinary, Fisheries and Forestry Colleges, should be initiated by ICAR.**

#### **6. Organic Farming Zones:**

To encourage organic farming in the country, a project could be introduced to provide support to the producers in form of technology and services including the technical advice and inputs required for organic farming. The identification of organic zones for the production of various crop commodities could be done depending on the agro-climatic conditions and land and water resources. Some beginning has already been made in case of spices through the support of Spices Board. The export of cotton and few other crop commodities like pineapple is also being done, but the quantity of produce exported is just a small fraction of the potential we have. For making an impact in this area, it will be necessary to develop requisite infrastructure especially for post harvest handling and certification of produce, besides providing technological support and services to the producers. At present, there is no agency in name to certify the organic produce except some limited facilities for spices and cotton. Therefore, **certification agencies accredited by world organization, have to be set up both under public and private sectors to facilitate the export of such produce. Besides, linkages for assured market of organic produce have also to be developed under such project.**

## **7. Animal Disease Free Zones\_:**

The zone concept should be focused to the areas where there is export potential for meat, milk, skin/hide and other livestock products or the areas from where the disease could be easily controlled and animals and animal products could be exported. While considering these factors, the movement of animals needs to be kept in mind. Proper planning and identification of containment zone would be the key factor for the successful control of Foot & Mouth Disease.

## **8. Soil Health Management with particular reference to micro-nutrient deficiencies:**

Besides being thirsty, our soils are also hungry and malnourished. Because of mostly hot and humid conditions, the Indian soils have low capacity of preserving the organic matter. Over and above this, the practices concerning recycling of crop residues and organic wastes are unsatisfactory. The imbalanced use of fertilizers has also added to the soil health problems which is already low in organic matter content. The imbalanced use of fertilizers especially under intensive cropping system has resulted in the deficiency of several micro nutrients. This situation has become widespread especially in Northern and North Western parts of the country. The negative impact of imbalanced use of fertilizers, non/less use of organics and increasing micro nutrient deficiency has already started showing on yield of crops. The crop yields in such areas are plateauing and fertilizer input and crop output ratio has gone down. These second generation problems which have cropped up in intensive agriculture areas have to be solved by encouraging sustainable cropping /farming systems and production technologies. **To check further degradation of soils especially in terms of organic matter content and micro-nutrients a special programme needs to be drawn up for which support could be provided to the farmers in the form of technology and assistance so as to encourage the sustainable practices and use of micro-nutrients and soil amendments.** Most soil testing laboratories are in poor shape and perform much below their capacity. There is almost total lack of infrastructures for testing micro-nutrients. The much needed productivity and quality revolution can be achieved only through balanced fertilization and soil health care.

## **9. Sanitary and Phyto-sanitary measures and Codex Alimentarius Standards of Food Safety:**

With the integration of our commodity market globally there will be increase in pressure on our commodities for conforming to standards generally acceptable in the world market to fetch similar prices in the market place. Besides, such sanitary and phyto-sanitary standards should be enforced in the domestic market so that food items which are free from pesticides residues and mycotoxins are available to ensure better health to our people. Unless there is quality consciousness with reference to food items sold in the domestic product, the required standards of quality with reference to export commodities are unlikely to be achieved. Contamination with pesticides residues and mycotoxins with the food items also affect adversely health and the immune system of the body. These are important areas which need to be taken care of and our standards of hygiene have to be improved. There is need to take up an integrated programme on sanitary and phyto-sanitary measures by creating an awareness amongst the growers and consumers and by promoting infrastructure development for sampling and analyses and for taking measures to prevent the contamination of food items with pesticides and mycotoxins. Post-harvest handling, storage and transportation of food items need urgent attention of the urgently needed **Quality revolution**, both for domestic and export markets, is to be achieved.

### **5.2 NEW DEAL FOR THE SELF EMPLOYED:**

5.2.1 About 69% of our population is still dependent on agriculture but the share of agriculture sector in the GDP has gone down substantially to about 24% at present. This indicates that the share in income of rural population, which is dependent on agriculture, has come down and their income has not increased in the same proportion as in case of other sectors during the corresponding period. The poverty ratio has come down to 26% as derived from the consumption survey of 55<sup>th</sup> round (1999-2000) quinquennial survey of NSSO. Most of the poor reside in rural areas. Their nourishment requirements are not met. In spite of the fact that the availability of foodgrains is just adequate, there are large surplus stocks in the reserve pool indicating poor economic access of the people to the food. It can be increased only by increasing their purchasing capacity through better employment livelihood opportunities. The opportunities have to

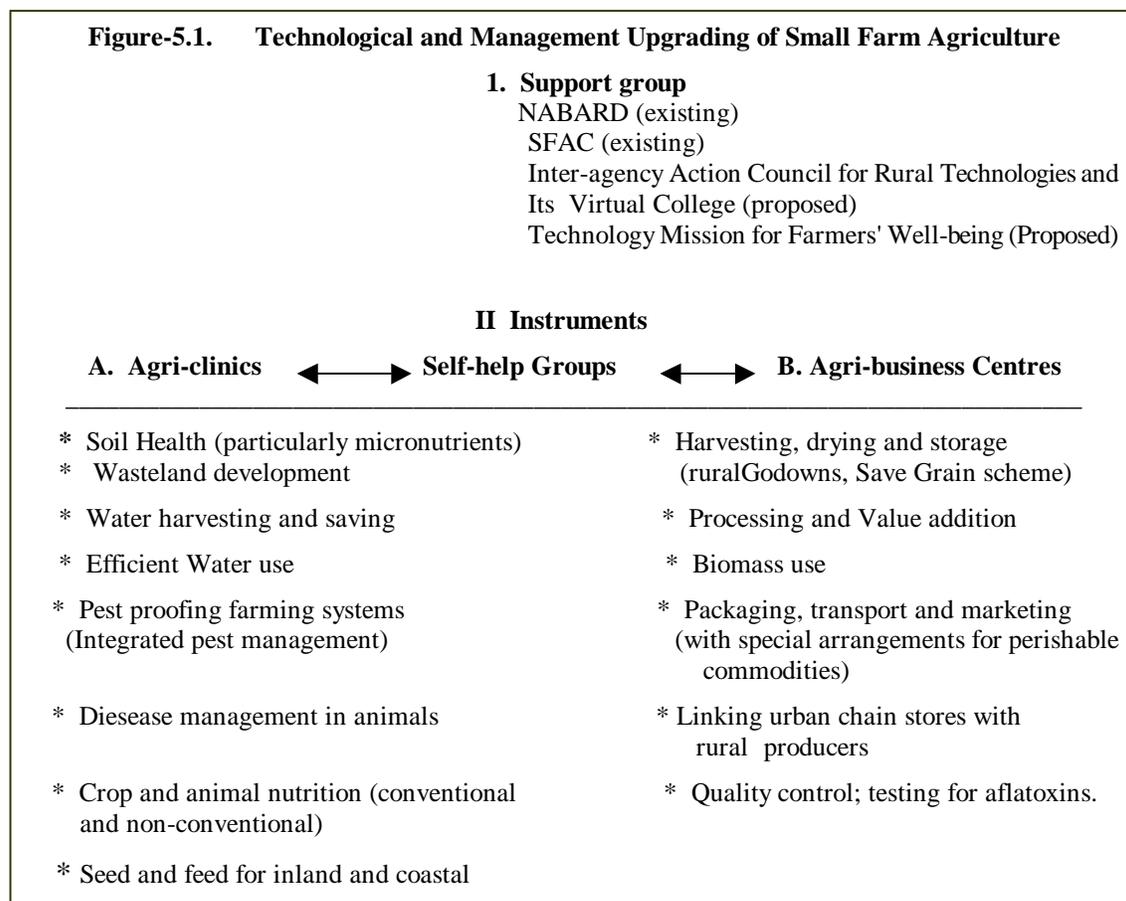
be created for the self-employment of rural youth by helping them to set up their own agri-enterprises/agri-ventures or by providing them land based employment opportunities. There is need for integrated attention to on-farm and non-farm employment. A strategy for the sustainable intensification of farming system as well as their diversification, and value addition to primary commodities will have to be planned in each agro-climate area. Some of the programmes listed below may be useful in generating the employment and also improving technological and support services to the farming community.

**(1) Agri-clinics and Agri-business Centres:**

The public extension services to the farmers under the Village Level Worker (VLW) and Community Development Block based manual extension system have become weak. The system has become outmoded as it is not effectively responsive to the changing agricultural scenario resulting from economic globalization. Some alternatives have to be found out, besides making the public extension services more effective with existing infrastructure and human resource. Moreover, the information needs of the farmer have become very varied in changing atmosphere from sustenance farming to commercial farming. Our agriculture is fast changing from being a 'a gamble in the monsoon' to one of being 'a gamble in the market'. The extension network has to take into consideration variations in degree of sophistication and attitude of farmers and other administrative and institutional structures of the region. There is need for a demand driven system. Services needed at the village level must be entirely controlled by the user groups themselves, and transmitted to them through modern IT systems. The role of non-government sector is also need to be increased. The revolution in the communication technology could help in meeting both the generic and dynamic components of the information needs of farm women and men.

Establishment of Agri-clinics and agri-business centres by the farm graduates by providing them credit facilities through commercial institutions is a step in this direction. Such agri-clinics could provide diagnostic services and information support to the farmers like technology for pest proofing of crops and animals, production technology, information about seeds and other inputs, market prices, etc. Similarly, the agri-business

centres besides providing market information support to the farmers could also provide input support and services on payment and can provide employment to some other rural youths. These could produce seed for the farmers, seedlings/ quality planting material of horticulture and vegetables, bio-control agents, bio-fertilizers; provide testing facilities for soil, irrigation water, fertilizers, bio-fertilizers, pesticides, veterinary services, AI services, livestock produce processing, etc. on payment basis. Above all, there is need for undertaking agro-processing in villages, so that opportunities for value added



employment become available to landless labour families. Such agri-clinics and agri-business centers will be economically viable only if a proper space is created for their economic viability. For the success of such ventures, Government, ICAR institutions and SAUs should train farm graduates to take to a career of remunerative self-employment through the establishment of Agri-clinics and Agri-business Centres. This will help to improve the efficiency of farming and reduce the cost of production considerably, besides providing the employment opportunities to thousands of educated youth. Proposals for the expansion of public extension services should take into account the

opportunity available now for thousands farm, veterinary, fishery and home science graduates to set up an integrated guide of agri-clinics and agri-business centers in villages. Such self-employed youth should be supported by appropriate technical consortia as shown in figure 5.1.

**(2). Public policies to promote remunerative self-employment for educated youth:**

For employment to rural youths, government already has several programmes but these programmes do not attract the educated rural youth. Besides the ongoing programmes have the limitations in availing of facilities only for certain activities which generally require less capital investment. The ventures/enterprises established with small capital would not be attractive enough to generate adequate employment opportunities for a large number of persons. Therefore, whereas the self employment programme is to be taken up on a mass scale attractive credit support facilities with low interest rate and longer period of repayment will have to be introduced.

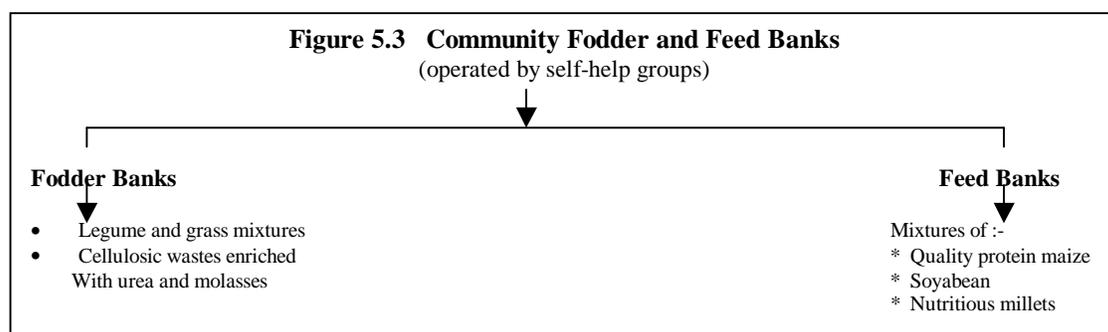
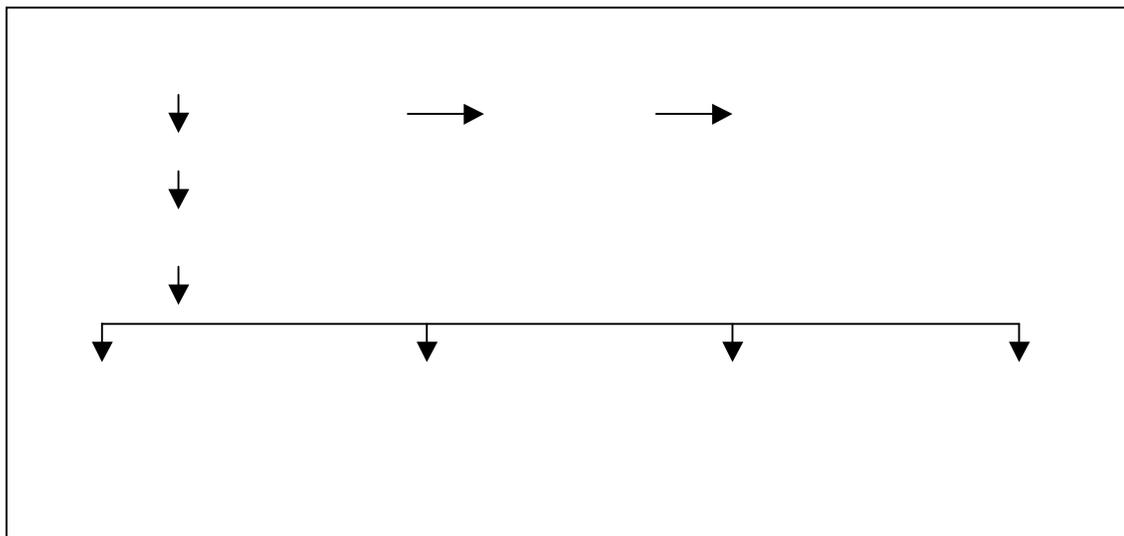
Proper policy measures to ensure unrestricted movement of agri-commodities, rural roads and godowns, encouraging livestock enterprises, agro-forestry, tree farming, freedom for cutting/logging all trees species grown on farmers lands etc. have to be introduced to attract rural educated youth in setting up agri-business centres/enterprises. Public policies for providing economic space for successful self-employment are urgently needed.

**(3). Community Food, Feed and Fodder Banks: Pathway to a Community Nutrition Security System:**

Establishment of community food, feed and fodder banks in rural areas could be taken up. To ensure the availability of food to human population and also feed and fodder to the animals. In future, non-degree, short-term, peripatetic training should be given as much importance by SAUs as is being currently given to degree programmes. The structure of community food bank and community feed and fodder bank are suggested in figures-5.2 & 5.3 .

The government of India has already initiated programmes like ‘Sampoorna Gramin Rozgar Yojana’ and ‘Tribal Grain Banks’. It should be possible now for initiating a

Community Nutrition Security System based on promoting convergence and synergy among all on-going programmes, so as to achieve a whole life-cycle approach in dealing



with the nutritional needs of an individual. Pregnant and nursing mothers and infants in the age group 0 to 2 years (nearly 80% of brain development is completed during this stage) need particular attention.

**(4). Hydrologic and Biodiversity ‘Hot Spots’:**

Hydrologic hot spots like Cherapunji in Meghalaya and biodiversity hot spots in the N.E. region , Western and Central Himalayas, Western and Eastern Ghats should be accorded the highest priority in the X Plan in eco-restoration and Food for Work programmes. The demonstration benefits of such eco-restoration are immense.

**(5) Integrating Technology Missions:**

There are Technology Missions for pulses, oilseeds and cotton, as well as a large watershed development and water harvesting programme. There is need for functional

integration among these programmes, so that the conserved water can be used for growing high value but low water requiring crops like pulses and oilseeds. High priority should go during the X Plan period for increasing the impact of the crop centred Technology Missions with the water harvesting and wasteland development programmes. At the field level, Technology Missions should converge in a synergistic manner, so that they take the form of an Integrated Technology Mission for Farmers' Well-being.

**(6). Safeguarding against invasive alien species:**

With increasing bulk imports of agricultural commodities like pulses, oilseeds, fruits and animal and poultry products, the threats to India's food and livelihood security through the introduction of invasive alien species (weeds, insect-pests and pathogens) is increasing. We do not have adequate checking and monitoring facilities. The National Bureau of Plant Genetic Resources (NBPGR) of ICAR has been reporting an alarming increase in the introduction of invasive alien species. Therefore, the Ministries of Agriculture, Commerce and ICAR should take steps to create the necessary infrastructure for preventing the unintended introduction of serious threats to our crops and farm animals. Import of animal products should not be allowed until the necessary monitoring mechanisms are in place. The experience of the United Kingdom with reference to the "mad cow" and foot and mouth diseases in dairy animals underlines the importance of strict vigilance against alien invasive species.