Preamble-

The WTO Agreement on Agriculture has been approved on 24th April, 1994 and at present along with India 140 countries have signed this agreement. This agreement has brought about an appreciable changes in last two years in Agriculture of the State. Under this agreement, primarily import duty, domestic support and export subsidy are three important areas. In 1998, the Cabinet decided to constitute Agriculture Commission for planning Agriculture development. However, world trade and related issues were not under consideration at that time.

2. Though, at present there is no large scale import of agriculture produce, the expectations that this agreement on agriculture would provide various opportunities of export of agriculture produce have not come true. Maharashtra, in last 5 decades has made noticeable progress in agriculture and horticulture areas. Due to research in agriculture, establishment of agriculture department and inclusion of hybrid/improved seed varieties, agriculture related programmes are being implemented successfully. In last decade, Employment Guarantee Scheme linked Horticulture Programme has been successfully implemented and achieved a record production in horticulture crops.

3. Though, there is progressive development in agriculture sector, due to adverse climatic conditions, in order to protect the interest of farmers the State Government had to resolved to procure of important crops (cotton etc.). Due to the price fluctuations in the open market, there is a dilemma before farmers as to what crop pattern should be adhere to. On the other hand, to find the market for fruits and vegetables, to facilitate export and to create infrastructure for processing of agriculture produce is also a challenge before the Government. Considering all these aspects it has become pertinent to give right direction and vision for corning 25 years in agro based industries and agro related pursuits. In order to face WTO and to avail maximum opportunities and to reduce the adverse impact to The farmers and to prepare the farmers for better export by supplementing it with right technology, for proper planning of limited water resources and its management are being the need for the future. The Government has decided to make comprehensive and long term planning in agriculture development and to give the right direction in
all these areas. For this the proposal to appoint a high level committee under the chairmanship of Dr. M.S. Swaminathan to prepare draft action plan for coming 25 years in agriculture related areas was under the consideration of the State Government.

Government Resolution-

In order to formulate draft plan for the agriculture related areas for coming 25 years, the Government has decided to constitute a high level committee under the Chairmanship of Dr. M.S. Swaminathan. The state has also decided to declare Dr. M.S. Swaminathan as State Guest of Government of Maharashtra. The committee consists of experts in agriculture related subjects. The constitution of high level committee will be as follows

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<tr>
<th>Sr.No.</th>
<th>Name</th>
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<tr>
<td>1</td>
<td>Dr.M.S.Swaminathan</td>
<td>Chairman</td>
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<td>2</td>
<td>Dr.Jayantrao Patil, Ex Member, Planning Board</td>
<td>Member</td>
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<td>3</td>
<td>Dr.Y.S.Nerkar, Director, VSI, Pune</td>
<td>Member</td>
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<td>4</td>
<td>Dr.S.N.Desai, Ex Vice Chancellor</td>
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<td>5</td>
<td>Dr.S.N.Puri, Vice Chancellor, MPKV, Rahuri</td>
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<td>6</td>
<td>Dr.V.M.Pawar, Vice Chancellor, MKV, Parbhani</td>
<td>Member</td>
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<td>7</td>
<td>Dr.S.S.Magar, Vice Chancellor, Dr.BSKKV, Dapoli</td>
<td>Member</td>
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<td>8</td>
<td>Dr.M.L.Madan, Ex.V.C., Dr.PDKV, Akola</td>
<td>Member</td>
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<td>9</td>
<td>Dr.M.C.Varshneya, Head, Dept. of Meteorology, Agriculture College, Pune</td>
<td>Member</td>
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<td>10</td>
<td>Dr.Badranarayan Ramulal Barwale, Chairman, MAHYCO Seeds Ltd.</td>
<td>Member</td>
</tr>
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<td>11</td>
<td>Dr.V.S.Khuspe, Ex.Vice Chancellor, MKV, Parbhani</td>
<td>Member</td>
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<td>12</td>
<td>Father Bacher, WOTR, Ahmednagar</td>
<td>Member</td>
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<td>13</td>
<td>Shri.Prithviraj Chavan, Ex.M.P., Karad</td>
<td>Member</td>
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<td>14</td>
<td>Representative of MCCIA, Pune</td>
<td>Member</td>
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<td>15</td>
<td>Commissioner Agriculture</td>
<td>Member Secretary</td>
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2. The terms of references of the committee will be as follows:
   1) To review the present cropping pattern and also varieties of seeds/planting material use in various agro climatic zones of the state and recommend desired interventions,
   2) Recommend measures for reduction in gap between potential and actual productivity of various crops in various agro-climatic conditions,
   3) To review varieties of fruit plants propagated under the ongoing scheme of
horticulture under EGS and recommend intervention, if any,
4) To review public sector research in cereals, pulses, oil seeds and cotton and recommend the future course of action to make them need based,
5) Setting the direction and programme for public sector research in the fruits and vegetable sector
6) Recommend intervention in Fruits & Vegetable sector by way of import of promising varieties of seeds / planting material until such time the public sector research yields desired results,
7) To study the scope for diversification of agriculture to Floriculture spices, aromatic and herbal plants,
8) To draft action plan for the application of biotechnology in agriculture,
9) To review present strategy of the state with respect to soil and water conservation and reclamation of degraded land and suggest interventions required.
10) To review present policy of state of agriculture produce marketing, export, processing and suggest reform / action plan.
11) Any other aspect of agriculture of the state which the committee thinks fit to be incorporated in action plan.

3. The committee should submit its report within a period of six months.

4. Administrative members attending the committee meeting are eligible for re-embursement of traveling / daily allowances as per the provisions of the Mumbai Civil Service Rule part II annexure 42(A) section (One)(B) and Government Resolution, Finance Department No. TRV 10981CR74/S8/ Seva5, dated 4th December, 1999. Non-official members appointed on this committee will also be eligible for re-embursement of traveling / daily allowances as per the provisions of above mentioned rules. However, traveling by air or by railway A/C first class is not allowed. Legislative member / member of parliament appointed on this committee are eligible for TA / DA as per the provisions made in the Government Resolution Finance Department No. TRA 1470/ 131/ 18 dated 27th January, 1971.

5. The expenditure incurred for this allowances should be debited to the following budget head and met from the grants sanctioned there under for the year 2001-2002.
   Demand No, D-10.
   3451-Secretariat Economic Services:
   090- Secretariat
   090- Secretariat (I)(A) Agriculture, Animal Husbandry, Dairy Development and Fisheries Department.

   Voted (3451 0028)
   The Under Secretary and Drawing and Disbursing Officer of Agriculture, animal Husbandry, Dairy Development and Fisheries Department, Mantralaya, Mumbai is authorised to incur the expenditure, on this account.

6. This Government Resolution issues with the concurrence of, the Finance Department vide its u.o.r. No. 580 /Exp.1, dated the 1st December, 2001.

By order and in the name of the Governor of Maharashtra.

/-/
(Shivajirao Deshmukh)
Secretary ( Agriculture & Horticulture)
ANNEXURE-II

HIGH LEVEL COMMITTEE OF THE GOVERNMENT OF MAHARASHTRA TO PREPARE AN ACTION PLAN FOR AGRICULTURAL PROGRESS IN THE STATE

Interim Report and Recommendations

The Committee chaired by Dr. M.S. Swaminathan has had two meetings so far. The following Working Groups have been set up to suggest ways of consolidating the progress already made in the State and to make new gains in enhancing the productivity, profitability and sustainability of the major farming systems of the State.

1. Water and Soil Conservation and Management - so as to capture and conserve every drop of water and to produce more crop and income per drop of water, and to preserve soil health in a manner that farm productivity can be enhanced in perpetuity (Chair : Father Bakar).

2. Sustaining and expanding the Horticultural Revolution (including cashewnut) and organizing Small Holders Horticulture Estates, so as to confer on small and marginal farmers the advantages of scale in both production and post-harvest technology (Chair : Dr. Jayantrao Patella).

3. Mobilizing Frontier Technologies (Bio-information, space, nuclear, renewable energy and management technologies) and fostering an expanded Education for Agricultural Progress and Prosperity programme, using also distance education techniques (Chair : Dr. M.L. Madan, VC Dr. Punjabrao Krishi Vidyapeeth).

4. Achieving Productivity and Quality Revolutions in an environmentally and economically sustainable manner (Chair : Dr. Y.S. Nerkar).

5. Herbal Technology, Medicinal and aromatic plants, establishment of a herbal bio-valley and promotion of organic farming using IPM and other environment friendly technologies (Chair : Dr. S.N. Puri and Pawar).

6. Coastal aqua-agriculture including post-harvest technology.

7. New Deal for the self-employed educated youth by enlarging the space for remunerative self-employment. This will involve attracting and retaining farm, veterinary, fisheries, home science, commerce and management graduates in the following market-driven enterprises.

* Agri-clinics
* Agri-business Centres
* Food Processing Parks
* Biotechnology Parks
* Computer and internet aided Rural Knowledge Centres
* Manufacture of agricultural implements
* Soil Health Management with particular reference to testing for micro-nutrient deficiencies.

8. **Enlarging the role of the private sector in transforming Maharashtra's agriculture**, including the initiation of an era of genetic revolution, with attention to hybrids of wheat, rice, cotton, pigeon pea, jowar, bajra and vegetable crops. (Chair: Dr. Badrinarayan R Barwale).

9. **Enlarging agricultural exports** and strengthening for this purpose post-harvest technology, sanitary and phytosanitary measures, aflotoxin testing facilities and adoption of codex alimentarius standards of food safety. (Chair: Shri Bijay Kumar, Commissioner Agriculture).

10. **Strengthening the role of women in agriculture**, by paying special attention to the addition of economic value to their time and labour, providing the needed support services such as credit and technical support for self-help groups.

11. **Strengthening the ecological foundations essential for sustainable agriculture**, with particular reference to the conservation and sustainable and equitable use of agro-biodiversity (keeping in view the provisions of the Protection of Plant Varieties and Farmers' Rights Act and the proposed Biodiversity Act). (Chair: Ms Dilnavaz Variava).

12. **Mobilizing resources** (technical managerial and financial) for agricultural progress (Chair: Shri Shivajirao Deshmukh).

The above Working Groups will be submitting their precise action points by March 31, 2002. They will take into consideration the need for concurrent and interactive attention to technology, training, techno-infrastructure and home and external trade. They will also indicate the packages of services and public policies needed to achieve the goals of more food, more income and more jobs / livelihoods.

**Recommendations for incorporation in the budget for 2002-2003**

The Government attaches greatest importance to enhancing factor productivity in agriculture through concurrent attention to monetary and non-monetary inputs thereby reducing the cost of production and enhancing income per unit of input. In an era of liberalization of trade, it is imperative that we increase the efficiency of agricultural operations and add value to primary products. For enabling our farm men and women to achieve productivity and quality revolutions. Government proposes to take immediately the following four measures.
First, it is proposed to establish four Demonstration-cum-Training Centres in Precision Farming and High Technology Horticulture at each of the Agriculture Universities (Rahuri, Akola, Parbhani and Dapoli).

Second, it is proposed to establish both in the private and public sectors additional facilities for testing soils for micro nutrients like zinc, boron etc. There is evidence that farmers are not getting full benefit from the application of nitrogen, phosphorous and potash due to the deficiency of micro nutrients. It is proposed to make good this deficiency.

Third, additional facilities for sanitary and phytosanitary measures, testing centres for aflatoxins and for adopting codex alimentarius food standard will be created, so that we can enhance further our agricultural exports.

Finally, a major initiative will be launched for providing our farm, home science, veterinary, fisheries, commerce and management graduates greater opportunities for remunerative self-employment. For this purpose all avenues like the establishment of Agri-clinics and Agri-business Centres, Food Processing and Biotechnology Parks, Computer and Internet aided Rural Knowledge Centres and agro-aqua Parks along the coast, will be provided to our educated youth. Government will make a major effort to attract and retain educated youth in farming so that knowledge and skill intensive agriculture is promoted. A Venture Capital Fund will be established for this purpose.

For these initiatives an ad-hoc provision of Rs.50 crores is being made in the budget for 2002-2003.

(M.S.Swaminathan.)
ANNEXURE-III
Recommendations of the steering committee on agriculture constituted by Planning Commission for tenth five year plan.

1. Major Thrusts

1.1 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. Besides, quality testing facilities, especially for pesticide residues and mycotoxins, also need to be strengthened. There is a need to foster a quality revolution all round.

1.2 Based on the land capability, activities like tree farming, agro-forestry, dairy, fisheries need 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.

1.3 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 rainfed tracts where the consumption of agro-chemicals is low or negligible particularly during the south west monsoon or Kharif season.

1.4 We must widen the food and feed security baskets, through greater attention to underutilized crops and forage grasses.

2. Public Investment and Plan Allocation

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.

3. Subsidies

Whereas subsidies to the farmers may be desirable to help them adopt the improved production technologies and promote entrepreneurship, the subsidies 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.

4. Extension

4.1 The public extension system needs to be the broad based one with reliance on the information and communication technology.

4.2 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.

5. Seeds

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.

6 Credit

6.1 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.

6.2 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.

7. Plant Nutrient Management

7.1 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.

7.2 Whereas the technologies developed by the ICAR-SAUs research systems with regards to fortification and placement of fertiliser in the problem soils & in the areas affected with soil moisture stress and excess soil moisture / water situations needs to be propagated. There is also a need for carrying out further research on this aspect so as to find out better and efficient materials and application techniques.

7.3 Private soil clinics along with diagnostic centres for soil and water health need to be actively promoted. Agri-clinics/agri-business centres could also be encouraged in the private sector 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.

8. **Pest Management and S&PS Measures**

8.1 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. Research on the entire question of crop pests and resultant damages would need to be augmented to develop meaningful farm advisories becoming available.

8.2 Amongst the pressing requirements is the need to enforce pesticide residue standard statutorily from health angle. Given the importance from the SPS guidelines and the Agreement on Agriculture our exports may face serious problems unless we take systematic steps. 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.

9. **Agriculture Marketing**

9.1 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 metropolis. These markets should be given encouragement and allowed to function outside the purview of APMC Act.

9.2 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 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.

10. Exports

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.

10.1 There is a large potential for organic farming in India due to large cropped area and wide range of agro-climatic conditions. 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.

10.2 Exports of cereals suffer from infrastructure constraints and quality parameters. 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.

10.3 Presence of aflatoxins has posed serious threat to country’s groundnut export to Europe. Efforts 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.

10.4 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.

10.5 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.

10.6 Although, cashew production in Maharashtra has increased substantially in recent years but processing facilities are inadequate. Promotional efforts, therefore, are called for to set up processing units with current quality trend in international market.

10.7 India is immensely rich in medicinal and aromatic plants, occurring in diverse eco-systems. Since, there is tremendous demand, both internally and internationally, more focused attention is required towards these group of plants. 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.

11. Removal of all restrictions

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.

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.

12. Forest and natural resource management.

12.1 The ownership and control over revenue wastelands should be transferred to PRIs and village organizations to ensure certainty of tenure. 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.

12.2 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.

12.3 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.

12.4 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.

12.5 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.

13. Enhancing the consumption capacity of poor

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. 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.

14. Convergence and Synergy

There is need to forge the linkages for implementation of similar developmental programme in an area. There seems a multiplicity of schemes implemented by the different divisions of 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.

15. Maximising the benefits of the existing infrastructure

15.1 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. Priority of the Government
should be to first complete all the uncompleted irrigation projects so that the benefits of investment made could be realised.

15.2 The storage and cold storage facilities in the country are limited. 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.

15.3. 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 that it can help develop the Indian agriculture.

16. Blending traditional and frontier technology.

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. However, traditional wisdom which has been developed over the centuries cannot be abandoned/given up and will still remain relevant. Such technologies may have to be blended with the modern frontier technologies so as to have synergistic impact.

17. Integrated Natural Resource Management

Sustainable development and utilization is necessary for accelerating the growth in agriculture sector. Presently the natural resources like land, water, forests, biodiversity are being looked after by the different departments at the national level as well as the State 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.


18.1. 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. Such areas can be used for the production of different crops/livestock produce with the adoption of organic farming.

18.2 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.

19 Climate and monsoon management:

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.

INSTITUTIONAL REFORMS

20. 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 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.

21. Research
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. 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. 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.

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.

22. Research Priorities
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 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.
• Dryland farming through appropriate land use and water conservation measures.
• Diversification of cropping and farming systems and greater attention to crop-livestock integration.
• Intensification of research on underutilised crops, thereby expanding the food basket changing the nomenclature “coarse cereals” into “nutritious cereals”.

23. 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.

24 International Conventions

24.1 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.

24.2 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).

25 Gender Dimensions of Agricultural Research Education

Following are gives some suggestions on mainstreaming gender considerations in agricultural research and curricula.

a. Engendering the agricultural curriculum and knowledge and skill empowerment of Women in Panchayats and other elected local Bodies
b. Mainstreaming gender concerns in agricultural Research (i.e. crops and animal husbandry, fisheries, forestry and agro-processing)

c. Research on Delivery system for reaching the unreached (printed, electronic and the new media and folk theatre); institutional structures for empowerment (cooperatives, self help groups etc.)

d. Farm and Tribal women and legal rights.

26. Education

The present infrastructure is adequate to address our education needs and human resource development. However, there seems lack of financial support to SAU's because of resources problem with most of the states. In view of this, more support from the centre should be made available to SAU’s Agricultural Universities (SAU’s) need to be diversified into Agricultural and Veterinary Universities (AVU’s).

27. Extension Services

The extension system requires 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.

28. State Land Use Boards (SLUBs)

28.1 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.

28.2 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. Virtual Colleges linking scientists and farm women and men are becoming essential for promoting precision farming techniques.

28.3 The Land Use Board through a virtual college should give proactive advice on the choice of crops and farming systems, so as to achieve a match between demand and supply in farm commodities and to ensure that the most efficient crops are grown in different agro-climatic and agro-ecological regions.

29. Technology Missions

The Technology Missions should be for a specific period to achieve the desired objectives and after that or even if these fail 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 mission for farmers' well being.


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. 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.

NATIONAL CHALLENGE PROJECTS AND NEW DEAL FOR SELF EMPLOYED

31.1 National Challenge Projects

To face the new challenges, 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.

- **Waste land development using Sampoorna Gramin Rozgar Yojana:** 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. 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.

- **Agro-aqua Farms along coastal region** - Agro-aqua farms can be established along the coast, which involve concurrent attention to culture and capture fisheries and forestry and agro-forestry. During the Xth Plan period, coastal States could plan to establish Agro-Aqua Estates, which provide key centralized services to decentralized production by farm and fisher communities. These farms should be provided with basic infrastructure such as hatcheries and grow out facilities for endangered species of animals, fish, mangroves.

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

- **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. 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. Besides, linkages for assured market of organic produce have also to be developed under such project.

- **Soil Health Management:** 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. 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.

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

### 31.2 NEW DEAL FOR THE SELF EMPLOYED:

Some of the programmes listed below may be useful in generating the employment and also improving technological and support services to the farming community.

- **Agri-clinics and Agri-business Centres:** 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.

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.

- **Self-employment for educated youth:** 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.

- **Community Food, Feed and Fodder Banks:** 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 SAU’s as is being currently given to degree programmes. 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 need particular attention.

- **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. 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.

- **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. 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.
ABBREVIATIONS

AEZ  Agri Export Zone
AoA  Agreement on Agriculture
APEDA Agriculture & Processed Food Export Development Authority
APMC Agriculture Produce Market Committee
BAIF Bharatiya Agro Industries Foundation
BARC Bhabha Atomic Research Centre
BNHS Bombay Natural History Society
BSI Botanical Survey of India
CA Controlled Atmosphere
CIMAP Central Institute for Medicinal & Aromatic Plants
CSIR Council of Scientific & Industrial Research
DFID Department for International Development
Dr.BSKKV Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth
Dr.PDKV Dr. Punjabrao Deshmukh Krishi Vidyapeeth
EGS Employment Guarantee Scheme
ENT Extension & Training
F&V Fruits & Vegetables
FAO Food & Agriculture Organization
FFS Farmers Field Schools
FIG Farmers Interest Group
FO Farmers Organization
GATT General Agreement on Tariffs & Trade
GDP Gross Domestic Product
GEAC Genetic Engineering Approval Committee
GIS Geographical Information System
GM Genetically Modified
GMC Genetically Modified Crops
GMO Genetically Modified Organism
GMV Genetically Modified Varieties
HOPCOM Horticultural Produce Marketing
HRD Human Resource Development
HYV High Yielding Varieties
ICAR Indian Council of Agricultural Research
ICRISAT International Crop Research Institute for Semi-Arid Tropics
ICT Information & Communication Technology
IFAD International Fund for Agriculture Development
IMO International Marketing Organization
INM Integrated Nutrient Management
IPM Integrated Pest Management
IPR Intellectual Property Rights
IRM Integrated Resistance Management
KVK Krishi Vigyan Kendra
LEISA Low External Input Sustainable Agriculture
MAHYCO Maharashtra Hybrid Company
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>MANAGE</td>
<td>National Agricultural Extension Management Institute</td>
</tr>
<tr>
<td>MCAER</td>
<td>Maharashtra Council of Agriculture Education &amp; Research</td>
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<tr>
<td>MCCIA</td>
<td>Mahratta Chamber of Commerce, Industries &amp; Agriculture</td>
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<tr>
<td>METSAT</td>
<td>Meteorological Satellite</td>
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<tr>
<td>MKV</td>
<td>Marathwada Krishi Vidyapeeth</td>
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<tr>
<td>MoA</td>
<td>Ministry of Agriculture</td>
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<td>MoC</td>
<td>Ministry of Commerce</td>
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<tr>
<td>MPKV</td>
<td>Mahatma Phule Krishi Vidyapeeth</td>
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<tr>
<td>NABARD</td>
<td>National Bank for Agricultural &amp; Rural Development</td>
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<tr>
<td>NAFED</td>
<td>National Agricultural Marketing Federation</td>
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<td>NATP</td>
<td>National Agricultural Technology Project</td>
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<td>NCDC</td>
<td>National Co-operative Development Corporation</td>
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<td>NCL</td>
<td>National Chemical Laboratory</td>
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<td>NDDB</td>
<td>National Dairy Development Board</td>
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<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
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<td>NHB</td>
<td>National Horticultural Board</td>
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<td>NRC</td>
<td>National Research Centre</td>
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<td>PHT</td>
<td>Post Harvest Technology</td>
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<td>PVP</td>
<td>Plant Variety Protection</td>
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<tr>
<td>QPM</td>
<td>Quality Protein Maize</td>
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<tr>
<td>R&amp;D</td>
<td>Research &amp; Development</td>
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<tr>
<td>RCF</td>
<td>Rashtriya Chemicals &amp; Fertilizers</td>
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<td>RTS</td>
<td>Ready To Serve</td>
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<tr>
<td>SAU</td>
<td>State Agricultural University</td>
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<td>SC&amp;WM</td>
<td>Soil Conservation &amp; Watershed Management</td>
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<td>SFAC</td>
<td>Small Farmers Agri-Business Consortium</td>
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<td>SHG</td>
<td>Self Help Group</td>
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<td>Sanitary &amp; Phyto-Sanitary</td>
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<td>Seed Replacement Rate</td>
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<tr>
<td>SS&amp;ST</td>
<td>Soil Survey &amp; Soil Testing</td>
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<td>SSI</td>
<td>Small Scale Industries</td>
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<td>Ten Guntha Experiment</td>
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<td>TRIFED</td>
<td>Tribal Marketing Federation</td>
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<tr>
<td>TSS</td>
<td>Total Soluble Solids</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>UNESCO</td>
<td>United Nations Educational Scientific &amp; Cultural Organization</td>
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<tr>
<td>UNSHEIA</td>
<td>Unsustainable High Energy &amp; External Input Agriculture</td>
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<td>US&amp;EU</td>
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<td>Watershed Organization Trust</td>
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<tr>
<td>WTO</td>
<td>World Trade Organization</td>
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<tr>
<td>YASHADA</td>
<td>Yashvantrao Chavan Academy of Development Administration</td>
</tr>
<tr>
<td>ZSI</td>
<td>Zoological Survey of India</td>
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