

REPORT OF
THE WORKING GROUP ON

WATERSHED DEVELOPMENT,
RAINFED FARMING
AND
NATURAL RESOURCE MANAGEMENT

FOR
THE TENTH FIVE YEAR PLAN



सत्यमेव जयते

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PREFACE

The Planning Commission, Government of India, vide their order No. M12043/13/2000-Agri. Dated 15th November, 2000 constituted a Working Group on “Watershed Development, Rainfed Farming and Natural Resources Management” for the formulation of the Tenth Five Year Plan (2002-07). The terms of reference (TOR), inter alia, included review of various ongoing schemes & projects in the sphere of natural resource management, particularly the programmes based on watershed development approach under the Ministries of Agriculture, Rural Development and Environment & Forests. The Group was also entrusted with the responsibility of studying the feasibility for private sector investment in the development of problem soils, wastelands under common property regimes and state property regimes. This Working Group was a broad based one entrusted with the task of reviewing the performance of different schemes under different ministries and to suggest the programmes & project areas of operation for the Xth Five Year Plan. This was to be based on the experiences gained and lessons learnt in Watershed Development & Natural Resource Management covering water, land and bio-diversity vegetation as well as animal resources. The inter-relationship and inter-play among these natural resources exercises a tremendous influence on the ecosystems, as well as on their sustainable development and through that process, on generation of enough utilizable biomass to meet demands of humans and livestock, fauna and flora.

In order to get a systematic feedback and analysis of the schemes of the three concerned ministries, three sub-groups were constituted, one for each of the three ministries. These sub-groups were entrusted with the responsibility of examining the existing projects, identifying their strengths, weaknesses, constraints and bottlenecks in their implementation and for suggesting appropriate measures for the Tenth Five Year Plan, so as to achieve the objective of sustainable development and utilization of natural resources. They were also asked to review the progress under the on-going schemes and suggest proposals for the Tenth Five Year Plan, based on the experiences gained as well as the objectives to be achieved. The Working Group had two meetings, first on 18th December, 2000 and the second on 8th February, 2001. The Working Group in its second meeting held on 8th February, 2001 constituted a broad-based drafting committee, with the following members, for preparing the report:

- i. Shri M. Lall, Joint Adviser (Agriculture), Planning Commission.
- ii. Dr. S.L. Seth, Former Additional Commissioner, Watershed Development & Rainfed Farming, DAC.
- iii. Mr. R.P. Aggarwalla, D.I.G, DLR, Ministry of Rural Development.
- iv. Mr. M.M Joshi, Additional Commissioner, DAC.
- v. Mr. L.R. Thanga, D.I.G., MoE&F.
- vi. Shri Rajendra Singh, Tarun Bharat Sangh, an NGO.

The draft report based on the discussions in the Working Group meetings was circulated to all the members of the Working Group for suggesting modifications, if any. The final report has been prepared taking into consideration the comments and suggestions made in the two meetings of the Working Group held on 18th December, 2000 and 8th February, 2001, as well as the views expressed by participants in the Steering Group meeting held on 28th July, 2001 under the chairmanship of Dr. M.S. Swaminathan. The report has the following structure:

PART-I

Chapter-1- Introduction: Context and Background

Chapter-2- Natural Resource Scenario and Developmental Efforts

Chapter-3- Review of Ongoing Programmes & Schemes of different Ministries and their proposals.

Chapter-4- Lessons Learnt, Experiences Gained and Issues that Emerged
Chapter-5- Recommendations- Broad Framework and Guiding Principles for the Tenth Five
Year Plan.

ANNEXURE-I: Terms of Reference **ANNEXURE-II:** Composition of the Working Group

PART-II

Documents, & supplementary information relevant to the subject matter of the Working Group have been compiled as appendices.

APPENDIX. I- Minutes of the Working Group meetings held on 18th December, 2000 and on 8th February, 2001.

APPENDIX. II- Problems identified in different Eco-Systems of the Country and suggestions for the development of agriculture.

APPENDIX. III- Sustainable Agriculture as a Means to Poverty Alleviation.

The terms of reference of the Working Group have enabled it to generate a process of cohesive thinking in the three ministries MoA, MoRD & MoEF, in relation to planning and implementation of watershed development programmes. Each of the three sub-groups provided full opportunity to all the members of the Working Group to have their say on the different schemes of the three ministries. All the members were also asked to give their views in writing in order to facilitate their incorporation in the Working Group Report. I am thankful to all the members of the Working Group as well as of the Steering Group for their valuable suggestions, which has made this report a comprehensive one.

I am particularly indebted to Dr. Amrita Patel, Chairperson, NDDDB, Anand, for her detailed comments. She has emphasized the “critical and cyclical role that all forms of life play in maintaining a balance in Nature”, and has pointedly mentioned that these seem to be generally disregarded in developmental policy planning. She further adds “A totally new paradigm of watershed development must now be accepted, one based on the incontrovertible fact that ecological security is the foundation of equitable and sustainable development in every aspect of the country’s economic endeavors. The tragedy of contemporary development concepts is the total absence of any appreciation of the simple fact that the country’s entire economy rests on ecological foundations and if these foundations collapse as is now progressively happening, so will the economy. Of overriding importance in any approach to economic development must be to secure the foundations of the country’s ecological infrastructure.” She has supported the concerns of the forest department regarding natural forests that do not have much human interaction by suggesting that these should be set aside as areas totally immune from human interference to be called “National Forests” to cover the uplands all over the country to maximize in situ rainwater conservation. According to her the watershed development programme should aim at a major attempt to bring about ecological restoration of the entire landscape and geo-hydrological regime based on appropriate local self-governance to progress towards ecological security.

Appendix II gives particulars regarding eight types of ecosystems that are found in the country. These do not in anyway take away from the importance of the Agro-Climatic Regions in the country delineated by ICAR. In fact, there could be more than one or two types of ecosystems in each of these regions. An ecosystem approach to dealing with watersheds all over the country would enable fine-tuning of restorative and development measures in them. Appendix III is a paper on “Sustainable Agriculture as a Means to Poverty Alleviation,” and has been included in

the Working Group Report because of the fact that alleviation of poverty in India has never been approached from the viewpoint of sustainable agriculture. Poverty Alleviation happens to be the mandate of the MoRD and Agricultural Production the mandate of MoA. Perhaps, in the implementation of watershed development programmes these two mandates could be coordinated. I would like to specially mention para 15 of this paper on “Energy Issues in the Context of Sustainable Agriculture” wherein it has been mentioned that the import bill of petroleum crude and products has risen from about Rs 7000 crores in 1960-61 to Rs. 10,870 crores in 1990-91, to Rs. 24,095 crores in 1995-96, to the figure of Rs. 33,420 crores in 1996-97. This figure in the year 2001-2002 is likely to exceed Rs. 70,000 crores. About 60% of the energy used in the agricultural sector at present comes from petroleum products. As against this draught animals constitute together an estimated 40 million horsepower as mechanical power. Over 70% of the sown area in the country is covered by smaller holdings which are still dependant on draught animals. Unfortunately, the breeding policy of cattle in India has only emphasized milk production at the cost of draught power. This is being mentioned here because the issue of breeding policy does not fall within the ambit of this Working Group. These animals are well integrated into the Indian agricultural economy and ecology, and provide not only draught power, but also milk, dung, and urine as manure and pesticide, as well as a host of valuable products on death. The cattle of India provide more than the biotic pressure they exert on the ecosystem.

Water bodies on the surface of the earth are a sight to behold. Water bodies created by impounding of flowing water in rivers through dams and rivulets & streams by bunds, also provide a picturesque sight. Impounding of flowing water through rivulets & streams has been found to be, not necessarily the best way of conserving rainwater. Surface water in a tropical climate as in India rapidly evaporates. Inadequate vegetative cover of the appropriate type in the catchments of the rivulets & streams causes soil-erosion whenever there is rainfall, thereby silting up the reservoirs created by the bunds. A much greater hardship is caused by sufficient water not reaching the habitations downstream due to the bunds. A more pragmatic approach is, that small obstacles like pond-bunds buttressed by gabion structures at suitable locations all along the drainage lines be dug out which would have the effect of promoting recharge into the soil all along the drainage line, thereby enabling the surplus water to pass on to the habitations downstream. Dug wells on the sides of the drainage line at appropriate intervals and locations would enhance the water recharge to promote vegetation of the appropriate kind, thereby preventing soil-erosion. The basic approach has to be to convert surface flow into sub-surface flow for recharging of open wells and groundwater aquifers. Under our geo-hydro-thermo regime it is important to conserve water in the soil profile and through groundwater recharge, rather than trying or allowing the disposal of the run-off to the reservoirs and rivers respectively. There has to be a shift in the approach and strategy of the watershed programme from the conventional soil conservation approach of **SAFE DISPOSAL OF RUN-OFF** to **RAINWATER CONSERVATION AND HARVESTING** based on indigenous systems and practices, suitably supported by appropriate technology. The perspective plan that the Working Group has proposed is to cover 88.5 million hectares of rainfed and degraded lands in the next four FIVE YEAR PLANS. The long-term concern should be towards evolving more sustainable rural livelihood support systems to prevent further degeneration of the natural resources, particularly in rainfed areas as well as to restore them back to their optimum level.

I would like to place on record my appreciation of the hard work put in by Shri M. Lall, Member Secretary of the Working Group and Dr. S.L Seth in preparing this report.

15th August, 2001

- J.C. Pant
Chairman.

LIST OF ABBREVIATIONS

1. **BPL** - Below Poverty Line.
2. **CAPART** -Council for Advancement of Peoples' Action & Rural Technology.
3. **CBO** - Community Based Organizations
4. **CRIDA** -Central Research Institute for Dry Land Agriculture.
5. **CSWCR & TI**- Central Soil and Water Conservation Research & Training Institute.
6. **DAC** -Department of Agriculture & Cooperation.
7. **DDP** -Desert Development Programme.
8. **DLR** -Department of Land Resources.
9. **DLRD** -Department of Land Resource Development.
10. **DPAP** -Drought Prone Area Development Programme.
11. **FPR** -Flood Prone Rivers
12. **FYP** -Five Year Plan.
13. **GOs** -Government Organizations
14. **GOS** -Group of Secretaries
15. **IAEPS** -Integrated Afforestation and Eco-development Projects Scheme.
16. **ICAR** -Indian Council of Agricultural Research.
17. **IPS** -Investment Promotional Scheme.
18. **IWDP** -Integrated Wasteland Development Project
19. **JFM** -Joint Forest Management.
20. **LEISA** -Low External Input Sustainable Agriculture.
21. **MoA** -Ministry of Agriculture
22. **MoE&F** -Ministry of Environment & Forest.
23. **MoRD** -Ministry of Rural Development
24. **MTA** -Mid Term Appraisal.
25. **NABARD** -National Bank for Agriculture and Rural Development.
26. **NBPGR** -National Bureau of Plant Genetic Resources.
27. **NGO** -Non-Governmental Organizations.
28. **NRSA** -National Remote Sensing Agency.
29. **NWDB** -National Wasteland Development Board.
30. **NWDPRA (Seventh Plan)** -National Watershed Development Programme for Rainfed Agriculture.
31. **NWDPRA (Eighth Plan)**- National Watershed Development Project for Rainfed Areas.
32. **PIA** - Project Implementing Agency.
33. **RVP** -River Valley Projects.
34. **TDET** -Technology Development, Extension & Training.
35. **TOR** -Terms of Reference.
36. **WARASA** -Watershed Areas' Rainfed Agricultural Systems' Approach
37. **WCT** -Water Conservation Team.
38. **WDF** -Watershed Development Fund.
39. **WDPSCA** -Watershed Development Projects in Shifting Cultivation Areas.
40. **WDTF** -Wastelands Development Task Force.

CHAPTER-I

INTRODUCTION: CONTEXT AND BACKGROUND

1.1 The Planning Commission, Government of India, vide their order No. M12043/13/2000-Agri. Dated 15th November, 2000 constituted a Working Group on “Watershed Development, Rainfed Farming and Natural Resources Management” for the formulation of Tenth Five Year Plan (2002-07) under the Chairmanship Shri J.C. Pant, former Secretary (Agri & Coop.), Government of India. The terms of reference (TOR), inter alia, included review of various ongoing schemes & projects in the sphere of natural resources management, particularly the programmes based on watershed development approach under the Ministries of Agriculture, Rural Development and Environment & Forests. The Group was also entrusted with the responsibility of studying the feasibility for private sector investment in the development of problem soils, wasteland under common property regimes and state property regimes. The TOR along with the composition of the Working Group are given in the **ANNEXURES-I & II**.

1.2 The Working Group had two meetings, first on 18th December, 2000 and the second on 8th February, 2001. During the first meeting three sub groups were constituted, as indicated below, to review the programmes and to look into the issues relating to programmes of Department of Agriculture & Cooperation (DAC), Department of Land Resources (DLR), and the Ministry of Environment & Forest (MoE&F), respectively. A field visit to Rajasthan was also undertaken.

I. Ministry of Agriculture, Department of Agriculture & Cooperation (DAC)

Dr. Rita Sharma, Joint Secretary, Chairperson

Mr. M.M. Joshi, Additional Commissioner (RFS), Member-Secretary

II. Ministry of Rural Development, Department of Land Resources (DLR)

Mr. Mohan Kanda, Additional Secretary, Chairman

Mr. P.S. Rana, Joint Secretary, Member-Secretary

III. Ministry of Environment & Forest (MoE&F)

Dr. A.K.Kundra, Special Secretary/Mrs. Meera Maharshi, Joint Secretary, Chairman

Mr. S.K Puri, Director, Member-Secretary

1.3 These sub-groups were entrusted with the responsibility of examining the projects, identifying their strengths, weaknesses, constraints and bottlenecks in their implementation and suggest appropriate measures for the Tenth Five Year Plan, so as to achieve the objective of sustainable development and utilization of natural resources. They were asked to review the progress under the on-going schemes and suggest proposals for the Tenth Five Year Plan, based on the experiences gained as well as the objectives to be achieved.

1.4 These sub-groups, as required, made presentations in the second meeting of the Working Group held on 8th February, 2001 and also submitted their reports. With respect to the programmes of the DAC, presentation was made by Shri M. M. Joshi on behalf of Dr. Rita Sharma, while Mr. Mohan Kanda made the presentation on programmes of DLR, and Ms. Meera Maharshi, on behalf of MoE&F.

1.5 The Working Group in its second meeting held on 8th February, 2001 constituted a broad-based drafting committee for preparing the report. Care was taken to include representatives from the three ministries concerned so that the final outcome reflects their concerns and viewpoints.

CHAPTER-II

NATURAL RESOURCE SCENARIO AND DEVELOPMENTAL EFFORTS

2.1 Natural resource scenario

2.1.1 Natural resources of sunlight, water and land constitute the primary life support systems for all forms of life-microbes, vegetation, animals and human beings,. The inter-relationship and inter-dependencies among water, land, vegetation and animal resources determine the nature and kind of livelihood support systems particularly in rural areas. Depletion of natural resource base and increasing biomass demand of expanding human and livestock population are attracting attention of all concerned: farmers, technicians, scientists, administrators and policy makers. The degeneration of natural resources, particularly in rainfed areas, is assuming alarming proportion.

2.1.2 While acknowledging the fact that indigenous knowledge and experience regarding the use of natural resources are available to the local communities, which could form the basis for evolving strategies for sustainable natural resources management, it is believed that long term concern should be towards evolving more sustainable rural livelihood support systems. Therefore, it becomes imperative to observe changes that are taking place in the landuse pattern, in general and in agricultural sector, in particular, which could have implications for local biodiversity & ecosystem, and food & nutritional security of the local population. Traditional livestock management can be utilized and skills can be transferred to livestock owners for increasing biomass production by conserving green fodder, dry fodder and by growing fodder trees. It is equally important that social, economic, ecological and environmental introspections are applied to the issue of physical biomass generation through different interventions, especially in arid & semi arid tropics.

2.2 Water Resources

2.2.1 Water is the most critical component of life support system. India shares about 16% of the global population but it has only 4% of the total water resource. The national water policy gives priority to drinking water (domestic) followed by agriculture, industry and power. The basic needs as lpcd (liters per capita per day) for human beings, bovines and small ruminants are 40, 30 and 1.5 respectively. This policy document seems not to have taken the requirement of drinking water of wild life into consideration. Scarcity of water in rainfed areas is causing serious hardship. Average annual surface water flow available in the country is estimated at around 1869 billion cubic metre (bcm). But only about 690 bcm of this can be utilized in addition to the annual replenishable ground water resources of 432 bcm. Thus, the total utilizable water resource in the country is assessed at 1122 bcm¹. 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 2000². 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 flow³.

¹ Ministry of Water Resources

² Human Development Report-1999 and 2000 UNDP.

³ B.B Vohra, Managing India's Water Resources (1990) –The Intach Environmental Series.

2.2.2 The single most important task before the country in the field of India's water resource management is to pay special attention to rainwater conservation, especially which falls on our vast rainfed lands but most of which flows away from it. If out of this, adequate precipitation is stored in the soil profile itself, as sub-surface water and wells as¹ ground water, it would save the soil from erosion which occurs due to surface runoff, mitigate the impact of droughts & floods, and minimize siltation of reservoirs in addition to optimizing the productivity of rainfed lands.

2.2.3 Due to poor water harvesting and recharge, the problem of receding groundwater has been increasing. 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. However, in Bihar the number of dark blocks has come down from 14 to 1 and in Uttar Pradesh from 53 to 41. Although the number of dark blocks has declined at some places an overall increase of 51 percent has occurred over a period 7-8 years. If this rate continues, the number of over exploited blocks will double over a period of every twelve and half years⁴. This calls for effective groundwater recharging measures and also the regulation of groundwater resources.

2.2.4 Most of the rainfed lands have undulating topography which generates huge proportion of rainfall into run-off (surface flows). This happens even in low rainfall areas (Northern Karnataka and adjoining areas of Andhra Pradesh and Maharashtra with annual rainfall in the range of 300-600mm). Even in lower rainfall areas of Western Rajasthan (50-425 mm) there is run-off due to high intensity storms as in river Loni. In areas with high run-off, even if the rainfall is very high there is acute water shortage even after rainy seasons, and particularly so in summer months. The drinking water problem has persisted largely due to adoption of cropping pattern with high water demanding crops in some parts of the rainfed areas. In fact, a thumb rule can be laid that if there is shortage of drinking water, then the agriculture practiced there is not sustainable.

2.2.5. The water resources in the country are unevenly distributed. Some regions have abundance while others suffer from acute scarcity. Rainfall in India, the primary source of sweet water, is characterized as erratic, in quantum, intensity and distribution. Most of the rain falls in 4 months (June to September) in high intensity storms (wet spells) on a few rainy days interspersed with long dry spells. Rainy season is followed by dry winter, and dry & hot summer with very high evapo-transpiration. The Hydrological challenge is: how to relocate rainwater in time so that 4 months' rainwater can be utilized for 12 months for multiple uses: human and livestock drinking, domestic consumption and life-saving irrigation, on which depends food-security in rainfed areas. Under the low rainfall situation in tropical/subtropical conditions and in the present scenario of depleting water resources, urgent attention is needed for sustainable development and utilization of water resources.

2.3 Land Resources

2.3.1 Land is the foundation of food, fodder, fuel, fruit and fibre production. The health, vigour and fertility of land resources determine the living standard, quality of life, culture and

⁴ Midterm Appraisal (MTA) of Ninth Five Year Plan, Planning Commission.

civilization. Land is vital but an in-elastic resource. Per capita availability of land in India is declining with growth 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 of which 31.00 m.ha is degraded forest. About 63.8 million ha is estimated to be wastelands which are unutilized or under utilized⁵.

2.3.2 This Working Group was mainly concerned with rainfed agricultural land, (87.5 m.ha), degraded forest land (31 m.ha) and wastelands (63.84 m.ha)⁶ . Improving productivity and production in rainfed croplands is essential for food and nutritional security, as total food production fluctuates with crop performance on the vast dry lands, and nutritionally important crops like coarse cereals, pulses, oilseeds etc. are generally grown under rainfed conditions. Regeneration of degraded forest is also important for restoration of ecological balance. In addition there are also socio-economic priorities, as livelihood of the rural poor depends to a great extent, on adjoining forest areas who derive fuel, fodder and income through minor forest products. Hence, regeneration of degraded forests should receive priority.

2.3.3. Wastelands need special attention both from ecological and socio-economical considerations. Besides reclamation, the trend of degradation should be arrested and reversed. It should be emphasized that wastelands, especially the common property resources, provide biomass lifeline for the rural poor. Historically wastelands are not wastelands but common property resources. Such lands might have been wastelands for revenue-based colonial administration, as these lands did not contribute revenue to the crown. In a welfare state, the so-called wastelands should become productive assets, not only for landless households and marginal farmers, but also for the entire rural community. Reclamation of such lands and equitable distribution of biomass produced on these should receive the highest priority.

2.4 Animal Resources

2.4.1 Livestock have been an integral part of farming systems and the livelihood of rural households especially in rainfed areas throughout the world. It is estimated that more than 80% of all ruminants in Asia are reared by farmers engaged in rainfed agriculture. The rainfed agriculture-animal system is characterized by a few animals raised by each household, often used as draught animals in addition to meat or milk.⁸ Animal husbandry has played an important role in the livelihood support in low rainfall areas. Rajasthan, the state with large rainfed lands and low rainfall has highest cattle population. However, with the changing paradigm of mechanization (use of tractors) and with the degradation of pastures, there is a perceptible shift to milch cattle and goats in lieu of draught cattle and sheeps.

2.4.2 In fact the vital role of livestock and interdependence of crop and livestock systems has not been properly appreciated from ecological and economic points of view. Livestock not only supplement income and nutrition but also play other vital roles in the welfare of society. It would

⁵ Agricultural Statistics at a Glance (MOA), Forest Survey of India 1997, Wasteland Atlas of India, 2000, MoRD.

⁶ This includes culturable wastelands already covered under rainfed agricultural lands, and some parts of notified degraded forestlands.

⁷ Wasteland Atlas of India, 2000, MoRD.

⁸ Rainfed Agriculture in Asia and Pacific-Asian Development Bank Publication

be of interest to know why livestock population is high in low rainfall areas, like Western Rajasthan?

- (i) In most years (3 out of 5 years) there are deficient rains. Whenever rains are deficient and monsoon recedes early, crop plants fail to reach maturity and grain formation is adversely affected. The dry biomass can be utilized only through the livestock as fodder.
- (ii) In low rainfall areas, vegetation is more leafy and less woody and the growth is slow. As a result, if the wood is used as household fuel there would be no trees left, as demand would outstrip the availability. Leafy dry matter cannot easily be used for fuel for household purposes. The much-maligned grazing herds of animals graze or eat dry leaves scattered throughout the landscape, digest them and return the same in the form of cow-dung, of which dung cakes are prepared for use as fuel. In drier parts of Haryana & Rajasthan, heaps of cow-dung cakes can be seen in every village. Use of cow-dung as fuel has saved whatever trees are still seen now in drier parts of the country.
- (iii) Biomass is decomposed by microbes and some of it converts into humus. Microbial activity takes place within a critical range of moisture availability in soils. When moisture levels fall below the critical levels, microbial activity is reduced or discontinued and microbes hibernate. In low rainfall areas microbial action is limited to few months or few days. It is the agency of livestock that collects and decomposes dry biomass and converts them into valuable cow-dung which is utilized as manure or fuel.
- (iv) The other factor for the higher livestock population in rainfed dry land areas is because of low rainfall which is inadequate to grow successful arable crops in most years. The farmers moved to pearl millet, mothbean and clusterbean for various reasons. In the case of pearl millet, they grow land races that are capable of yielding some grain besides fodder (even under moisture stress). Top feed is one of the sources of fodder during lean periods. With all these, still there is deficiency of fodder (upto 40% in normal and 60% in drought affected years).

2.4.3 Whenever prolonged droughts occur consecutively for a few years, livestock are hit the hardest. Helpless farmers unable to provide water and fodder, abandon animals or sell them at throw away prices. This leads to breed degeneration and ultimately to extinction. Degeneration of Tharparker breed in Western Rajasthan is an eloquent testimony of erosion of animal genetic resources. Preservation of indigenous breeds and improved livestock productivity are primary concerns of rural households in rainfed areas. Whereas another Working Group would study and recommend overall national policy on animal husbandry and milk, wool and meat production, breed improvement, veterinary services etc., this Working Group has concentrated primarily on availability of drinking water and fodder for livestock, and feed management in view of livestock being an integral part of the rainfed farming systems.

2.5 Plant Resources

2.5.1 The traditional rainfed agriculture is endowed with much wider genetic base and biodiversity. The onslaught of intensive agriculture for yield maximization may endanger the indigenous germ plasm (land races and varieties). Modern trend and approaches of high yielding varieties in commercial agriculture in Western countries and Green Revolution Agriculture of

irrigated areas depend on a few 'ideo-types' and tend to move towards monoculture. The best suited few varieties are exploited under modern agriculture. Monoculture plantations also erode natural bio-diversity in forest areas. In this scenario there is urgent need to collect and preserve indigenous germ plasm *in-situ and ex-situ* in the long term and sustainable interest of rainfed farming systems. The bio-diversity could be conserved and utilized in topo-sequence in watersheds under different agro-ecological situations (Appendix-II). Bio-diversity, which is essential for sustainable natural resource management in rainfed areas, is under threat from modern trends in agriculture, animal husbandry and forestry development. Fortunately, many individuals and institutions are rising up to preserve biodiversity. The National Bureau of Plant Genetic Resources (NBPGR), under the Indian Council Of Agricultural Research (ICAR) has a well-designed massive plant genetic resources conservation and maintenance programme. Besides, it has also taken up the conservation and utilization of animal, fish, microbes and insect genetic resources.

2.6 Development Efforts in Retrospect

2.6.1 Watershed development approach with government support, in India, started in mid 50s, but group efforts existed even in early twenties. The efforts of Lingayat Peetadhipathi near Bijapur is a case in point. The first government scheme namely 'Soil Conservation Works in the Catchments of River Valley Projects (RVP)' was launched in 1962-63 to control the siltation of multi-purpose reservoirs. The second Mega-Project 'Drought Prone Area Development Programme (DPAP)' started in 1972-73 for drought-proofing the vulnerable areas and mitigating the impact of drought. Later in 1976-77, 'Desert Development Programme (DDP)' was also added for development of desert areas. The DAC launched a scheme of propagation of water harvesting/conservation technologically in rainfed areas in 19 identified locations in 1982-83. In October 1984, MoRD adopted this approach in 22 other locations in rainfed areas. In these 41 model watersheds ICAR/SAUs were also involved to provide research and technology support. In 1986-87 'National Watershed Development Programme for Rainfed Agriculture (NWDPR)' was launched for optimizing the production of important rainfed crops like pulses, oilseeds, coarse cereals, cotton, groundnut etc. National Watershed Development Project for Rainfed Areas (NWDPR) was a modification of NWDPR of the VII Plan to introduce a project and area- approach to watershed development in the VIII Plan. A series of **WARASA (Watershed Areas' Rainfed Agricultural System's Approach) Vol. I to VIII** were, with a farmer-centered approach, prepared and circulated. These guidelines had provided for NGO participation only to the extent it would enable triggering of peoples' mobilization, but not to the extent of making them implementing agents. Ministry of Rural Development (MoRD) launched a new initiative in 1994-95 incorporating the essential elements of WARASA guidelines and providing for NGO participation as implementing agents. Number of projects assisted by bilateral donors and international funding agencies like World Bank were also launched in the 80s. Besides, a number of NGOs are also working for Integrated Watershed Development Projects in different parts of country.

2.6.2 The overall national objectives of controlling the siltation of reservoirs, mitigating the impact of drought and improving/stabilizing the production of crops like pulses and oilseeds, generally grown in the rainfed areas, do not seem to have been achieved to a satisfactory level. Reservoirs are silting at alarming rates, droughts are causing hardships over large areas and huge amount of money is being spent on drought relief. The production of pulses, oilseeds, and coarse cereals still fluctuates from year to year depending on the pattern and quantum of rainfall.

Besides, there has not been any substantial increase in production and productivity of these commodities.

2.6.3 During 80s and 90s, particularly in recent years, several attempts have been made to scrutinize the programme and important suggestions have been made. In view of the fact that overall objectives have not been achieved in the last 40 years and only **27.5 m. ha** of land, out of 107 m. ha of degraded lands and other rainfed areas are expected to be covered under all the schemes of different ministries by the end of the IXth FYP, there is urgent need to review the programme so as to accelerate the pace of development/reclamation of rainfed areas/degraded lands. Nevertheless, valuable lessons have been learnt and some good projects have created inspiring impacts on the ground.

2.7 NWDPRAs Guidelines: WARASA (Watershed Areas' Rainfed Agricultural System's Approach)

2.7.1 During late 80s, particularly after the 1987-88 drought, the relevance and effectiveness of watershed-based soil & water conservation programme became questionable. It was being debated whether this programme should be continued or jettisoned. GOI constituted a high power Group of Secretaries (GOS) under the Chairmanship of the Cabinet Secretary to examine the watershed-based programme for rainfed areas and to advise if this programme should continue or not. If it is to continue, the group should advise in which modified form this should be promoted. After in-depth discussion for over a period of 2 years the GOS made valuable recommendations. The present NWDPRAs reflects the recommendations of the GOS and the lessons learnt till 1990. The **WARASA Guidelines** proved a landmark in the evolution of the watershed development programme in India. Salient features of the guidelines are as follows:

- **Whose programme?** Government programme in which people participate or peoples' programme in which government participates? For the first time, a paradigm shift was brought about in participatory approach. "The basic objective behind public participation in this project is the ultimate goal, though a distant one at present i.e. to convert the watershed development project from a government scheme to people's movement. In fact, ultimately, NWDPRAs should become a people's programme and government would participate in it to provide necessary support."⁹
- **Indigenous knowledge and people's wisdom:** a blend of local wisdom and modern science. NWDPRAs emphasized on building upon local practices, knowledge and wisdom. The WARASA guidelines provided that "in the project, the physical treatments would be decided in active consultations with individual farmers and village communities. In fact the current farming systems and practices should be thoroughly analyzed and farmers' experiences and skills should be given due weightage. The project staff may have to learn a lot from the village community and unlearn some of their orthodox views and theoretical presumptions about people's capabilities. Thus, in the ultimate analysis science and technology from research institutions, technical and managerial know-how of the project staff and accumulated experience of the village community should be symbiotically integrated to finalize the choice of treatments".

⁹ WARASA, NWDPRAs Guidelines 1990, MoA.

- **Elimination of contractors:** Soil conservation schemes had acquired the character of public works with all the attributes of actors and factors. The programme had become the business of contractors and technicians. For the first time a bold decision was taken to eliminate contractors from NWDPPRA and enable individual farmers to implement treatments on private holdings and village associations/ beneficiary groups to implement community works.
- **Financial discipline:** The Group of Secretaries (GOS) noted that major project investment was made on large engineering structures like check dams in the lower reaches of drainage lines, which only benefited rich farmers in the villages. Little attention was given to training and capacity building, nursery raising etc. Therefore, in the WARASA guidelines funds were earmarked for all the important activities to ensure balanced utilization of funds.
- **Mixed farming systems- Interdependence of crops and livestock sub-systems:** For the first time, specific funds were provided for livestock, particularly for fodder cultivation, preventive medication, paravet and primary healthcare, and capacity building of cattle tending households. Similarly several innovations including participatory Post-Graduate (PG) apprenticeship were initiated under NWDPPRA, through the WARASA guidelines.

2.8 Twenty five Years' Perspective Plan

2.8.1 Parliament had directed that a perspective plan should be prepared to treat and improve the problem areas in 25 years. In pursuance of this, the Planning Commission prepared a 25 years' perspective plan. The basic approach recommended by the Planning Commission is to accelerate the pace of progress by involving the beneficiaries (land owners and users). Government cannot finance the treatment of the entire problem area. Therefore, attempt should be made to promote low-cost technologies and progressively increase the overall government allocation in the next twenty-five years. At the same time, the cost sharing by people and the beneficiary groups should be progressively increased so that, in addition to the government allocated funds, maximum possible area can be covered with peoples' contributions. The perspective plan also envisioned that alleviation of poverty should be the main objective of the Watershed Development Programme, as livelihood of the rural poor households is closely linked with the improvement of land productivity and reclamation of the village commons in rainfed areas.

2.9 Common Guidelines

2.9.1 MoA and MoRD jointly prepared Common Guidelines for the implementation of their respective watershed development projects: NWDPPRA and WDPSCA (MoA), DPAP, DDP, EAS and IWDP (MoRD). These guidelines provide framework on Implementing Strategy, Programme Content and Components, Principles of Watershed Development, Institutional Arrangements, Capacity-building, Financial Aspects, Monitoring and Evaluation etc. The guidelines consolidate lessons learnt and experiences gained to facilitate the programme planning, implementation, monitoring etc.

2.9.2 **The positive features of the guidelines include** the participatory approach and evolution of a National Movement for Watershed Development, empowering of the Community Based Organizations including handling of development funds, low-cost technology, indigenous low -

cost water harvesting devices, like Khadin, Sunken ponds, and indigenous innovations evolved by the local people etc. and allocation of resources to landless farmers.

2.9.3 The weaknesses include elements of equity, though equity has been mentioned repeatedly:

- (i) Out of total development funds, 70% have been provided for natural resource management and production systems and only 7.5% have been provided for supporting the livelihood of the landless families. Major portion of (70% of funds) assistance would be availed/made use of by the big and influential farmers, as no ceiling has been fixed on the financial assistance to a land holding family.
- (ii) In the Common Guidelines there is a provision for providing grants-in-aid to the land holding families but the landless people have been provided only with the facility of taking loan, that too depending on their savings and ability to provide matching share. Firstly, most of the landless and marginal farmers will not be able to save any substantial amount from their earning, and secondly, even if they could save and provide for their matching share, the total amount of loan/revolving funds to them will be limited and often inadequate to take up any livelihood ventures, as the provision for the entire Self Help Group (SHG) of 15-20 members is only of Rs 25000. This provision is against the policy of the welfare state where grants-in-aid should go to benefit the resource-poor, especially, to the landless and marginal farmers, to the maximum extent so that they can reinforce their livelihood.
- (iii) Over and above this, there is a provision of repaying the contribution of individual and groups, back to the village, whereas there is no limit of grant to landowners. Thus, they make only pseudo contribution. The 5% or 10% contribution by them can easily be shown by manipulation and jacking up the cost estimates.

2.9.4 Experience throughout the world has shown that watershed development programme succeeds only when people perceive the activities taken up as their own, and execute them with minimum external support. But in India, the watershed programme is mostly funded by the government and in practice there is no contribution from the landowners, even from those resourceful farmers who can contribute their share.

CHAPTER-III

REVIEW OF ONGOING PROGRAMMES & SCHEMES OF DIFFERENT MINISTRIES AND THEIR PROPOSALS.

3.0 For the development of rainfed and degraded wastelands, and the degraded forestlands, a programme based on the watershed development approach are being implemented by the MoA, MoRD and the MoEF. Schemes/ programmes of these ministries, achievements reported and their impacts etc. are summarized as below: -

3.1 Ministry of Agriculture (MoA)

3.1.1 **Ministry of Agriculture at Central Government level was entrusted with the responsibility of land conservation right from the beginning.** After Independence the nation relied on multi-purpose reservoirs in the Five Year Plans throughout the country for providing irrigation and generating hydro electricity. To stabilize the catchments of reservoirs and to control the siltation, a soil conservation programme was envisioned in the mid-50s. After training and development of manpower, a Centrally Sponsored Scheme of “ Soil Conservation Work in the Catchments of River Valley Projects (RVP)” was launched in 1962-63. The Ministry started a scheme of Integrated Watershed Management in the Catchments of Flood Prone Rivers (FPR) in 1980-81. A Pilot Project for Integrated Dryland Agriculture Development was taken up in 1972-73 to test, refine and adapt a dry-land farming technology.

3.1.2 In addition, a scheme of propagation of Water Conservation/Harvesting Technology in rainfed areas was launched in selected 19 districts located in different parts of the country. These projects generated valuable information which went into launching of the National Watershed Development Programme of Rainfed Agriculture (NWDPRA) in the VII Five Year Plan, covering 99 districts in 16 states. On the basis of experiences gained, a restructured “National Watershed Development Project for Rainfed Areas” (NWDPRA) was launched during the VIII Five year Plan covering all the 25 states and 2 Union Territories. The Ministry had also been concerned with the reclamation of degraded lands like ravines, sodic soils, acidic soils etc. Besides, MoA had also been handling the scheme for control of shifting cultivation. **Thus, the Ministry of Agriculture has all along remained at the forefront in the country, for the conservation of land and water resources, optimizing production in rainfed areas and reclamation of degraded lands.**

3.1.3 DAC is implementing several schemes/programmes like (i) National Watershed Development Project for Rainfed Areas (NWDPRA); (ii) Soil & Water Conservation in the Catchments of River Valley Projects (RVP) and Flood Prone Rivers (FPR); (iii) Reclamation of Alkali Soils; (iv) Watershed Development Projects in Shifting Cultivation Areas (WDPSCA), for the development of rainfed areas, natural resource management and land reclamation & development based on watershed approach. These programmes are summarized below:

(i) **Rainfed Farming:** The National Watershed Development Programme for Rainfed Agriculture (NWDPRA) was launched in the VII Plan (1985-86). This programme was radically modified to become the **National Watershed Development Project for Rainfed Areas (NWDPRA)** to incorporate a project and area-approach to rainwater conservation in the VIII Plan, and the outlay was increased from about Rs. 100.00 crore of actual expenditure in the VII

Plan (to cover only 99 districts in 16 states) to over Rs. 1000.00 crore in the VIII Plan to cover over 2500 blocks in all the states and UTs. The WARASA Guidelines from Volumes I to VIII elaborated the programme for the benefit of the field functionaries during the VIII plan period 1990-1995. At present also the project is being implemented in all the 25 states and two Union-territories. The twin objectives of NWDPRAs continue to be to improve production and productivity in the vast rainfed areas and to restore ecological balance. NWDPRAs have since been restructured for implementation during the IX Plan and the Common Approach for Watershed Development and New Operational Guidelines for NWDPRAs have been put into operation from November 2000 onwards. The restructured NWDPRAs allow a greater degree of flexibility in choice of technology, decentralization of procedures, provision for sustainability and re-emphasizes active participation of the Watershed Community in the planning and execution of their watershed development projects. **An area of 4.23 million ha in about 2554 number of watersheds was treated and developed with an expenditure of Rs. 967.93 crore up to the end of the VIII Plan.** In the IX Plan period an outlay of Rs. 1020 crore has been provided to treat 2.25 m. ha., which is a little over half of the area treated in the VIII Plan. During the first three years of the IX Plan (1997-98, 1998-99, 1999-2000), 3003 watersheds covering an area of 1.669 m. ha have been treated at a cost of Rs. 566.50 crore, which indicates substantial jacking up of per hectare cost as compared to the VIII Plan.

(ii) **Soil and Water Conservation:** The Centrally Sponsored Scheme of **Soil Conservation in the Catchments of River Valley Projects (RVP)** was launched in the III FYP (1962-63). Subsequently another scheme of **Integrated Watershed Management in the Catchments of Flood Prone Rivers (FPR)** was launched during the VI FYP (1980-81). These schemes are primarily aimed at treating catchment areas, extending over more than one state, with appropriate soil and water conservation measures and to cover degraded arable and non-arable lands on watershed basis. The objective of the scheme is to enhance the productivity of degraded lands, minimize siltation of reservoirs and moderation of the flood menace in flood prone rivers. In the IX Plan, both schemes were merged together into a new scheme namely “Soil Conservation for Enhancing Productivity of degraded lands in the catchments of River Valley Projects and Flood Prone Rivers (RVP & FPR)”. The Scheme is being implemented in 45 catchments spread over 20 states namely Assam, A.P., Bihar, Gujarat, Haryana, Himachal Pradesh, J & K, Karnataka, Kerala, M.P, Maharashtra, Mizoram, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, U.P, and West Bengal. The total catchment area of 45 catchments covered under RVP & FPR Scheme is 96.1 million ha out of which 25.62 million ha area falls under high and very priority for the purpose of treatment.

(iii) **Shifting Cultivation:** The **Watershed Development Project in Shifting Cultivation Area (WDPSCA)** was first launched during the Vth FYP as a pilot project with 100% financial assistance from the Central Government, covering the whole of North Eastern Region along with A.P and Orissa and later on was transferred to the state plan sector. A total of 1700 Jhumia families were benefited under this programme with an expenditure of Rs. 1.297 crore and an area of 0.03 lakh ha has been treated. But due to various reasons, the state governments discontinued the scheme with effect from 1991-92. On pressing demand from N.E states, the Planning Commission and MoA relaunched the scheme on watershed basis from 1994-95 onwards in seven N.E. states. Up to the VIII Plan period 0.71 lakhs ha of shifting cultivation area was treated with a total expenditure of Rs. 93.73 crore and nearly 75311 Jhumia families were benefited under this programme. During the IX Plan, the scheme is being continued in all the

seven N.E.states, excluding Sikkim, adopting watershed approach. In the first 3 years of IX Plan, an area of 99613 ha was treated at a cost of Rs. 48.39 crore.

(iv) **Reclamation of Alkali Soils:** The scheme for **Reclamation of Alkali Soils** was launched in 1974-75 in the states of Punjab, Haryana and Uttar Pradesh and extended to the state of Gujarat, M.P. and Rajasthan in the VIII Plan period. Presently, in the IX Plan, the scheme has been extended to all the states, where soil alkalinity exists. The main objective of the scheme is to reclaim land affected by alkalinity and improve land and crop productivity including development of horticulture, fuel wood and fodder species. The Scheme also endeavors to enhance the capacity of extension personnel and farmers in respect of alkali soil-reclamation technology. Since inception of the scheme up to the end of VIII FYP, an area of 0.49 million ha has been reclaimed with a central investment of Rs. 62.29 crore. During the whole of the IX Plan, it is proposed to treat 75000 ha area for reclamation at a cost of Rs. 64.55 crore (central share). In the first three-years of the IX FYP an area of 0.07 million ha has been reclaimed with an expenditure of Rs. 8.75 crore.

(v) **Watershed Development Fund:** Besides, the above programmes, **Watershed Development Fund (WDF)** has been established in 1990-2000 at National Bank for Agriculture and Rural Development (NABARD), with the objective of integrated watershed development in 100 priority districts through participatory approach. The total corpus of the fund is Rs. 200 crore, which includes Rs. 100 crore by NABARD and a matching contribution of Rs. 100 crore by the DAC. The fund is to be utilized to create framework conditions to replicate and consolidate the isolated successful initiatives under different watershed development programmes in the government, semi-government and NGO sectors. The WDF is being operationalized in close co-ordination with the central and state ministries and departments with a distinct identity, and contribution by NABARD and Government of India, financially and managerially. As per programme of operation, 14 states in 2 phases (6 states in Phase I and 8 states in Phase II) are to be covered. Phase-I includes the states of A.P. Maharashtra, Gujarat, M.P., Orissa and U.P and Phase-II includes Bihar, Karnataka, Rajasthan, Tamil Nadu, J&K, West Bengal, H.P. and Haryana. In all, 100 districts are covered with WDF mode of assistance. Two –thirds of the allocation from the WDF is loan to state governments at interest rate of 9.5% for watershed development and remaining one third is for grant-based activities, covering capacity building. The repayment period of loan is 9 years including a grace period of 3 years. As per the latest progress report, about 20 crore have been allocated to the states of Gujarat and Maharashtra under loan component for watershed development activities.

(vi) **Externally Aided Projects (EAPs):** In addition to above mentioned programmes, there are **17 Externally aided Projects**, on Watershed and Land Reclamation & Development in operation in 15 major states covering about 1.50 m. ha area with an estimated cost of Rs. 2021.00 crore.

3.1.4 In order to understand and assess the performance of various ongoing projects/programmes of watershed and land reclamation, evaluation studies have been conducted by ICAR Institutes, State Agriculture Universities, National Remote Sensing Agency, All India Soil & Land Use Survey, Agro-Economic Research Centers, Indian Institutes of Management and independent agencies like Agriculture Finance Corporation, Institute of Development and Communication, Development Center for Alternative Policies etc. **It was noticed that the DAC has taken pains to evaluate its projects by external evaluations and the results seem to be**

encouraging. Wherever the external evaluators have pointed out weaknesses they need to be addressed by the DAC. The representative of DAC has suggested that programmes on reclamation of problem soils/land should also be taken up so that such lands which at present are not utilized or under-utilized are put to use for crop/biomass production. It was suggested that the scheme on the reclamation of acidic soils, ravines, riverines, etc. should also be taken up during the Tenth Plan. It was noticed that the programme of NWDPR, Soil & Water Conservation Programme in RVP & FPR, and Reclamation of Alkali Soils implemented by the DAC have been subsumed under the Macro management programme of the Planning Commission during the year 2000-01, with consequences that do not promote natural resources management, because individual states do not perceive the importance of this item of regional and national importance.

3.2 Ministry of Rural Development (Department of Land Resources)

3.2.1 Department of Land Resources is implementing various programmes for the development of wasteland/degraded lands and fragile eco-systems mainly through the watershed development approach. The programmes being implemented by the DLR include: - (i) **Drought Prone Areas Programme (DPAP)**; (ii) **Desert Development Programme (DDP)**; (iii) **Integrated Wastelands Development Project (IWDP)**; (iv) **On-going Watershed Projects under EAS**; (v) **Technology Development, Extension & Training (TDET)**; (vi) **Investment Promotional Scheme (IPS)**; (vii) **Support to NGOs**; and (viii) **The Wastelands Development Task Force (WDTF)**. These programmes are summarized as under: -

(i) **Drought Prone Areas Programme (DPAP):** Drought Prone Areas Programme (DPAP) was launched in 1972-73 to tackle the special problems faced by areas constantly affected by severe drought conditions. The main objective of the programme is to minimize adverse effects of drought on the production of crops, livestock and productivity of land, to promote the overall economic development and improve the socio-economic condition of the resource-poor and disadvantaged sections of inhabitants. **An area of 86.60 lakh ha is estimated to have been covered up to the VIII Plan with a total release of Rs. 1109.95 crore since inception of the programme.** During the IX FYP the scheme covers 961 blocks of 180 districts in 16 States namely Andhra Pradesh, Bihar, Jharkhand, Gujarat, Himanchal Pradesh, Jammu & Kashmir, Karnataka, Madhya Pradesh, Chattisgarh, Maharashtra, Orissa, Rajasthan, Tamilnadu, Uttar Pradesh, Uttaranchal and West Bengal. Since inception of the scheme to the end of March 1999 funding pattern was on 50:50 basis between the center and state governments. However, in 1999-2000 the allocation of share is 75:25 basis between center and states for the projects sanctioned after 1.4.1999. **In the first 4 years of the IX plan an area of 19.39 lakh ha is estimated to have been covered with central release of Rs. 448.29 crore to the programme states.** During 2001-02 an out lay of Rs. 210.00 crore has been provided to cover an area of 7.90 lakh ha.

(ii) **Desert Development Programme (DDP):** Desert Development Programme (DDP) was started in 1977-78, both in hot desert areas of Rajasthan, Gujarat and Haryana and cold desert areas of Jammu & Kashmir and Himachal Pradesh. From 1995-96, the coverage has been extended to a few districts in Andhra Pradesh and Karnataka. The programme aims to mitigate the adverse effects of desertification and adverse climatic conditions on crops, human and livestock population, for combating desertification through shelter-belt plantation, pasture development, soil moisture conservation & water resources development and also to restore ecological balance. Presently this programme covers 232 blocks of 40 districts in the above 7 states. The funding pattern under the scheme was 75% central grant in hot arid (non sandy area)

and 100% central assistance in other areas like hot arid (sandy area) & cold arid areas. The funding pattern has since been changed for all areas to 75:25 sharing basis w.e.f. 1.4.1999. **Since inception of the programme up to the VIII Plan an area of 8.48 lakh ha is estimated to have been covered by various drought mitigations measures with total central release of Rs. 613.27 crore.** In the first 4 years of the IX Plan an area of 8.48 lakh ha is estimated to have been covered with total central release of Rs. 369.79 crore. During 2001-02 an out lay of Rs. 160.00 has been provided to cover an area of 4.04 lakh ha.

(iii) **Integrated Wasteland Development Project: (IWDP):** Integrated Wasteland Development Project: (IWDP) was started in 1988-89 by the MoE&F with an objective of development of wastelands based on village/micro-watershed plans. However, the scheme was transferred to the Department of Wastelands Development (DWD) now called DLR, during 1992-93. The stakeholders prepare these plans after taking into consideration the capability of land, site-conditions and local needs. Promoting the overall economic development and improvement of economic condition of the resources-poor and disadvantage sections of inhabitants are the main objectives. The projects under IWDP are being implemented in 216 districts of the country. **Since inception of the programme an area of 2.84 lakh ha has been covered by various development measures with an expenditure of Rs. 542.96 crore.** In the first 4 years of the IX Plan an area of 6.51 lakh ha has been covered with an expenditure of Rs. 326.80 crore. During 2001-02 an out lay of Rs. 210.00 crore has been provide to cover an area of 4.0 lakh has.

(iv) **Technology Development, Extension & Training (TDET):** This scheme was launched during 1993-94 with a view to promoting the development of suitable technology for the reclamation of wastelands in order to secure sustainable production of food, fuel-wood, fodder etc. The main objective of the scheme is operationalization of appropriate, cost effective and proven technologies for development of wastelands. Under the scheme 100% central grant is admissible to implement the programme on wastelands owned by government/PSUs including Universities, Panchayats etc. In the case of private beneficiaries the project cost is required to be shared on the basis of 60:40 between GOI and the beneficiaries. **Since inception of the scheme about 104 projects have been sanctioned and an amount of Rs. 41.5736 crore has been released to the project implementing agencies. A total area of 31413 ha is estimated to have been covered/treated.**

(v) **Investment Promotional Scheme (IPS) :** This scheme was launched in 1994-95 in order to promote participation of the corporate sector and financial institutions etc. with a view to enhance the flow of funds for the development of non-forest wastelands. The scheme has been reconstructed in August, 1998 with a major thrust for the development of degraded lands belonging to small & marginal farmers including SCs/STs. **Since inception of the scheme 26 projects estimated to be covering an area of 893.08 ha have been sanctioned with an expenditure of Rs. 58.748 lakh.**

(vi) **Support to NGOs:** The objective of the scheme is to create awareness, encourage the application of appropriate technologies for the development of wastelands and provide training for increasing capability and capacity building. Extension & publicity are other components of the scheme. This scheme has now been transferred to the Council for Advancement of People' Action & Rural Technology (CAPART). **Since inception of the scheme 238 projects have been sanctioned with expenditure of Rs. 20.37 crore.**

(vii) **The Wastelands Development Task Force (WDTF):** The scheme was implemented using the services of ex-servicemen for development of 1200 ha of wastelands in ravines of Chambal in Morena district of M.P. The objective of the scheme was to develop wastelands through afforestation including soil & moisture conservation, plantation & protection. An area of 1200 ha ravine land is estimated to have been developed with an expenditure of Rs. 4.74 crore during 1994-99.

3.2.2 DLR is also implementing EAPs, assisted by the donor agencies like DFID, EEC, CIDA and SIDA, in the States of Orissa, Andhra Pradesh, Haryana, Kerala, etc.

3.3 Ministry of Environment & Forests (MoE&F)

3.3.1 The schemes implemented by the MoE&F have relevance to sustainable eco-system development in rainfed/degraded areas in the country. The scheme implemented on watershed basis is “Integrated Afforestation and Eco-development Projects Scheme (IAEPS)” since 1989-90 with intention to promote afforestation and development of degraded forests by adopting an integrated watershed approach to development of land and other related natural resources through the micro-planning process.

3.3.2 It is a 100% centrally sponsored scheme. An area of 2,98,259 ha has been regenerated through afforestation with an expenditure of Rs. 203.12 crore up to the end of the VIII Plan. During the IX FYP an area of 2.27 lakh is targeted to be regenerated with financial outlay of Rs. 247.00 crore. In the first four years of the IX plan an area of 1.2 lakh ha has been covered with afforestation activities through an expenditure of Rs.135.00 crore.

3.4 Impact of Watershed Development Programmes

3.4.1 Technical Committee¹⁰ on DPAP and DDP (1994) noted that “*ecological degradation has been proceeding unabated in these areas with reduced forest cover, receding water table and shortage of drinking water, fodder and fuel-wood. Clearly, these Programmes have failed to neutralize the adverse impact of the overall processes of degradation on account of increased pressures on the fragile eco-systems from growing population, poverty and affluence. Inadequate attention to the development of infrastructure for generating income-earning opportunities by using indigenous resources and skills and the heavy subsidization of electricity resulting in pumping of water at a rate higher than the rate of recharge have also contributed significantly to the degradation of environment*”.

3.4.2 The Ninth Plan Mid Term Appraisal (MTA) by the Planning Commission brought out in October, 2000, however, indicated that “*Several evaluation studies conducted on various projects implemented under NWDPPA, FPR and RVP indicate beneficial impacts such as increase in cropping intensity, change in cropping pattern, increase in crop productivity and increase in underground recharge as a result of conservation measures, reduction in soil and run-off losses with lesser siltation effect and reduction in sedimentation at watershed level. These projects have also generated employment and increased family incomes through diversified farming system such as livestock development, dryland horticulture and household production activities*”.

¹⁰ Report of the Technical Committee on DPAP and DDP (1994) Ministry of Rural Development

3.4.3 But it (MTA) also adds that there is yet another side of the picture too, ***“A survey of 70 villages of Maharashtra and A.P., covering several watershed programmes, revealed that increase in agricultural production did not last for more than two years. Structures were abandoned because of lack of maintenance and there was no mechanism for looking after common lands. Projects have failed to generate sustainability because of failure of Government agencies to involve the people. For watershed projects to be sustainable community-managed systems are needed and they can succeed only with farmers contribution and their commitment of time and resources. This has been amply demonstrated in watershed programmes implemented by some voluntary organizations, in 25 villages of Pune. Equitable distribution of water amongst the families has also been one of the main factors in the success of Sukho- Majari (Haryana) and Ralegaon Sidhi (Maharashtra) Projects”***. These findings/reports clearly indicate that the impact of watershed development programmes has not been uniform and the effect remained limited to some programmes or/and watersheds.

3.4.4 In so far as, impact of the programmes implemented by the Department of Land Resources (DLR), MoRD is concerned, there seems that no systematic assessment or evaluation has been made due to non-involvement of technical expertise in the execution of programmes. These programmes are being executed/implemented by department/agencies which do not possess technical staff/personnel. The Department of Land Resources informed that their interest is limited to monitoring of financial releases and expenditures of funds to DRDAs/Zilla Parishads alone¹¹. This seems to be supported by the information provided by the DLR, as investments shown are in terms of releases and/or expenditure (refer to the details of scheme/programme of the DLR under para 3.2.1 (i), (ii) (iii) (iv) (v) (vi) and (vii).

3.4.5 Although guidelines of the Ministry of Rural Development emphasize decentralization and participation, implementation of watershed projects has remained poor because of little participation of local people, limited human resources capability and practically no involvement of senior state government officers and line agencies. Watershed development programmes require a comprehensive integrated approach involving several line departments. In the present form, schemes are left to be planned and executed by district level officers/DRDAs/Zilla Parishads with limited capability to do planning, due to which quality of project preparation and of implementation suffers a great deal. Moreover, the quality of project preparation and implementation further suffers, once it is realized that senior officers from the division and state capital take no interest in such schemes and that their interest is limited to monitoring of financial expenditures alone. Horizontal linkage is very weak between various line agencies at the district level. Thus, although watershed development may require integration of soil conservation technique with plantation, there is little likelihood of effective coordination between the district soil conservation officers, agriculture officer and divisional forest officer.

3.4.6 The present status of participatory development with NGOs is largely due to their continuous presence in the area. If they also withdraw what would still remain, as of now, has no answer. However, in Fakot where CSWCR&TI, Dehradun was involved, as a withdrawal strategy they left one junior staff member at the place even after the completion of the project period. The results are still persisting to a large extent, but due to the presence of an external agency, local institutions have not developed. The ICAR/World Bank study found that there are

¹¹ Minutes of Half-Day Working on the Impact of Watershed Development in Rainfed Areas, held on 5-1-2001, in Planning Commission.

several good farmers who can be used as para extension workers for sustainability of the gains. So a mechanism has to be found for sustainable development involving local interest groups who can be oriented to carry forth the basic lessons of the project period.

3.5 Under the programmes of DAC, DLR and MoE&F and all other programmes, upto the end of the VIII FYP 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**.

The programme wise details of area treated/covered are summarized in Table-1 on the next page.

The programme wise details of area treated/covered are summarized in the table-1 below.

Table-1. Area treated/reclaimed under various Watershed Development Programmes

<u>Sr. No</u>	Ministry / Scheme	Year of start of scheme	Upto VIII Plan		During first 4 years of IX Plan (1997-2000)	
			Area Treated (Lakh ha)	Total Investment (Rs. crores)	Area treated (Lakh ha)	Total investment (Rs. crores)
1	2	3	4	5	6	7
I	DEPARTMENT OF AGRICULTURE & COOPERATION					
(I)	NWDPR	1990-91	42.23	967.93	21.19	792.15
(ii)	RVP & FPR	1962 & 81	38.89	819.95	8.17	470.14
(iii)	WDPSA	1974-75	0.74	93.73	1.30	63.40
(iv)	Alkali Soil	1985-86	4.84	62.29	1.00	13.75
(v)	EAPs		10.00	646.00	5.00*	1425.00*
Sub Total			96.70	2589.90	36.66	2764.44
II	DEPARTMENT OF LAND RESOURCES					
(I)	DPAP	1973-74	68.60	1109.95	19.35	448.29
(ii)	DDP	1977-78	8.48	722.79	8.48	369.79
(iii)	IWDP	1988-89	2.84	216.16	6.51	326.80
(iv)	TDET	1993-94	Neg.		0.32 t	41.57 t
(v)	IPS	1994-95	Neg.		0.01 t	0.59 t
(vi)	WDTF		0.01	4.74		
Sub Total			79.93	2380.44	34.66	1187.04
III	MINISTRY OF ENVIRONMENT & FORESTS					
(i)	IAEPS	1989-90	2.98	203.12	1.23	141.54
GRAND TOTAL			179.61	5173.46	72.56	4093.02

*-Likely achievement during the IX plan, t-Total since the inception of the scheme

Source: DAC, DLR and MoE&F

CHAPTER-IV

LESSONS LEARNT, EXPERIENCES GAINED AND ISSUES THAT EMERGED

4.1 Watershed Development Programme in India has been in operation for about last 40 years. Overall national objectives of controlling siltation of reservoirs, mitigating the impact of droughts, and improving/stabilizing the production of important rainfed crops like pulses and oilseeds, have not been achieved to a satisfactory level. However, the impact of some of the watershed projects has been very pronounced and visible on the ground, in reducing siltation, expansion of area, increase in cropping intensity and grain /biomass yields. The water harvesting and additional water created has led to a new divide of people having access and those who have no access to water. Large amounts of money were spent in the process, for the benefit of a lucky few, who largely happen to be the richer or influential in the community. This injustice can be set right only by treating the harvested water as a Common Pool Resource and giving the right on such water to all the stakeholders of the watershed (e.g. Pani Panchayat). Valuable lessons have been learnt and experiences gained. The experiences accumulated and the suggestions made by the participants in the group/sub-group meetings, are summarized as under:-

4.2 Rainwater Conservation is the Central Point for Success

4.2.1 Wherever success has been achieved the conservation and utilization of rainwater has been the motivating force. Projects like Sukho Manjari (Himalayan Foot Hills), Haryana, Ralegaon Sidhi of Anna Hazare, Maharashtra, Johad Project of Tarun Bharat Sangh in Alwar, Rajasthan have succeeded and attracted so much attention because they brought about water conservation and improved availability of water. The scheme of Propagation of Water Conservation/Harvesting Technology in Rainfed Areas launched by the DAC, MoA was also adopted by MoRD in the early 80s. ICAR also collaborated in these schemes. Water conservation and harvesting was the central point and success of the watershed development projects under this scheme earned them the name of Model Watersheds. These projects paved the way for formulating National Watershed Development Projects for Rainfed Areas (NWDPRA) and influenced the scheme of DPAP. Success on the ground attracted many bilateral and international donors to participate in Watershed Development Programme in India.

4.2.2 Several members of the Working Group re-emphasized the importance of water conservation in the development of rainfed lands. It was suggested that for future, such programmes need to be renamed as “Water Conservation Programme”, instead of Watershed Development Programmes. The basic approach should be convert surface flow to sub-surface flow for recharging of open wells and ground water aquifers. A valid concern was expressed regarding drinking water availability for the cattle of the poor, their only resource.

4.3 Participatory Approach

4.3.1 The Conventional Soil Conservation Approach and Technology in India were started in the nature of Public Works to control the soil erosion for minimizing the siltation of multipurpose reservoirs. Most of the benefits accrued to down-stream people through canal irrigation. Many state governments enacted soil conservation acts/land improvement acts and armed themselves legally to plan and implement the programme on individual land holdings and

common lands. Conservation of soil and control of erosion were the primary objectives. Production and productivity in the catchment areas were, at best considered as secondary and as follow-up after conservation of land and water.

4.3.2 The general scenario in most of the watersheds in India is (a) mere emphasis on soil and water conservation efforts/methods but not on productivity linked best agronomic practices; (b) livestock production is not complementing crop production on a scale to contribute to a balanced animal ration with minimal reliance on purchased feeds resulting in lack of self reliance in food, and decreasing income from sale of both crop and animal products; and (c) forage legumes are not grown as part of crop rotations towards enhancing soil fertility and reducing pest and disease.

4.3.3 Active participation of people/community in watershed development programme is very important in its success. This has also been brought out in the Ninth Plan MTA of Planning Commission that *“Projects have failed to generate sustainability because of failure of government agencies to involve the people. For Watershed Projects to be sustainable, community management systems are needed and they can succeed only with farmers’ contribution and their commitment of time and resources.”* In recent years, the peoples’ participation in Watershed Development Programme has been given increasing importance in theory. In fact, the WARASA Guidelines of NWDPR for the VIII FYP also, for the first time envisaged that watershed should be ultimately peoples’ programme and government/NGOs should participate in it. But, in practice largely the programme has remained that of the government with the participation of people in terms of their involvement and contribution just for namesake. People would participate meaningfully, if production is increased/stabilized and they/every family gets their share in benefit/assistance made available. Without direct and tangible benefits, peoples’ participation would remain passive and just a few big and influential farmers will corner a large portion of the assistance. The programme needs to be reoriented in favour of the people, their animals-cows, buffaloes, goats, etc., the forests, common lands, wastelands etc. for their improved productivity. The main purpose of the programme should be to promote the welfare of the poor and their ownership over the community and natural resources. The participation of women and landless in decision making is also important for their active involvement.

4.3.4 It has been the experience of some of the NGOs that only rich and prosperous participated in the government run programmes and the major share of benefits were cornered by them. Some people get substantial benefits whereas others get little or no benefits at all under the current watershed development programme. People who get more benefits should pay/contribute for this. The benefit sharing by the community is more important, and sharing of usufruct with proper basis requires special attention so as to involve them in the programme to raise their income. The involvement of the community and their active participation in water harvesting activities is crucial. When the village communities are fully prepared to get involved in planning and implementation, then alone should the financial support be extended to them.

4.4 Conservation Measures & Technology

4.4.1 The Conventional Soil Conservation Technology emanating from Tennessee Valley Model of USA encouraged safe disposal of water. This approach has succeeded in temperate climate where rainfall is evenly distributed. But in arid and semi-arid climates where rainfall is limited to 3-4 months and rainwater falls in high intensities, the safe disposal approach is inappropriate. Therefore, this Conventional Soil Conservation Technology has not succeeded in

tropical and semi-tropical countries of Asia Pacific, Africa and Latin America. Under our Geo-Hydro-Thermo Regime it is important to conserve water in soil profile and through groundwater recharge rather than trying or allowing the disposal of the run-off to the reservoirs /rivers respectively.

4.4.2 This approach is also based on rigid structural measures which often interfere with agricultural operations and damage the crops through temporary waterlogging, standing against bunds. Many studies have brought out that such structures get damaged and breached during high intensity storms. In addition, sometimes farmers also demolish structural measures to save their crops from waterlogging. The structures proposed must have the approval of the landowners. The technologies need to be re-oriented accordingly taking into account the indigenous systems. It was suggested that “The watershed programme implemented by various state governments have not yielded the desired results and have benefited mainly the private lands. The focus of these programmes has been primarily on farm bunding, nala bunding and land leveling and government funds have been spent on these physical activities.” The need is being felt now that conservation measures should be based on indigenous practices and devices.

4.4.3 The role of plant species in improving the saline/alkaline and waterlogged soils and increasing the soil fertility have been found to be very useful under several watersheds,. Therefore, plantation of right types of plant species in improving the land and its productivity should get adequate attention under the watershed development programme. To make it acceptable, trees should be to the liking of the stakeholders, largely improved native species. Vegetation in any form does ameliorate soil conditions and reduces erosion (wind and water)

4.5 Production Systems

4.5.1 Under conventional approach it was presumed that after the conservation measures had been installed, the production system would follow. This approach has not succeeded throughout the developing world. In fact the whole approach has got to be reversed. Conservation measures are to be conceived, planned and implemented to serve the chosen landuse. Conservation measures would be different for different crops and different pieces of lands located in the topo sequence. The present approach is that good land husbandry and a scientific production system will also serve as conservation measures. The basic principle, however should be that conservation measures need to be conceived as means and the production system as ends.

4.6 Rainfed Farming Systems

4.6.1 Mixed farming and mixed cropping have been traditionally followed throughout the world particularly, in low rainfall areas to minimize the risk which is inherent in rainfed production environment. In modern agriculture phenomenal development has been brought about by use of high yielding varieties, high doses of fertilizers and pesticides to promote intensive agriculture. This approach has succeeded in commercial agriculture of the western countries under temperate climate where rainfall is equitably distributed. It has also succeeded in “Green Revolution” areas under assured means of irrigation and water availability. This intensive agriculture is inappropriate for rainfed areas where production depends upon uncertain and erratic rainfall received only on a few rainy days interspersed with long dry spells. In this environment of uncertainty of water availability and vulnerability to droughts, the intensive agriculture has proved disastrous. Mixed farming or cropping is practiced for risk minimization

also to obtain the home needs and to seek synergy to sustain production. Many farmers' crops grown with high external inputs failed owing to droughts. Reports of farmers committing suicide in different parts of the country due to indebtedness can be linked to situations where high-cost external chemical inputs failed to yield the expected results. Therefore, in-place of intensive agriculture which is characterized by monoculture, mechanization and labor saving devices, use of high doses of chemical fertilizers and pesticides, mixed cropping-based Low External Input Sustainable Agriculture (LEISA), characterized by diversified agriculture combined with animal husbandry, agro forestry & agro-horticulture, has been found more appropriate for tropical and sub tropical climates.

4.6.2 Many members suggested that more reliance should be placed on indigenous germ plasm, and organic farming which is a building block for sustainable agriculture including organic manures and bio-fertilizers. Suggestions were also made that "Green Foods" based on organic farming should be promoted to fetch high market value for the benefit of rainfed farmers.

4.6.3 It has also been experienced that in successful watersheds when the availability of water increased, people changed their cropping pattern from less water requiring to more water requiring cropping sequences. This has resulted in scarcity of water in other areas of the watershed and has affected the overall production. Therefore, as far as possible, cultivation of high water exacting crops should be avoided in the watersheds solely dependent on rainfall. Besides, efforts should be made to enhance the water use efficiency.

4.7 Equity and Poverty Alleviation

4.7.1 The rural poor who live in watershed areas draw their survival biomass needs of fuel and fodder from wastelands and adjoining forest areas. Such households exercise tremendous impact on degeneration of the green cover. Unless their life sustaining biomass needs are provided by strategically planned interventions, their development in rural areas will not be sustainable. As a welfare state the Government of India and state governments accord the highest priority to poverty alleviation in rural areas. The 25 years' perspective plan prepared by the Planning Commission also indicated poverty reduction as one of the major objectives of Watershed Development Programme. It was suggested that the financial requirements for Watershed Development Programme should be worked out on per family basis rather than the current practice of working out the budget on per unit area (hectare) basis. It was also pointed out that in many watershed development programmes only the rich and the prosperous participate and corner the major share of benefits from the project investment. It was suggested that the main purpose of the programme should be to promote welfare of the poor and their ownership over community & natural resources. Unless survival biomass needs of the rural poor are satisfied within the project area, the objective of the watershed development programme would not be achieved. One way is to allot specifically, funds for the families below the poverty line out of the total funds for livelihood security. They should also be encouraged to form into beneficiary groups, so that they have a say in project planning and implementation. The beneficiary groups should be comprised of families of similar interest and status.

4.8 Perspective Plan and Funding of Watershed Development Programme

4.8.1. Since its inception, watershed development programme in India is expected to cover a small fraction of about **27.5 m.** ha by the end of the IXth FYP out of about 107 m. ha of problem

area/degraded land and other rainfed areas in a period of about 40 years. At this pace it will take several decades to treat the areas suffering from different forms of land degradation. Also the natural vegetative cover and groundwater are depleting at alarming rates. Therefore, there is need to move faster by adopting the approach suggested by the Planning Commission in its 25 years' perspective plan, and operationalizing the same starting with the Xth FYP, and thereafter during the next four FYPs.

4.8.2 Both union and state governments should provide maximum financial support. But Government alone cannot provide resources of such huge magnitude for funding the Watershed Development Programme. If there is a shift in the development paradigm and watershed development becomes a production programme, with short term, medium term and long-term benefits flowing to the people, the watershed community will gladly come forward to fund the activity. This has been demonstrated under the watershed development project implemented in Ralegaonsidhi where watershed development programme has been implemented without any assistance from an outside agency or government. In the watershed development programme of village Nimvi implemented by Tarun Bharat Sangh where local community has contributed for construction of a dam by donating money or labor, not only did villagers stop deforestation but gave up drinking alcohol for this community work.¹² Government funds should be used as enabling assistance to individuals, user groups and village development committees for managing their own natural resources.

4.8.3 Nevertheless, governments both at the central and state levels have responsibility to make investment in rainfed areas, to offset the imbalance between rainfed and irrigated areas and to reduce the disparity. Since huge public funds have been invested for irrigated areas, government should provide maximum possible financial support in the next 4-5 FYPs through increasing budgetary provision. The credit-linked subsidy for land development/reclamation through NABARD and Commercial Banks as soft loans will enable the farmers to contribute their share. There are many examples in the country where farmers have taken loan, improved their production base and repaid the same to the banks/financial institutions.

4.8.4 The watershed development programme has attracted the attention of bilateral donors and international funding agencies. Such funds should be accessed to the maximum possible extent.

4.8.5 The Private Sector in the shape of local farmers may also participate in the reclamation of large tracks of degraded lands like ravines, desert areas, and salinized lands. The concept of leasing of land of absentee farmers to local landless farm labourers needs to be given a trial. However, small patches of the wasteland scattered in thousands of villages throughout the country which provide livelihood support to the rural poor should be developed by the Panchayats/CBOs and utilized in a manner that the rural poor are not adversely affected. Thus the basic funding should come from the landowners and users, with supplemental funding provided by government and donor agencies.

4.8.6 In the last 40 years only an area of about estimated **27.5** million ha will have been treated under all the schemes put together by the end of the IXth FYP, out of about 107 m. ha of vulnerable degraded land and the remaining lands are in need of urgent attention. Besides, the

¹² The Hindustan Times New Delhi 23rd April, 2001

rained agricultural lands also require water harvesting/conservation measures. Old habits die hard and hangovers tend to continue. But time has come when watershed development should become a mass movement for accelerated pace of progress. The Watershed Development Programme must become a peoples' programme with government support and should not remain as a government programme for the people. The Panchayati Raj Institutions need to be empowered to give shape to a possible peoples movement, with the need-based village level planning as its central theme. Even this need-based village level planning would have to be conducted by the village communities themselves, and they alone ought to be entrusted with the task of implementing their own plans.

4.8.7 The Working Group, in the short time that was at its disposal, found it difficult to estimate such degraded land/rained areas which need reclamation efforts and soil and water conservation measures. No separate data category-wise, is available for degraded land which is under cultivation or unutilized. The estimates for total wasteland are for about 63.85 m. ha which do not include the isolated patches of less than 100 ha spread over the states. Besides, some categories of land taken as wasteland is also covered under the net sown area. Therefore, estimation of degraded land together with rained areas needing reclamation and/or conservation measures could not be worked out correctly. As per recent estimates made by the MoA, the degraded lands in the country account for about 107.4 m. ha. Besides, most of the rained lands especially with undulating topography in low rainfall areas also require some or other type of conservation measures, especially for harvesting and conserving the rainwater. As per the information provided by the DAC, DLR and MoE&F a total of about 27 million ha is likely to be treated/reclaimed by the end of the IX FYP (2001-02). An area of about 0.5 m. ha has been assumed to have been treated/developed through the efforts of NGOs where there has been no government's support. Thus, considering that a total of 27.50 m. ha is likely to be covered by the end of the IX Plan, about 79.55 m. ha of degraded land remains unattended. This would be again on the presumption that all the 27.5 m ha of land already treated was/is degraded land. Besides, the degraded lands, most of the rained uplands in low rainfall areas also need soil and water conservation measures. All such areas may work out to approximately 88.5 m. ha¹³. **Therefore, the Working Group suggests the perspective plan for the reclamation/development of an area of 88.5 m ha with active participation and sharing of investment by the people/beneficiaries, through the Watershed Development Programme which could be taken up as a Single National Initiative (Table.2)**

Table-2 Projected Treatment/Reclamation of Land under Watershed Development Programme and Fund Requirement with Cost-Sharing during the next four Five Year Plans.

Five Year Plan	Area envisaged to be covered (million ha)	Estimated cost of development (Rs./ha)	Total Cost on average (Rs. crores)	Cost Sharing Ratio*	Cost sharing (Rs. crores)		
					By Centre	By States	By People
X Plan(2002-07)	15.0	5000-7000	9000	50:25:25	4500	2250	2250
XI Plan(2007-12)	20.0	6000-8000	14000	40:30:30	5600	4200	4200
XII Plan(2012-17)	25.0	7500-9500	21250	30:30:40	6375	6375	8500
XIII Plan(2017-22)	28.5	9000-11000	28500	25:25:50	7125	7125	14250
Total	88.5		72750		23650	19950	29200

* Cost-sharing ratio between Centre, States and people/community.

¹³ Total degraded land (107.4 m. ha) + 10% of rained land of 87.5 m. ha.-27.50 m. ha already treated/covered = 88.6 m. ha

4.9 Flow of Funds

4.9.1 The availability of adequate funds at the right time to the Project Implementing Agencies (PIA) was discussed in detail in the group and sub-group meetings. NGOs expressed great reservations in accessing funds through DRDAs/Zilla Parishads. The flow of funds through normal government channels—from central to state governments to project implementing agencies also has many bottlenecks and is characterized by delays. The pros and cons of creating district level authority and release of funds to them directly by the center for a smooth flow were also discussed. The consensus emerged that bypassing the state government could not be a healthy financial management system in a federal polity like India. State governments should be involved as Agriculture and Lands are State Subjects under our Constitution. In general, consensus was in favour of following a procedure to be adopted for fund flow as is currently being done for externally aided projects:

- i. The PIA (Project Implementing Agency) should prepare annual plan indicating quarter-wise activity and fund requirements. The Government of India should release first installment after receiving the detailed annual plan.
- ii. The state government will incur expenditure and submit a Statement of Expenditure duly signed by the designated authority of the state government along with funds required for the second quarter, in the second week of the third month of the first quarter. Similarly, the funds should be released on quarterly basis after the funds already released in the previous quarter have been satisfactorily utilized.

4.9.2 This procedure would ensure timely utilization and release of funds. If a state does not utilize central funds for a particular quarter it would forfeit its claim for central funds for the second quarter. There should be financial discipline.

4.10 Treatment of Waterlogged & Flooded Areas

4.10.1 Most of the watersheds in India fall under moisture scarcity categories. However, there are considerable areas, which suffer from waterlogging and floods, outside as well as inside the command areas of irrigation projects. Such natural or otherwise waterlogged areas are spread over vast tracts of drainage-congested lands from Terai Region of central Uttar Pradesh to northern parts of Bihar, West Bengal and southern parts of Assam. In these areas, excess and stagnated water adversely affect crop-production and is also a major cause for diseases like Malaria, Kala Azar, etc. in human beings, and also some disease like liver flu in animals.

4.10.2. Valuable experiences have been accumulated in a Tikra Project of NWDPR in Barabanki district of UP where disilting of village ponds and vertical drainage through shallow tubewells had totally solved the problems. In addition, fish culturing in disilted ponds and summer cropping of ladies finger, greengram and cucurbits, irrigated from shallow tubewells are generating considerable income to the farmers.

CHAPTER -V

RECOMMENDATIONS- BROAD FRAMEWORK AND GUIDING PRINCIPLES FOR Xth FIVE YEAR PLAN

5.0 On the basis of lessons learnt, experiences gained and deliberations in the Working Group's & sub-group meetings following recommendations are being made.

5.1 Shift in Development Paradigm: Self-help culture, local initiative, innate urge for development and gradual elimination of dependence on G.Os (governmental organizations) and NGOs.

5.1.1 Soil conservation in India was initiated to control the siltation of reservoirs, drought and floods, more as public works based on concerns of the government and not as a felt need of the people for sustainable management of natural resources for the benefit of individuals and groups residing in the watershed areas. The hangover still persists. Even today the mindset of government functionaries and NGO volunteers is conditioned by the compassion to help the peasantry as saviors. Work culture and ethos are inspired more by charity and welfare by outsiders rather than development of the people, for the people and by the people. Villagers are considered beneficiaries, and not the prime movers and not even partners of development. Experience has clearly brought out that the farmers do not accept soil conservation measures which do not synergise with their traditional wisdom, and often even demolish them, and therefore the need for a shift of paradigm. The rural communities –landowners and land users– should feel the innate urge and need for developing their own natural resources to secure short term, medium term and long term benefits. Thus a movement of self-initiative and self-reliance in respect of natural resources development and management should be created by all stakeholders.

5.1.2 On the other hand, the villagers' psychology of extracting maximum grants, doles and subsidies, is considered as smart performance. Demand driven choices are often subsidy driven. The development scenario is characterized by development with dependency. Dependency syndrome is discernible at all the levels. A stage has now been reached when this dependency syndrome should be broken. A new development paradigm based on development with dignity should be ushered in. Self-help culture, local initiative, innate urge for development should inspire people for watershed development. G.O.s and NGOs should work as stimulants and facilitators. **Thus watershed development should become peoples' programme and GOs/NGOs should participate in it in a manner that would enable rural households to enhance their livelihood. The landowners should also contribute financially and share the cost of their land-development. A credit-linked subsidy programme for financing by NABARD and the Commercial Banks as soft loan should be adopted. Recognition of the rights of women and landless in decision making is important in motivating them to get involved actively. The women and landless can acquire benefits in the programme only when separate funding is provided for household production system by design. Otherwise equity or gender issues would remain as mere slogans. Out of the funds meant for land development as component of Natural Resource Management, at least 20% should be allocated for production systems and livelihood security, for poorer sections of women and landless (BPL group), in addition to the 17.5% of the total project cost for livelihood support.**

5.2 The Concept of Watershed Development- An Area Development Approach For Rainfed Lands: Need for Conceptual Clarity

5.2.1 There are two developmental approaches: Commodity Development Approach and Area Development Approach. Under Commodity Development Approach all efforts are made for production/processing and marketing of identified commodity/group of commodities. National Dairy Development Board, Central Silk Board and other Mission Modes of Development follow this approach. The second developmental approach is Area Development Approach. The area to be developed can be man made boundaries decided by administrative convenience: districts, talukas and community development blocks and even villages, where land revenue/land resource is important.

5.2.2 However, when water is the primary concern the area development approach is divided into two broad categories: Command Area Development for comprehensive development of natural resources and production of all possible commodities in the irrigated areas, and Watershed Development Approach which is followed for sustainable utilization of natural resources of water, land, vegetation and livestock in rainfed areas. Any watershed area should also be a part of the overall development plan for the block/mandal in a district and it should be ensured that there is no duplication of funds in the watershed area. This area development approach must also ensure that ecological security so essential to bring about sustainable economic development, is progressively promoted.

5.2.3 Throughout the world and particularly in India now Watershed Development Programme has also evolved as a comprehensive development concept for sustainable and efficient utilization of natural resources for the benefit of the local community with special attention to the rural poor. In the absence of a measurable definition of ecological security, the watershed development programme ought to become an instrument to progressively promote conservation of natural resources and stabilization of the geo-hydrological regimes in order to ensure that the annual increment in the biomass generation is enough to support all life forms in the watershed area. This conceptual clarity, common vision and common understanding by all the ministries and stakeholders should serve as the guiding principle for efficient utilization of natural resources in watershed areas for bringing about sustainable development through Rainfed Farming Systems. **The basic objective under the watershed programme ought to be that the conservation and development measures be conceived as means and the production systems compatible with the concept of ecological security as ends. “Watershed development is, thus, holistic development seeking sustainable livelihood security system for all life forms in the area”.** Conceptually, it should be clear that watershed development is no longer a sectoral programme with a narrow focus like control of siltation of reservoirs. This approach in the past has led to taking up of the areas which contribute maximum silt yield as the highest priority areas, and not necessarily the areas most prone to soil erosion. In such an approach it would be futile to argue what is more important “means” or “ends” as both are supposed to serve each other.

5.3 Relationship between Conservation Measures and Production Systems

5.3.1 The Conventional Soil and Water Conservation Development Approach is based on the assumption that conservation measures should be planned and implemented first. The production

systems would follow. This approach has not succeeded anywhere in the developing countries of arid and semi-arid tropical areas. The experiences worldwide have brought the realization that the conservation-measures should be decided to meet the requirements of the production systems. “This is a reversal of the previous idea that it is necessary to conserve the soil in order to get better crops. Improve the soil conditions for root growth and crop production, and in so doing achieve better conservation of water and soil”¹⁴. Thus, the conservation measures and production systems should be conceptualized in the relationship of means and ends – Conservation Measures as means and Production Systems as ends. In the landmark publication “From Soil Conservation to Land Husbandry” it is clearly recommended that the need is the reversal of the old approach. **“The primary objective of land management should be improved, sustainable production through good land-husbandry. Control of soil erosion follows as a consequence”**.

5.4 Shift in Approach and Strategy–From Conventional Soil Conservation Approach of safe disposal of run-off to rainwater-conservation and harvesting based on indigenous systems and practices.

5.4.1 Rainwater conservation and harvesting hold the key for sustainable development of rainfed areas. What is watershed development if it cannot meet the basic minimum needs of water of the rural communities in the project areas? **Therefore, the rainwater management should encompass the multiple uses of water namely, drinking water for humans, livestock and fauna, domestic uses, life saving and pre-sowing irrigation of crops, natural regeneration of flora and other uses in this order of priority.** The harvested water needs to be treated as a common pool resource by evolving suitable community practices which will ensure equitable distribution of the usufruct.

5.4.2. The present system of construction of check dams in the lower reaches of watersheds helps only a few farmers, generally the rich ones. **It is recommended that a series of small sunken water harvesting devices all over the landscape and all along drainage lines should be installed for equitable distribution of water. It has been suggested that low-cost small earthen ponding dams should be dug out on the upper reaches of the watershed so as to augment, activate the watercourse (drainage lines) and also provide adequate soil moisture below such devices for the benefit of the poorer sections of society who make a living from that part of the watershed. Vegetating the upper reaches to provide the usufruct rights with pro-poor bias and also to enhance the stream-flow, besides increased groundwater recharge are the other possibilities. Cost-sharing in such community works requires special attention.**

5.5 Poverty Alleviation-Livelihood Support to the Rural Poor

5.5.1 Marginal farmers and landless households residing in the rural areas have composite livelihood support systems which typically comprises of deriving fuel for the hearth and fodder for their livestock, particularly small ruminants, piggery, goatery, etc. They also collect raw material for biomass-based cottage industries like basket and mat weaving, broom binding, rope making etc. They also heavily depend on minor forest produce like Mahuva, Chironji, Honey,

¹⁴ From Soil Conservation to Land Husbandry, 1993, Swedish International Authority.

Gum, Tendu leaves etc. Thus wastelands and forestlands are inseparably linked with livelihood of the rural poor. In addition they also collect fuelwood for selling in the nearby towns exercising tremendous impact on the green cover. Typically, many families supplement their income through wage-earnings by working on the field of rich farmers, local public works and seasonal migration to towns and cities. Unless their survival biomass needs are satisfied, the ecological management will continue to be vulnerable, as the poor exploit natural resources due to compulsion of urge for survival. Therefore, Watershed Development Programme should focus on strengthening the livelihood system of the rural poor, both for improving their social and economic status and for improving and preserving the ecological production environment. **Thus the basic biomass survival-needs of poor and landless for fuelwood, for self-consumption and for market, fodder for their livestock and raw material for cottage industries from the village wastelands and nearby forests should be ensured. Giving such lands on lease to the women and poorer sections of society is being attempted by several NGOs with success. Adequate funds need to be provided for retrieving such lands for leasing to the target groups.**

5.6 Perspective Planning for Watershed Development-2002 to 2022

5.6.1 Watershed Development Programme has been operational in India for about 45 years and so far only 27.5 m. ha out of problem area of 107 m. ha is expected to be treated by the end of the IXth FYP. This is because different ministries operating the watershed programme, did not formulate a perspective plan. At the instance of Parliament, the Planning Commission formulated a 25 years' perspective plan. The approach suggested in the Perspective Plan should be followed. **MoRD, MoA and MoE&F together should develop a perspective plan to treat the problem area in the given time frame and the X FYP should be a part of the perspective plan of each of these Ministries. The Working Group suggests a Perspective Plan to treat/reclaim/cover 88.5 m. ha of rainfed degraded lands in next four FYPs with cost-sharing by the centre, the states, and the beneficiaries (refer para-4.87).**

5.7 Financing of Watershed Development Programme: Total funds and flow of funds

5.7.1 Vast areas are in need of Watershed Development Programme which call for urgent attention. Both Union and state governments should provide maximum possible budgetary support for development of degraded rainfed lands on priority basis. There is felt need as well as convincing reasons for this: -

- (a) The regional imbalance between irrigated areas and rainfed areas needs to be corrected on priority basis. Governments have invested huge sums of money for irrigated areas and now the welfare state should make investment for the benefit of rainfed areas.
- (b) Government is spending good amount of money as drought relief and flood relief. If watershed development mitigates the impact of drought and floods there should be good saving from government relief funds.
- (c) The nutritionally important crops like pulses, oilseeds, and nutritional grains (coarse cereals) are grown under rainfed conditions. The increase in production in rainfed crops would tend to correct nutritional imbalance and reinforce food and nutritional security.

5.7.2 Governments alone cannot finance development of vast rainfed areas and degraded lands in the foreseeable future, even if there is a will to do so. Therefore, the following strategy should be adopted:

- (i) **Promotion of low-cost conservation measures/strategy based on indigenous practices and devices with higher reliance on vegetative conservation measures and the use of plant species in reclamation and development of problem-soils.** Thus, comparatively more areas can be treated with lesser amount of financial support. Indigenous systems are very well known to the people and they would be able to accelerate the pace of progress.
- (ii) **The cost-sharing arrangement.** If Watershed Development Programme becomes peoples' movement the outside funds will be only supplemental in nature. **The principles of cost-sharing should be enforced based on the direct benefit to the households and their capacity to pay. Thus, an appropriate ceiling of project benefit should be decided for different states/regions. This may be equal to the funds provided to the landless and marginal farmers' households e.g.: a ceiling of Rs 10,000/- per family should be fixed. Resource-rich farmers should pay 100% for the investment on their holding beyond Rs.10, 000 /-.**
- (iii) **Convergence of funds.** The principal source of funding should be the beneficiary household. However, depending upon their capacity and the need, **integrated funding support system should be promoted which includes government financial support, credit from NABARD and Commercial Banks and funds provided by Private Sector for specified activities like drinking water, cattle care etc.** Thus, the integrated financial package will accelerate the coverage of area-treatment and would bring in ecological and socio-economic benefits in the near future.
- (iv) **Flow of Fund.** Instead of creating a new system of fund-flow as was suggested by some of the members of the Working Group, improvement should be brought about in the existing system. Sending funds directly to the districts, bypassing the state governments, creates a work-culture wherein state governments and senior officers of the concerned departments do not own the project. Therefore, the Working Group recommends **that the system of flow of funds currently followed for the World Bank and Foreign Aided Projects, should be applicable to Central funding also. The project implementing agencies and the state governments should prepare quarter-wise activity-plan and fund-requirements for submission to the concerned Central Ministry/Department. The financial requirements for the first quarter of the financial year should be released. Thereafter, further releases should be effected only after statement of expenditure is duly furnished by the state government to the concerned Ministry.**

5.8 Cost-norms-Average Unit Cost

5.8.1 The Working Group examined the cost norms provided in the common guidelines and endorses the range of Rs. 4500/- to Rs. 6000/hectare and also endorses the cost distribution between management component (22.5%) and development component (77.5%). However, **the**

working group recommends the re-distribution of cost within development component as suggested here under.

- (i) **Natural Resources' Management 40%:** farmers with larger holdings should contribute more and a maximum ceiling of Rs. 10, 000 per farmer family, should be the extent of support to the individual landed farmer family. 20% of the funds under this head meant for land development should be allocated to the BPL families for livelihood security.
- (ii) **Farm production system 20%:**
- (iii) **Livelihood support to landless families-17.5%:** The landless-poor exercise tremendous impact on the ecosystem for their survival needs of living and for fuel, fodder etc.

5.9 Delineation of Areas: Panchayat-the Primary Unit

5.9.1 Under the provisions of 73rd & 74th Amendment of the Constitution, watershed development has been placed as one of the selected activities under the jurisdiction of panchayats. Ultimately, panchayat would be the primary implementing agency of watershed planning and action. This should be suitably dovetailed into need-based village-level planning to be done by the communities living in habitations and hamlets of revenue villages, and such beneficiary communities alone should implement the plans on behalf of the Panchayat. The initiative in this direction should be taken in the Xth FYP. This would go a long way to inter-weave ecosystem concerns into the mechanisms of local self-governance, in order to ensure conservation of natural resources for promotion of sustainable lifestyles.

5.9.2. While selecting the panchayats for implementation of watershed development programme, priority should be given to those panchayats which commit in advance, through the revenue villages comprising the Panchayat, to practice of: -

- (i) Social fencing of common pastures/silvi pastoral systems and forest lands (ban on grazing (Charai Bandi));
- (ii) Equitable sharing of usufruct from common property resources, village common lands and adjoining forest areas, like grasses, fuel etc.;
- (iii) Preserving trees and bio-diversity through ban on felling of trees (Kulhadi Bandi); and
- (iv) Promotion of small family norm (family planning);

This prescriptive approach seems to be necessary in order to motivate Panchayats to prepare in advance, before governments funds are made available to them for such projects.

5.9.3 As per common guidelines of delineation of working area for different departments (DAC, DLR, MoE&F) development block is the unit. In one block one department would work and no other ministry would work in the same block. Block is a large area. In view of limited

financial resources, if only one department works in one block, it would take decades to cover the entire problem area. The slow progress of the programme has also been observed by the L.C.Jain Committee Report (1990) that DPAP and DDP could treat only 5.7% of the problem area between 1972-73 to 1990. It is, therefore, recommended that **the unit area for delineation of working areas of different schemes supported by different central ministries and departments should be area of the panchayat, in place of block with the same cost-norms. Since common guidelines would be followed by both MoA and MoRD, there would be no operational problems in working in adjoining panchayats.**

5.9.4 At present MoA and MoRD are supporting projects outside the forest areas and MoE&F is working within the forest areas. The ground reality is that nature does not follow man-made legal boundaries of forest and non-forest lands. Sometimes, the natural geo-hydrological unit of watershed has both forestland and non-forestland. Many times the livelihood of the rural poor is inseparably linked with forest areas. Therefore, the following general guidelines should be followed: -

- (i) **The panchayats where schemes of DPAP, DDP, IWDP of MRD are operating at present, should continue to cover the entire project area in the X FYP, and from X FYP onwards, each scheme should expand to adjoining panchayats.**
- (ii) **Similar schemes like NWDPRRA, Shifting Cultivation, Soil Conservation Works in the catchment of River Valley Project and Flood Prone Rivers etc. under MoA/DAC should complete the works in common panchayat areas and move to adjoining panchayat in the X FYP.**
- (iii) **MoE&F should be the nodal agency for the watersheds located in panchayats in or contiguous to forest areas. Besides, Forest Department should also adopt the ceiling of cost-norms of Rs. 4500 to Rs. 6000 as provided in the common guidelines while implementing the schemes of DAC and DLR in forest areas and areas adjoining to forests.**

5.9.5 The scheme of MoE&F is operating to rehabilitate the degraded forest areas on watershed basis. **It is recommended that the scheme should be re-designed and launched as watershed based regenerative and participatory rehabilitation of degraded forests.** The suggested recommendations are:-

- (i) **Participatory system based on traditional management system through village community should be promoted. The community based organization like forest protection committees, watershed development associations, etc. should plan and implement these schemes under the guidance of forest department.**
- (ii) **The local community would have to respect social fencing and must not allow grazing in the demarcated areas; sheep, cows and buffaloes to be prohibited for three years from grazing, goats for five years, and camels for seven years. In the remaining areas the local community may graze their animals. After a period of 5-7 years, the areas taken up in the first stage would be opened up for grazing and the remaining areas will be taken up for development.**

- (iii) **More reliance should be placed on re-generation and development of silvi-pastoral practices, rather than on conventional forestry. Thus, in the short run fodder and fuel will be available to the local community which will reduce pressure on reserve forest areas and areas under national parks.** This low-cost re-generative silvi-pastoral system with full participation of the local communities under the support of forest department would bring about sustainable rehabilitation of degraded forest areas in the future and meet the bio-mass needs of the local communities on a sustainable basis, and would not be as costly as the conventional forestry norms.
- (iv) In spite of the fact that Joint Forest Management (JFM) has been accepted by the forest department, its' functionaries do not appear to see the need to integrate ecological restoration of the watershed with forestry activities, even if it was to sustain forestlands.
- (v) There is a basic reluctance to see communities as custodians of the forests, or forests as the mother of agriculture and therefore such communities and forests performing a crucial role in farming systems. This implies that a basic change in mindset is called for.

5.9.6 Such linkages between forest department and the local community with the patronage of local administration will create an affordable model of rehabilitation of degraded forests which will meet both the concerns; restoration of the ecological balance and economic development of the degraded forest areas which are presently under great biotic pressure.

5.10 Macro-Management and Natural Resource Management.

5.10.1 A number of crop-production schemes and schemes on natural resource management like NWDPPRA, RVP & FPR have been subsumed under Macro-Management and funds have been transferred to state governments with the flexibility to utilize the total funds as per need and priority of the state government. The basic principle is that states know what is good for them.

5.10.2 But, it is also a fact that most of the state governments are operating under financial resource crunch. The priorities of the state government include paying salaries to their employees, crisis management due to natural calamities, and schemes which produce short-term results. Crop-production schemes produce quick results and assume high priorities.

5.10.3 On the other hand, schemes for natural resource upgradation, conservation and management take longer time to generate visual impacts. Therefore, such schemes get low priority in the financial management of the state governments. Experience indicates that when funds were passed on to the state governments in the past, schemes of natural resource management got little funds or were discontinued.

5.10.4 Therefore, at this stage when national natural resources are degrading at an alarming rate the Central Government should not be satisfied with a passive role. Moreover, natural resource problems are often inter-state issues like river valley projects. **The Working Group recommends that schemes for natural resource management should be delinked from the Macro-Management Mode and should be operated as Centrally Sponsored Schemes.**

Central Government, State Government, NGOs and local people should act as active partners for preserving the health and purity of national natural resources.

5.11 A vast land area remains unutilized or under-utilized because of its low fertility/productivity and severe degradation. The estimates of such areas made by the different agencies/organizations /individuals vary widely from 53.3 m.ha (NRSA, 1985) to 239 m. ha (NWDB, 1987). It is unfortunate that even after having a large number of agricultural development and research organizations we do not have even near accurate estimates of degraded and wastelands in the country. Some attempts have been made by the Indian Council of Agricultural Research (ICAR), Department of Land Resources and National Remote Sensing Agency, etc., However, these efforts have remained limited to assessing a specific category of degraded/wastelands. **It is therefore, necessary that a comprehensive soil survey is taken up in hand, and mapping of landmass in the country is completed in a time-bound period, so as to develop and utilize this vital resource for productive purposes. The three concerned Ministries, MoRD, MoA and MoE&F should try to evolve a working strategy to reconcile their landuse survey data. However, this need not come in the way of effectively going forth to collaborate and coordinate their activities in implementing rainwater conservation programmes.** There is a pressing need to revitalize the National Land-Use Board and the State Land-Use Boards to serve the purpose for which they were originally set up to promote integrated land-use planning. Promotion of integrated land-use planning has also been given due emphasis in the Approach Paper circulated by the Planning Commission for the Xth Five Year Plan. It is within such overarching planning and regulatory authorities that the country's sectoral planning policies on agriculture, forests, water resources, industry and infrastructure should be nested at the national and state levels.

5.12 At present, watershed development programmes in the country are being implemented by multiple agencies. DAC is mainly concerned with the rainfed agricultural lands; DLR is restricting its programmes to Drought Prone Areas and Desert Prone Areas. The mandate of the MoA (DAC) is to enhance production and productivity of rainfed areas through sustainable agricultural practices. Mandate of MoRD (DLR) is development and maintenance of the natural resource base in rural areas for increased employment generation and improvement in the general socio-economic conditions of the rural poor on a micro-watershed basis through people's participation. MoE&F is implementing its programme for regeneration of degraded forests and also the programme to combat desertification. There seems no active coordination among these departments and focus on the watershed development activities vary according to the perceptions and mandates of different departments/ministries. During the Workshop on the Impact of Watershed Development Programme organized by the Planning Commission on 5th January, 2001, it was observed that whereas the focus of DAC has been on production-oriented activities, the focus of DLR was on land development. DLR has not been able to get its programme evaluated due to non-involvement of technical expertise in the execution of programmes. These programmes are being executed/implemented by departments/agencies which do not possess technical staff/personnel. The DLR's interest is limited to monitoring of financial releases and expenditure of funds by DRDAs/Zilla Parishads alone, and there is no/low priority on physical activities/achievements. **It is considered necessary that watershed development programmes must focus on regeneration of the productivity of such degraded/wastelands. To achieve these objectives it would be desirable to have a Single National Initiative for the watershed development programmes. MoA feels that the implementation of all such programmes/schemes should be brought under the purview of Ministry of Agriculture as**

they have the required technical manpower, unlike the DLR which lacks in technical expertise especially with regards to productivity activities. The DLR, however feels that the single national initiative should be brought under MoRD.¹⁵ With an established record of indifferent monitoring and evaluation of its programmes, it is difficult to understand the emphasis of DLR that the single national initiative for watershed development programmes should be brought under MoRD. Considering that in para 5.9, delineation of areas of operation of different departments has been worked out, it is felt that MoA, MoRD and MoE&F should work in their respective areas of concern, and the single national initiative could become some kind of a coordination mechanism at different levels.

5.13 Development of natural or otherwise waterlogged & flooded areas inside and outside the command of irrigation projects.

5.13.1 There are vast areas, which suffer from waterlogging due to drainage-congestion and silting of village ponds. Waterlogging affects crop-production, hinders movement of the people and causes many human and livestock diseases. Successful watershed development projects have demonstrated that waterlogging and flooding can be controlled by desilting and deepening of village ponds, and through vertical drainage with shallow tubewells. This improves the ecology of the area and promotes economic growth particularly for self help groups of the rural poor through fish culture etc. Summer cropping improves socio-economic conditions. **It is recommended that during the Tenth Five Year Plan this approach and strategy should be expanded to similar other areas with due modifications.**

5.14 Public perceptions of watershed development programmes.

The presence of Shri Anna Hazare and Shri Rajendra Singh in the meetings of the Working Group enabled all the members to benefit from their well-considered views. Shri Anna Hazare's views are recorded in paras 6, 7, 8 & 9 in the summary record of the second meeting of the Working Group held on 8th February, 2001. The views of Shri Rajendra Singh are recorded in

¹⁵ The DLR though endorses the view to have a Single National Initiative for the Watershed Development Programme, as was reflected in the Finance Minister's Budget Speech, it does not subscribe to the suggestion that all the Watershed Development Programmes should be brought under the purview of DAC. Instead, it expects that all these watershed schemes will be brought under the DLR. The DLR also does not agree to the viewpoint of the Working Group about the lack of expertise with it and feel that it has sufficient technical manpower to implement the existing watershed development programmes within its purview.

In the view of DLR "the main objective of any Watershed Programme (including programmes of DAC) is sustainable production of biomass (not enhancing crop production or productivity, both of which may happen in the course of the implementation of the Watershed Programme but cannot be regarded as fundamental properties of the programme) and restoration of ecological balance through conservation of natural resources. Thus the transfer of watershed programmes to the DLR would, in no way be likely to adversely affect food production. Out of around 100 million hectares rainfed areas in the country, the DAC are treating only around 0.4 to 0.5 m. ha area annually, through watershed programmes, which is insubstantial and cannot, therefore, be seen as significant contribution to the foodgrains production of the country. There is also no record available to establish that the increase in production is attributed to treatment of areas under the Watershed Programmes. The basic aim of the Watershed Programmes is to improve the quality of life of the rural poor and the MoRD are responsible for improving the economic standards and sustainable livelihoods through various poverty alleviation programmes which could be conveniently dovetailed with Watershed Programmes as a watershed plus approach."

The DLR is taking help for the Watershed Development Programme from the nearby institutions along with scientist of KVK/ICAR and SAUs. *In large number of projects Line Departments of State Government like Soil Conservation, Agriculture, Forest, Horticulture, etc. have been functioning as project implementing agencies.* Thus, it seems that though the DLR is implementing the Watershed Development Programmes in cooperation with some of the experts in various fields of agriculture in the states, they do not feel that at Central level the programme should be implemented by the organizations wherein such expertise is available. Besides, the DLR does not seem to rely to alleviate rural poverty by increasing the production and productivity of land through watershed programme but is of the opinion "that in some areas the plight of poor which is aggravated further by the vagaries of nature and inadequate rainfall could be tackled systematically through proper planning and effective execution of relief programmes with the active involvement of the Panchayati Raj Institutions." Thus it seems that DLR places more reliance on relief programmes than on addressing the route cause of the problem.

paras 11, 12, 13, 14 & 15 of the same summary record of the second meeting of the Working Group. Their narration provides a graphic picture of the public perception of the watershed development programme as it has been carried out so far, and also provides valuable guidance to the fieldworkers and policy planners for the future. The summary record of the two meetings of the Working Group held on 18th December, 2000 and on 8th February, 2001 are contained in **Appendix-I**.

No.M-12043/13/2000-Agri.
PLANNING COMMISSION
(AGRICULTURE DIVISION)

Yojana Bhavan, Sansad Marg,
New Delhi-1, Dated: 15th November, 2000

ORDER

Subject: Constitution of the Working Group of “Watershed Development, Rainfed Farming and Natural Resources management” for the Tenth Five Year Plan (2002-2007)

It has been decided to set up a Working Group on Watershed development, Rainfed Farming and Natural Resources Management for the formulation of Tenth Five Year Plan (2002-2007) under the chairmanship of Shri J.C. Pant, Former Secretary, Department of Agriculture & Cooperation, Government of India.

2. The Composition of the Working Group is given at **ANNEXURE-II**.
3. The Terms of Reference of the Working Group will be as follows:-
 - (i) To review the performance of various central and centrally sponsored schemes being implemented by the Department of Agriculture and Cooperation during the Ninth Plan with reference to their goals set both in terms of physical and financial achievements and to suggest modifications so as to make these programmes more effective in realizing the objectives of soil and water conservation, land reclamation & development and rainfed/dry land agriculture programmes for the sustainable development of natural resources.
 - (ii) To review the performance and impact of various programmes based on watershed development approach such as National Watershed development Programmes for Rainfed Areas (NWDPA), Watershed development programme in shifting cultivation areas (WDPSA), watershed programmes of River Valley Projects (RVP) and Flood Prone Rivers (FPR) of the Ministry of Agriculture, the watershed programmes implemented under Drought Prone Areas Programme (DPAP), Desert Development Programme (DDP), Integrated Wasteland Development Programme (IWDP), Technology Development, Extension & Training (TDET) and Investment Promotional Scheme (IPS) implemented by the Ministry of Rural Development and the other programme of the Ministry of Environment & Forest as well as the externally aided projects being undertaken in various states in raising land productivity, cropping intensity, *insitu* moisture conservation, safeguard on the measures for prevention of silt deposition in the reservoirs, bio-mass production and overall economic and social upgradation in the rainfed/watershed areas.
 - (iii) To review the programmes of land reclamation during the Ninth Plan and suggest measures for making these cost effective and popular with private sector participation and also taking up programmes for some special problematic land/soils.

- (iv) The Working Group may also study the feasibility for the involvement of and investment by the private sector in mechanized land reclamation development of problem soils, wasteland at a large scale under common property regimes and state property regimes on sharing basis or on lease contract for the fixed period for production of high value crops.
- (v) Working Group may suggest measures, programmes for land resources development for the Tenth Five Year Plan and the requirements of funds as also the area to be covered under the programme of various Ministries/Departments as well as State Governments.

4. The Chairman of the Working Group may set up sub-groups/task forces, if necessary for undertaking in-depth studies and formulation of proposals for the Tenth Five Year Plan.

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

6. The Working Group may co-opt/non-official experts/ representatives of other agencies, if required.

7. The Working Group will submit its final report to the Planning Commission by 31st March, 2001.

Sd/-
(Suresh Pal)
Deputy Secretary to the Government of India

Copy forwarded to the Chairman and Members of Working 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

P.S to Pr. Adviser (Agri.)

P.S to Adviser (PC)

Joint Adviser (Agri.)/Joint Adviser (APS)/Directors (agri)

Dy. Advisers /SROs/ROs in the Agricultural Division.

Pr. Advisers/Advisers of all Divisions

PA to Deputy Secretary/SO (Admn.I)

ANNEXURE-II

Composition of the Working Group on Watershed Development, Rainfed Farming and Natural Resources Management

- | | |
|---|-----------------|
| 1. Shri J.C. Pant,
Former Secretary (A&C) GOI,
Shraddha Kunj, 159 Vasant Vihar, Dehradun-248006. | Chairman |
| 2. Special Secretary
Ministry of Environment & Forests,
CGO Complex, Paryavaran Bhawan, New Delhi-110003. | Member |
| 3. Adviser (RD)
Planning Commission, New Delhi. | Member |
| 4. Shri Mohan Kanda, Additional Secretary,
Department of Land Resources,
Ministry of Rural Development, G-Wing,
NBO Building, Nirman Bhavan, New Delhi-1 | Member |
| 5. Dr. G.B. Singh,
Former DDG (NRM), ICAR,
C-II/131, Satya Margh,
Chanakya Puri, New Delhi-21. | Member |
| 6. Dr. I.P Abrol,
Former DDG (Soils and Agro)
Centre for Advancement of Sustainable Agriculture,
Vasant Kunj, New Delhi-110070. | Member |
| 7. Dr. M. Velayutham,
Director,
National Bureau of Soil Survey & Land Use Planning,
Shankar Nagar, Amraboty Road, Nagpur-462038. | Member |
| 8. Dr. J.S. Samra,
DDG (NRM), ICAR, Krishi Bhavan, New Delhi-1 | Member |
| 9. Dr. J. Venkateswarlu,
Consultant, Central Research Institute for Dry Land Agriculture (CRIDA),
Hyderabad-500059. | Member |
| 10. Shri Kishan Babu Rao alias Anna Sahab Hazare
Hindu Sawraj Trust, Firodia Hostel, Near D.M. Collage,
Agarkar Road, Pune-411004 (Maharashtra). | Member |
| 11. AVM. S. Sahni,
Development Alternatives, 1077, Civil Line, Jhansi-284001, (U.P.) | Member |

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|---|------------------|
| 12. Shri Harnath Jagawat,
Director,
NM Sadguru Water & Development Foundation,
Post Box No. 71, Dahod-389151, Gujarat. | Member |
| 13. Dr. Rita Sharma,
Joint Secretary (NRM & RFS), DAC,
Krishi Bhawan, New Delhi-1 | Member |
| *14. Dr. S.L. Seth,
C-101, Shivalik, New Delhi-110016. | Member |
| **15. Shri Rajendra Singh,
Tarun Bharat Sangh, Bhikampura-Kishori, via Thana Gazi,
Alwar-301002, Rajasthan. | Member |
| **16. Shri Ganesh Pangare, Chief Executive Officer,
India Network on Participatory,
Irrigation Management (India NPIM), Room no. 318,
Old Building, CSMRS, Olaf Palme Marg,
Hauz Khas, New Delhi. 110016. | Member |
| **17. Shri Aloysius P. Fernandez,
Executive Director, MARYADA, No.2, Service Road,
Domlur Layout, Banglore-560071, Karnataka. | Member |
| **18. Shri Crispen Lobo,
Executive Director, Watershed Organization Trust,
Market Yard Road, Ahmednagar-414001. | Member |
| **19. Representative of Secretary (WR),
Ministry of Water Resources,
Shram Shakti Bhavan, New Delhi-110001. | Member |
| **20. Adviser (WR),
Planning Commission. | Member |
| **21. Adviser (E & F),
Planning Commission, | Member |
| 22. Shri M. Lall,
Joint Adviser (Agri.),
Planning Commission, New Delhi-1 | Member Secretary |

* Included vide office order of even number 4th December, 2000.

** Included vide office order of even number 12th December, 2000.

SUMMARY RECORD OF THE FIRST MEETING OF THE WORKING GROUP ON WATERSHED DEVELOPMENT, RAINFED FARMING AND NATURAL RESOURCE MANAGEMENT HELD ON 18TH DECEMBER, 2000 UNDER THE CHAIRMANSHIP OF SHRI J.C.PANT.

The first meeting of the Working Group on Watershed Development, Rainfed Farming and Natural Resource Management constituted for the formulation of Tenth Five Year Plan under the Chairmanship of Shri J.C. Pant, Former Secretary, Department of Agriculture & Cooperation, Government of India was held on 18th December, 2000 at Yojana Bhawan, New Delhi.

2. The list of the participants is appended.
3. Dr. Rohini Nayyar, Adviser (RD), Planning Commission while introducing the Chairman to the participants, thanked the Chairman and all members of the Working Group present for accepting the request of the Planning Commission to be in the Working Group. She welcomed the Chairman and all the members of the Working Group and other participants in the meeting.
4. Shri J.C. Pant, Chairman said that management of rainfed areas and management of natural resources is of crucial importance. Much water has flown down several rivers since the programmes of Dry Land Farming and Watershed Development were initiated by GOI. Now the scope for the programme has become much more comprehensive. The Chairman emphasized that as per the Terms of Reference of the Working Group, the Report is to be submitted by 31st March, 2001 for which a lot of work has to be done by all members for completing the task in time. Basically, the concern of the group should be to fine-tune the present approach and strategy for sustainable development of rainfed areas, land and water resources which are vital for agriculture.
5. The Chairman also made a mention of Terms of Reference of the Working Group and asked the representatives of the various concerned departments & ministries to give their views and suggestions. He also informed that MoE&F had already made some suggestions with respect to the Terms of Reference of the Working Group.
6. The Chairman constituted three Sub-Working Groups under the Chairmanship of (i) Special Secretary, Ministry of Environment and Forests (MoE&F), (ii) Additional Secretary, Department of Land Resource Development (DLRD) and (iii) Joint Secretary (NRM&RFS), Department of Agriculture & Cooperation (DAC) to review the existing schemes of the concerned ministry & departments and suggest measures & programmes to bring about improvements in their implementation as well as sustainable development of land and water resources in the country. The Chairman also suggested that Sub-Group meetings should be held in the first week of January (4th and 5th), 2001 so that the Chairpersons of these Sub-Groups are able to make their presentations in the second meeting of the Working Group which is to be held on 16th January, 2001 at Yojana Bhawan. Thereafter the Chairman asked the members and other participants to give their views and suggestions on the implementation, impact and shortcomings observed

in various watershed development programmes implemented through the support of Government or with the initiatives of NGOs and other organizations.

7. Members of the Working Group and the participants narrated their experience about the implementation of watershed development programmes with which they were involved, directly or indirectly and gave very valuable suggestions & observations, especially with regard to sustainability, peoples' participation and their contribution, equity issues and benefit sharing, and other problems associated with the implementation of Watershed Development & Natural Resource Management programmes. Some of the important observations & suggestions made by the members & participants were:
- (i) Very often it has been observed that structures in the field do not conform to the contours and are without any consideration of technical parameters. In several watersheds such structures have been washed away or have broken down, as observance of technical & engineering aspects have not been up to the mark. In some cases structures have been washed away after just a few inches of rainfall.
 - (ii) Water should be the focal point of attention under the watershed development programme. If water conservation and management is not done even in high rainfall areas, there is likelihood of water scarcity for agriculture as well as for drinking purposes in lean seasons.
 - (iii) Peoples' participation including that of women and landless agricultural labor in preparing the plan is necessary for sustainable development and management of resources. Their involvement in decision-making is also important for success in implementation.
 - (iv) Along with food grain, production of grasses, fodder and fuel needs to be given due attention to meet the needs of the landless and the poor families.
 - (v) Some people get extra benefits whereas others get nothing or no benefits at all under the watershed development programme as it is being implemented at present. People who get more benefits should pay & contribute for this. In implementation of watershed development programme, the cost norms should not be based only on per unit area but should also be worked out on per family basis so as to ensure equitable benefits to all the families covered in the watershed programme.
 - (vi) Benefit-sharing by the community is very important. Sharing of usufruct with a pro-poor or landless bias requires particular attention so as to involve them in the programme and also to raise their income.
 - (vii) Progress under some watershed projects has been found to be slow because of non-release of funds to the project implementing agencies. It was suggested that the feasibility of releasing funds directly to the implementing agencies including the NGOs with proper audit system to ensure proper utilization of funds, may be explored. One of the ideas was to release the funds to the Zila

Panchayats for watershed projects in a district. The representative of DLRD informed that though the department has been releasing funds directly to DRDAs the utilization so far has not been satisfactory, and there remain huge unspent balances. Besides, the conflict which may arise between the implementing agency and the Panchayati Raj Institutions has to be avoided for the smooth and effective implementation of the programmes. The role of plant species in improving the saline or alkaline and waterlogged soils and in increasing the soil fertility have been observed to be very useful. Therefore, plantation of right types of plant species for improving the land and its productivity should get adequate attention.

8. Representative of the Department of Agriculture & Cooperation stated that there has been no commonality of approach in implementing watershed programmes of various ministries in the past. In the common guidelines prepared now, the approach is expected to become common. The progress under the watershed development programme has been slow vis-à-vis projections made. Up to the end of the Eighth Five Year Plan only about 18 million ha. area have been treated or developed through these programmes. There is likelihood of shortfall in achieving the targets during the Ninth Plan also because of shortage of funds and inadequate funding norms. Programmes for the reclamation of acid soils, coastal saline areas, ravines and waterlogged areas (outside the CADAs) envisaged by the department could not be taken up during the Ninth Plan due to shortage of funds.
9. Considering the slow progress under the watershed development programmes, the Chairman observed that “we have to have a people’s programme with Government involvement and not a Government programme with people’s involvement”. He mentioned that this approach was for the first time brought into the WARASA guidelines of the DAC in 1990 when NWDPRAs of the Eighth Plan was being drafted. In the 25 years’ Perspective Plan of the Planning Commission, emphasis has also been given to the active participation and involvement of the people and community at the planning, implementation and post-project evaluation stages.
10. It was suggested that the three sub-groups constituted under the Chairmanship of (i) Special Secretary, Ministry of Environment & Forests; (ii) Additional Secretary, Department of Land Resources Development; and (iii) Joint Secretary (NRM and RFS), Department of Agriculture and Cooperation may hold the meetings of the respective sub-groups on 4th and 5th of January, 2001, at Yojana Bhawan, New Delhi. The Chairman requested the three chairpersons to allow free discussion to take place in the sub-group meetings in order to highlight the perceptions of the non-official members of the Working Group. He also requested the non-official members in the Working Group to participate in the sub-group meetings in order to give full expression to their points of view.
11. The Chairman asked members & representatives of various organizations to provide a write-up which may include their experiences about the implementation of watershed programme, achievements, impact of the programme in improving the land and water resources and in increasing the income of the farmers and also suggestions to overcome

the difficulties that they may have experienced, as well as to bring about improvements in the approach and strategy to achieve the objectives of the programme.

12. The meeting ended with a vote of thanks to the Chair.

List of participants to the Ist Meeting of the Working Group held on 18.12.2000

1. Shri J.C. Pant, I.A.S (Retd.) Former Secretary (A&C), Chairman, India Literacy Board, Literacy House, P.O Manas Nagar, Kanpur Road, Lucknow-226023, U.P.
2. Dr. Rohini Nayyar, Adviser (RD), Planning Commission, New Delhi.
3. Shri P.S Rana, Joint Secretary, Department of Land Resources, Ministry of Rural Department, G-Wing, NBO Building, Nirman Bhawan, New Delhi-1.
4. Dr. Rita Sharma, Joint Secretary (NRM&RFS), Department of Agri. & Cooperation, Krishi Bhavan, New-Delhi-110001.
5. Dr. G.B.Singh, Vice-Chancellor, Jawahar Lal Nehru Agriculture University, Jabalpur M.P. Pin-482004.
6. Dr. J.S. Samra, Dy Director General (NRM), ICAR, Krishi Bhavan, New Delhi-1.
7. Shri S.K. Puri, Director, NAEB, Ministry of Environment & Forests C.G.O Complex, Paryavaran Bhawan, New Delhi-110003.
8. Shri M.Lall, Joint Adviser (Agri.) & Member Secretary, Working Group, Planning Commission, New Delhi.
9. Shri A.D Bhardwaj, Sr Joint Comm., Ministry of Water Resources, Room No. 108-B, Shastri Bhawan, New Delhi-110001.
10. Dr. J. Venkateswarlu, Consultant, Central Research Institute for Dry Land Agriculture (CRIDA), Santoshnagar, P.O-Saidabad, Hyderabad-500059.
11. AVM. S. Sahni, Development Alternatives, 1077, Civil Line, Jhansi-284001, UP.
12. Shri Harnath Jagawat, Director, NM Sadguru Water & Development Foundation, Post Box No. 71, Dahod-389151, Gujarat.
13. Shri Rajendra Singh, Tarun Bharat Sangh, Bhikampura-Kishori, via Thana Gazi, Alwar-301002, Rajasthan.
14. Shri Ganesh Pangare, Chief Executive Officer, India Network on Participatory, Irrigation Management (India NPIM), Room no. 318, Old Building, CSMRS, Olaf Palme Marg, Hauz Khas, New Delhi. 110016.
15. Shri Crispino Lobo, Executive Director, Watershed Organization Trust, Market Yard Road, Ahmednagar-414001.
16. Dr. S.L. Seth, C-101, Shivalik, New Delhi-110016.
17. Dr. Suraj Bhan, Addl Commissioner (SWC) Natural Resources Division, Deptt. of Agriculture & Cooperation, 106-B Shastri Bhavan, New Delhi-110001.
18. Shri Mukul Joshi, Additional Commissioner, RFS Division, Room No. 244 A, Krishi Bhawan, New Delhi-1.
19. Shri Shamsher Singh, Dy. Commissioner (WM), Natural Resources Division, Deptt. of Agriculture & Cooperation, Room No. 114-B Wing Shastri Bhawan, New Delhi-1.
20. Dr. Nagesh Singh, Director (RD), Planning Commission, New Delhi.
21. Dr. D.N. Pandey, Dy Adviser (Agriculture), Planning Commission, New Delhi.
22. Shri Shunil Sharan, S.R.O (RD), Planning Commission, New Delhi.
23. Shri S. Roy, R.O. (Agri.), Planning Commission, New Delhi.
24. Dr. Ramanand, R.O. (Moni. Agri.), Planning Commission, New Delhi.

SUMMARY RECORD OF THE SECOND MEETING OF THE WORKING GROUP ON WATERSHED DEVELOPMENT, RAINFED FARMING AND NATURAL RESOURCES MANAGEMENT HELD ON 8.2.2001 AT YOJANA BHAWAN, NEW DELHI.

The second meeting of the Working Group on Watershed Development, Rainfed Farming and Natural Resources Management was held under the chairmanship of Shri J.C. Pant at Yojana Bhawan, New Delhi. The list of participants is enclosed.

2. At the outset, the Chairman welcomed the members and participants and invited the members to present their views on the programmes and schemes under discussion.
3. Smt. Meera Maharshi, Joint Secretary, made a presentation on the present status of the ongoing scheme of Ministry of Environment & Forests. She pointed out that currently there is only one scheme that has a clear focus on the watershed approach, i.e., Integrated Afforestation and Eco-development Projects Scheme (IAEPS) which is a 100% CSS. It was also pointed out that all the afforestation schemes in the ministry have Joint Forest Management concept as an integral part and that project authorities are given adequate flexibility by way of 'entry-point activities' and requisite funds for building up awareness, etc amongst the participating communities. It was also mentioned that funds were limited and needed augmentation if the "Ridge to Valley" approach in regard to watershed development was to be followed.
4. In the discussions that ensued, the Department of Land Resources agreed to look into development of watersheds in the upper reaches, i.e., in forest areas to be taken up by the Forest Department, by considering the modalities of providing funds. It was also agreed that lands adjoining forest areas would be given a sharp forestry flavor for development and the work on watersheds in those areas would be entrusted to the Forest Department. It was urged upon the Forest Department that they should adopt the funding norms of the common guidelines while taking up watershed projects.
5. The problem of coordination in respect of the United Nations Convention to Combat Desertification was also discussed. The Ministry of RD was receptive to the idea of a core group comprising of the Ministries of Rural Development, Agriculture and Environment & Forests meeting at regular intervals to carry the implementation process further.
6. Shri Anna Hazare stated that it is commendable that efforts are being made for economic, social and cultural development of the country, but he regretted that even though watershed is a revolutionary programme, it has not been given serious attention. In the last 50 years, many large dams were constructed for electricity generation, industrial water-supply to cities etc. Due to neglect in the catchment of these dams there was heavy soil erosion and the dams were getting silted up. Sedimentation of dams will pose a big threat in the near future. To save the dams from further siltation, watershed management programme should be undertaken on a large scale in the catchment areas of the concerned rivers and streams. Watershed development programme is being implemented in our country for the last 40 years and crores of Rupees have been poured in, and still there was no desired output. In the watershed treatment works, quality is more important than

- quantity of works. When we select a village for watershed development, then the whole work must be done on an integrated basis e.g. land, water, forest, livestock and human beings in correlation with all these resources. When all the treatment works are completed then only should the project be considered to be complete.
7. He advocated that watershed development work must be done according to “Ridge to Valley” concept. It is, therefore, necessary to coordinate the functioning of various departments related to natural resources e.g. Forest Department, Social Forestry, Rural Development, Agricultural Department, Irrigation Department and Ground Water Department etc. at the central as well as state and district levels. In this programme, peoples’ participation is the soul of watershed development. Therefore, the participation of peoples must be ensured at all the stages of Planning, Execution, Evaluation and Maintenance of assets. Training, monitoring and evaluation should be an integral part of watershed management. Training for members of Water Conservation Team (WCT) is very essential. In the success of watershed development project, role of WCT is very prominent. As the members of WCT have inadequate qualifications i.e. Degree or Diploma in concerned disciplines, they must undergo a well-structured training programme for 3 to 5 months.
 8. Government PIA or NGO funds must be operated by joint account system to ensure transparency, which is most important. Funding given by different agencies must be operated by joint account of villager’s i.e. Gram Sabha representative and member of watershed development or conservation team, of the Government PIA or NGO PIA. In some states bank accounts are operated by Government officials. These funds may be deposited in local or nearby banks.
 9. At the Central level various departments and ministries are handling watershed development projects under various schemes, and guidelines of all these projects are different. Further more, the cost norms of the project are also different e.g. NWDPRA, DPAP, DDP and River Valley Projects. Sometimes, it happens that watershed projects under more than one scheme are implemented in the same village or nearby villages, which results in some confusion among villagers about the schemes. For active participation of villagers, it is essential that at the very start of a watershed development project, about 10% share may be contributed by the beneficiaries, and later on it could be increased to 20%, 30%, 40%, and 50%, after every one year of the project period.
 10. Dr. Venkateswarlu reiterated that land is a finite source and with the ever-increasing biotic pressure, it is degrading to a considerable extent. So it is our firm belief that we must have a two-pronged approach for proper land use. Firstly, we must retrieve the degraded lands. Secondly, the better-endowed areas should be brought to higher production levels. The severely degraded on-farm soils as well as all types of soil-degradations in off-farm sites need to be addressed by the programme. Unless we retrieve the degraded lands, the choice regarding proper landuse is well-nigh impossible. He also pointed out that in the country lakhs of hectares of land are lying fallow. These fallow lands may be brought under agricultural production on regular basis by leasing or contracting to agricultural graduates.

11. Shri Rajendra Singh pointed out that the watershed programmes implemented by various state governments have not yielded the desired results and have benefited mainly the private lands. The focus of these programmes has been primarily on farm bunding, nulla bunding and land leveling, and the government funds have been largely spent on these physical activities. All this has tarnished the credibility of the government-managed watershed programmes in various states. We need to bring about radical changes in such programmes. The programme needs to be reoriented in favour of the poor people, the animals- cows, buffaloes, goats, etc., the forests, common lands, wastelands etc. for improving their productivity. The main purpose of the programme should be to promote the welfare of the poor as well as their ownership over community natural resources. The big question is “Where will the cattle of the poor drink water”?
12. This can be achieved only when the real needs of the poor people are taken into consideration, and the works are taken up according to the peoples’ methods and the decisions are made by them. At present, funds are largely spent on surveys and technical reports and on constitution of committees in the watershed programmes. Our experience with Rajasthan government-run watershed projects with external aid from government of Switzerland (PAWDI), has not been a pleasant one. Only the rich and the prosperous participated and they cornered the major share of the benefits. We strongly feel that people’s institutions such as Gram Sabha should be constituted and the authority of execution of water conservation schemes should be vested with them. The water conservation work has to be specific to situation and geography of the village. The people should be granted requisite autonomy to take up works accordingly.
13. Our experience has been that wherever such autonomy has been given, people have been successful in taking up drought proofing projects. There have been instances of powerful vested elements tending to encroach on common property resources. But it is imperative on social volunteers to play a role in preventing such occurrences and to provide opportunities for people to move forward. The issue here is not of rich vs poor, but of sensitivity for problems of the poor. Even socially aware rich people need some encouragement in conservation of common property resources and in ensuring the flow of benefits to the poor.
14. Involvement of the community and their active participation in water harvesting activities is crucial. The concept of water conservation has to be internalized by the community and this sensitization has to be promoted before any physical activities are taken up. For scaling up the concept of water conservation, we should make use of the network of community relationships. The traditional links between the people and the communities need to be reinforced. An exchange between the communities for sensitization and sharing of experiences would help in mobilizing popular support for such a programme. The lean agricultural seasons can be utilized for organizing Jathas and Padyatras for social mobilization and for preparation of groundwork for physical activities.
15. Only when the communities are totally prepared should the financial support be extended to the village communities. Once a necessary environment is built at the village level then a committee of interested people should be constituted. The focus should be on water conservation works, which can cover any activity in the ambit of natural resource management, with the objective of promoting peoples’ initiative. Generally, the water

- related policies and the land laws tend to undermine peoples' initiative rather than promoting community initiatives. This de-motivates the communities to try a 'self-help' approach in water resource management. That's what is happening all over the country at present. On the one hand political leadership talks about self-reliance and "Gram Swarajya" for the villages, and the bureaucracy on the other hand hampers the growth of such efforts. Despite instructions from the top on taking up water conservation measures during drought relief, the officials go on building roads and other soil works in the name of drought relief.
16. Shri Mohan Kanda, Addl. Secretary, Department of Land Resources pointed out some issues for consideration. These were, whether DPAP and DDP should be 100% grant-in-aid, and whether IWDP should be restricted to non-DPAP and non-DDP Blocks; whether IPS should be discontinued and projects under TDET should be sanctioned out of IWDP allocations, and whether the concept of special schemes should be extended to other areas like cold deserts, waterlogged areas etc. He also mentioned that there should be a provision of essential facilities to Zilla Parishads & DRDAs such as vehicles etc.
 17. It has been mentioned that all funds under Rural Development Programmes are flowing directly to DRDAs or Zilla Parishads at the district level bypassing state headquarters. The state line departments like agriculture, soil conservation, rural development, forest etc. are not providing any technical support from top to bottom in the states. The Chairman pointed out that this matter may be given due consideration during the Tenth Five Year Plan.
 18. Shri Mukul Joshi, Department of Agriculture & Cooperation (DAC) informed that the minutes of the sub-working group on agriculture have been circulated, which indicate the department's views of their programmes. The major issues for discussion were, whether watershed development funding may be changed to 100% loan component, financial support should come from Corporate/Public sector, review of procedure of fund-flows to the grass root level organizations is required, and the present macro-management mode for DAC schemes needs to be reviewed. If direct funding to district nodal agencies or Zilla Parishads is to be resorted to, as practiced by MoRD, issuing sanctions would be a voluminous task and this has its own pros and cons, and that it was also difficult to manage direct funding to the grass root level. The department has suggested that a procedure adopted in World Bank Projects, such as putting the funds in a central kitty and reimbursement to the state governments after expenditure by them, effective mechanism for monitoring and evaluation and suitable checks for ensuring accountability may be an alternative method. Other points are department wise territorial delineation for project implementation, capacity building, convergence of components of other schemes into watershed areas etc. That macro-management mode of funding of watershed programmes of DAC initiated by the Planning Commission a few years ago, has affected the fund-flow to the projects in the field, came in for special attention and concern.
 19. Dr. Suraj Bhan, Addl. Commissioner (NRM) DAC stated that special attention is required to be given to reclaim, develop and manage the potentially fertile agricultural land areas which are waterlogged, saline including coastal saline, acid, alkaline, ravinous, shifting cultivation, riverine and torrents, tal & diara and flood-prone areas for increasing agricultural production on sustainable basis in the country.

20. Under the macro-management mode, many ongoing schemes and programmes have been subsumed and the state governments will be given all the funds for implementing these programmes. The rationale is that the states know their area better and if necessary can provide more funds for NRM schemes from their own resources. However, it has been observed that states prefer populist measures that benefit the peoples on a short-term basis. Due to this perception, many NRM projects get a setback. Shri J.C. Pant, Chairman of the Working Group observed that natural resources management projects should be guided by a national perspective as against states having only a local perspective. Therefore, programmes for development of natural resources should be retained for central government implementation, considering the national priority of conserving and promoting natural resources which may run across state boundaries. The Chairman also pointed out that the watershed programme should be territorially delineated department wise at the panchayat samiti level, and works of different departments or ministries or agencies may not be taken up in the same panchayat. This will avoid inter-ministerial and inter-department conflicts and will show visual impact of the works of different agencies and may even generate a healthy trend to do better than the other.
21. The Chairman constituted a drafting committee for drafting the Working Group's report which included Shri M. Lall, Joint Adviser (Agriculture), Dr. S.L. Seth, Shri M. Joshi, Addl. Commissioner, DAC, Shri Rajendra Prasad Aggarwalla, DIGF, DLR and Shri L.R. Thanga, DIGF, Ministry of Environment & Forests. It was decided that the Drafting Committee will hold its discussions on 12th, 13th, & 14th February, 2001 in the Planning Commission and submit a draft report for circulation among members of the Working Group by the end of February, 2001. The members will give their comments by 10th March, 2001. The drafting committee will again meet on 12th, 13th, and 14th March, 2001 to discuss and prepare the final draft report for consideration of the Working Group in its meeting scheduled to be held on 30.3.2001.

The meeting ended with a vote of thanks to the Chair.

List of participants in the Second Meeting of Working Group held on 8.2.2001.

1. Shri J.C. Pant, I.A.S (Retd.) Former Secretary (A&C), Chairman, HPC (High Powered Committee setup for preparation of disaster management plans at national, state and district levels by GOI), Shraddha Kunj, 159/I Vasant Vihar, Dehradun-248006.
2. Shri Mohan Kanda, Additional Secretary, Department of Land Resources, Ministry of Rural Development, NBO Building, Nirman Bhawan, New Delhi.
3. Dr. Rohini Nayyar, Adviser (RD), Planning Commission, New Delhi.
4. Shri B.N. Navalawala, Advisor (WR), Planning Commission, New Delhi.
5. Shri P.S. Rana, Joint Secretary, Department of Land Resources, Ministry of Rural Development, G-Wing, NBO Building, Nirman Bhawan, New Delhi-1.
6. Smt. Mira Mehrishi, Joint Secretary, Ministry of Environment and Forest, CGO Complex, New Delhi.
7. Dr. G.B. Singh, Vice-Chancellor, Jawahar Lal Nehru Agriculture University, Jabalpur M.P. Pin-482004.
8. Dr.J.S. Samra, Dy. Director General (NRM), ICAR, Krishi Bhawan, New Delhi-1

9. Shri M.Lall, Jt. Adviser (Agri.) & Member Secretary, Working Group, Planning Commission, New Delhi.
 10. Shri. V.S. Dinkar, Commissioner (CAD), Ministry of Water Resources, Room No. 234, Krishi Bhawan, New Delhi-110001.
 11. Dr. J. Venkateswarlu, Consultant, Central Research Institute for Dry Land Agriculture (CRIDA), Santoshnagar, P.O-Saidabad, Hyderabad-500059.
 12. AVM. S. Sahni, Development Alternatives, 1077, Civil Lines, Jhansi-284001.
 13. Shri Harnath Jagawat, Director, NM Sadguru Water & Development Foundation, Post Box No. 71, Dahod-389151, Gujarat.
 14. Shri Rajendra Singh, Tarun Bharat Sangh, Bhikampura-Kishori, via Thana Gazi, Alwar-301002, Rajasthan.
 15. Dr. S.L. Seth, C-101, Shivalik, New Delhi-110016.
 16. Dr. Suraj Bhan, Addl. Commissioner (SWC) Natural Resources Division, Deptt. of Agriculture & Cooperation, 106-B Shastri Bhavan, New Delhi-110001.
 17. Shri Mukul Joshi, Additional Commissioner, RFS Division, Room No. 244 A Krishi Bhawan, New Delhi-1.
 18. Shri K.R. Dandapani, Dy. Commissioner (RFS), RFS Division, Deptt. of Agriculture & Cooperation, 106-B, Shastri Bhavan, New Delhi.
 19. Shri L.R. Thanga, DIGF (NAEB), Ministry of Environment & Forests C.G.O. Complex, Paryavaran Bhawan, New Delhi-110003.
 20. Dr. Nagesh Singh, Director (RD), Planning Commission, New Delhi.
 21. Shri J.D. Sharma, DIGF, Department of Land Resources, Ministry of Rural Development, G-Wing, NBO Building, Nirman Bhawan, New Delhi.
 22. Shri Rajendra P. Agarwalla, DIGF, Department of Land Resources, Ministry of Rural Development, G-Wing, NBO Building, Nirman Bhawan, New Delhi.
 23. Shri S.K. Dargan, US, Department of Land Resources, Ministry of Rural Development, G-Wing, NBO Building, Nirman Bhawan, New Delhi.
 24. Shri N.K. Singh, Dy Adviser (E&F) Planning Commission, New Delhi.
 25. Shri Shunil Sharan, S.R.O. (RD), Planning Commission, New Delhi.
 26. Dr. Ramanand, R.O. (Moni. Agri.), Planning Commission, New Delhi.
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Problems identified in different Eco-Systems of the country and suggestions for the development of agriculture.

I. COASTAL ECO-SYSTEM

Situational Analysis-Problem Identification: Suffering from saline ground water, sandy surface of coastal eco-system some times and at some places, as shifting sand dunes, support only such vegetation which are acclimatized, like casurina, mangrove, palmera, coconut etc. However such areas have medium to high rainfall and people have developed a number of location-specific rainwater-harvesting-systems for raising crops, trees, drinking water etc., for sustainable living.

Proposed technology:

A. Conservation measures

1. Promotion of shallow wells (baby wells) to receive fresh rainwater percolating through sand columns. The wells should be shallow so that fresh water does not mix with saline water.
2. Plantation of shelterbelts.
3. Kuttai i.e. deepening or renovating shallow dug-out impressions of small size, to collect rainwater around which some cropping and planting of trees may be done.
4. Repairing of existing conservation measures including deepening/renovation of village ponds.
5. Contour cultivation.
6. Renovation/development of ponds in the depressions and beds on higher lands for brackish-water aquaculture and tree plantation.
7. Contour vegetative hedges.

B. Production Systems:

1. Crop Demonstrations.
2. Agro-forestry, Alley cropping, boundary plantation.
3. Dry-land horticulture (hardy and multipurpose species) including plantation of acclimatized trees like casurina, cashew, salvadora, and coconut; shrubs like lemon, guava, banana near baby wells, and cultivation of vegetables etc.
4. Pisciculture.
5. Organic farming systems and integrated nutrient management systems including addition of farmyard manure for increasing moisture-holding capacity of the soils.
6. Over seeding of grasses and legumes in uplands.
7. Planting of shrubs (uplands) and trees (low lying areas with raised mounds).
8. Mangrove plantation.
9. Homestead garden, kitchen garden.
10. Household biomass production systems (for marginal and landless farmers).
11. Livestock-management including small livestock systems specially goats.
12. Floriculture-Jasmine and mogra on southern coast

II. ARID AND DESERT ECO-SYSTEMS

Situational Analysis-Problem identification: Low rainfall, high evapo-transpiration, moisture-scarcity, poor soils, less organic matter contents, poor moisture-holding capacity, limited number of rainy days, poor vegetative growth, arid and hot climate does not permit fast growth of insects and pests. Livestock- based farming-system is adopted for sustainable living.

Proposed Technology:

A. Conservation measures:

1. Shelterbelts with hardy and acclimatized trees.
2. Brushwood barriers to check sand drifting.
3. Construction of Khadins.
4. Construction/Renovation of Tankees.
5. Repair of existing conservation measures, especially indigenously taken up by the watershed community.
6. Live fencing with hardy shrubs.
7. Social fencing for promoting regeneration of lost flora.
8. Controlled grazing.
9. Shallow dug-wells near households to store roof water.
10. Deepening/renovation of existing village ponds.
11. Vegetative hedges against wind direction.

B. Production Systems:

1. Crop demonstrations.
2. Agro-forestry, alley-cropping, boundary-planting with hardy and acclimatized flora.
3. Dry-land horticulture (hardy and multipurpose species)
4. Organic farming-systems.
5. Homestead gardening/kitchen gardening.
6. Over-seeding of grasses and legumes.
7. Plantation of shrubs and trees (hardy species).
8. Household biomass production and processing systems (for marginal and land less farmers) including small livestock systems.
9. Improvement of livestock-supported farming-systems.

III. RAVINOUS ECO-SYSTEM

Situational Analysis- Problem Identification: Network of gullies along riverbanks particularly Yamuna, Chambal, Mahi, having extensive ravinous areas, ingressing-tablelands (Dynamic system), unstable land-surface, criss-cross drainage, speedy run-off, occasional backflow of rivers causing caving of the banks. Structural measures highly unsuitable, gully beds used for cultivation of crops like mustard in Rabi. Potentially better for plantation of forest and horticultural species along with stabilizing conservation measures:

Proposed Technology:

A. Conservation cum production measures:

1. Since there is no clear demarcation in between arable and non-arable lands, the total funds for conservation measures and land-based production systems are to be spent on total land mass i.e. arable, non-arable lands and drainage lines. The following treatments are suggested for stabilization of tablelands.
2. Plantation of mixed trees in belts.
3. Construction/renovation of ponds and wells for collection of run-off for watering fruit trees.
4. Filter-strips of hardy bushes along the lower edge of the ravines.
5. For humps, development of mixed horti-arbory-pastoral system.
6. Over-seeding of grasses and legumes.
7. Plantation of shrubs.
8. Plantation of hardy fruit trees.
9. Plantation of forest trees.
10. In treating edges, over-seeding with deep-rooted grasses and legumes is recommended.
11. In treating of beds, V shaped gullies are to be converted into U shaped gullies with proper angle of repose and their stabilization.
12. Crop demonstrations.
13. Plantation of fruit trees at cross points between cultivated beds.
14. Platform-type checks with silt and water collection ponds.
15. For stabilizing deep ravines and riverbanks, planting of hardy species like Ipomoea etc. are to be taken up on riverbanks in stripes.
16. Homestead garden.
17. Livestock management.

IV. PLATEAU ECO-SYSTEM

Situational Analysis- Problem Identification: Spaced in central and southern area of India, starting from Bundelkhand to Kanya Kumari and from East coast to West coast, this ecosystem encompasses a variety of landscapes. Upper areas are characterized by undulating topography, red and black soils, low to medium rainfall with high intensity causing runoff and erosion. Often affected by droughts, with limited irrigation, is predominantly rain fed. Uneven distribution of groundwater and aquifers. Crop and livestock dominate landuse pattern. Management of rainwater for sustaining the crops and taking second crop in black soils are major challenges.

Technology Proposed:

A. Conservation measures:

1. Contour vegetative hedges.
2. Repair of existing indigenous rainwater conservation measures.
3. Gully-control measures.
4. Vegetative filter-strips.
5. Live-fencing.
6. Runoff and silt-collection ponds/runoff-management ponds.
7. Sunken dugout devices for promoting recharge and subsurface-storage.

8. Dug wells.

B. Production Systems:

1. Crop demonstrations.
2. Agro-forestry, Alley-cropping, boundary-planting.
3. Organic farming system.
4. Over-seeding of grasses and legumes.
5. Plantation of shrubs, bushes.
6. Plantation of trees along drainage lines.
7. Homestead garden.
8. Household biomass production/processing systems.
9. Livestock management.
10. Organic farming systems.

V. PLAIN ECO-SYSTEM

Situational Analysis- Problem Identification: These are valley areas which have remained outside the reach of the canal irrigation system. Groundwater evenly distributed. Good deep alluvial soils with high potentials. Suitable for shallow and deep tube wells. Some times there are small patches of depressions and salinity.

Technology Proposed:

A. Conservation measures:

1. Contour vegetative hedges.
2. Vegetative filter-strips.
3. Live-fencing.
4. Gully-control measures.
5. Runoff and silt-collection ponds/runoff-management ponds.
6. Sunken dugout devices for promoting recharge and subsurface-storage.
7. Dug wells.

B. Production Systems:

1. Crop demonstrations.
2. Agro-forestry, Alley-cropping, boundary-planting.
3. Organic farming system.
4. Over-seeding of grasses and legumes.
5. Plantation of shrubs, bushes.
6. Plantation of trees along drainage lines.
7. Homestead garden.
8. Household biomass production/processing systems.
9. Livestock management.
10. Organic farming systems.

VI. WATERLOGGED ECO-SYSTEM

Situational Analysis- Problem Identification: There is a vast natural area due to drainage-congestion starting from mid Uttar Pradesh and passing to north Bihar, north West Bengal and southern Assam. The water-logging during rainy season affects crops and creates problem of transport and movement. Such areas are also affected with health hazards like Malaria, Kalazar, Elephantiasis etc. in human beings and liver-flue disease in livestock.

Proposed technology:

A. Conservation measures:

1. Contour vegetative hedges.
2. Repair of existing conservation/drainage measures.
3. Contour cultivation on higher slope area.
4. Shallow bore-well with pumping sets for encouraging vertical drainage.
5. Percolation wells with pump sets.
6. Deepening/renovation of village ponds.
7. To develop water cavities/deepening of depressions for aquatic farming.
8. Live-fencing.

B. Production Systems:

1. Crop demonstrations.
2. Agro-forestry, Alley-cropping, boundary-plantation.
3. Dry-land horticulture (hardy multipurpose species).
4. Organic farming-systems.
5. Over-seeding of grasses and legumes.
6. Planting of shrubs.
7. Planting of trees on rainfed lands, in low-lying areas with raised bunds.
8. Fish culture.
9. Makhana cultivation.
10. Singhara cultivation.
11. Homestead garden.
12. Household biomass production/processing system for marginal and landless farmers.

VII. HIMALAYAN ECO-SYSTEM

Situational Analysis- Problem Identification: Characterized by high slopes, medium to high rainfall, high rate of soil erosion, depleting vegetative cover, shortening of the life of springs and streams, generating tremendous amount of silt with high volume and speedy surface flow. Basic need is to convert surface- flow to subsurface recharge for increasing prolonged and off-season stream-flow, reduce speedy surface-flow and soil erosion and restoration of ecological balance.

Proposed technology:

A. Conservation measures:

1. Contour vegetative hedges supported by trenches/stone-bunds.
2. Repair of existing conservation measures including inter-terrace treatment.
3. Gully-control measures with vegetative systems.
4. Contour cultivation.
5. Strengthening/repair and vegetative enforcement of terraces.
6. Vegetative filter-strips in place of diversion drains.
7. Live-fencing.
8. Spring-water/runoff utilization devices (traditional/innovative).
9. Renovation of traditional ponds, kua, naula.
10. Roof-water harvesting.
11. Landslide-control systems.
12. Brushwood checks.
13. Speed-breaker type gabion structures to regulate the flow/velocity at appropriate points, rainwater-conservation and drainage-line treatment.
14. Deepening and renovation of existing village ponds.
15. Bank-stabilization mostly with vegetative measures.
16. Treatment of upper reaches by live checks, brushwood checks, loose boulder structures with vegetative support.
17. Treatment of middle reaches by loose boulder speed-breaker type structures with sunken silt-catch-pits upstream, earthen checks with sunken silt-catch-pits upstream and runoff-management dugout devices along drainage-lines with vegetative inlet and outlet with minimum pitching.
18. Treatment of lower reaches by dugout runoff and silt-collection devices with vegetative support, network of recharge pits on stable areas above naulas and water ponds, runoff transfer devices on unstable areas.
19. Repair /construction of water mills.

B. Production Systems:

1. Crop demonstrations.
2. Agro-forestry, Alley-cropping, boundary-plantation.
3. Dry-land horticulture (hardy multipurpose species).
4. Organic farming systems.
5. Three-tier system of plantation in a horizontal topo sequence.
6. Over seeding of grasses and legumes
7. Planting of shrubs.
8. Planting of trees mostly along drainage lines.
9. Homestead garden.
10. Household production/processing systems.
11. Livestock management system.

VIII. SHIVALIK ECO-SYSTEM

Situational Analysis- Problem Identification: Foothills, particularly Himalayan foothills are subjected to high speed flow of gushing water resulting in formation of series of Choas, highly fragile ecosystem, unstable landscape often subjected to sand-casting, acute water-scarcity after rainy season, high biotic pressure for fuel and over grazing, accentuate the process of ecological degradation. Urgent need to rehabilitate foothills for making them stable and sustainable, and to prevent the rising of riverbeds in plains.

Proposed technology:

A. Conservation measures:

1. Vegetative hedges on operational contours/field-boundaries supported by pebbles.
2. Repair of existing conservation measures built by farmers.
3. Gully-control measures with vegetative system duly enforced with locally available boulders/pebbles.
4. Small dugouts, wells on farmers' fields.
5. Vegetative filter-strips in place of diversion drains.
6. Live-fencing in 5 rows around islands.
7. Treatment of upper reaches by loose boulder/gabion and stone-spurs.
8. Loose boulder checks (speed-breaker type with vegetative support).
9. Small dugout sunken ponds to promote moisture regimes.
10. Treatment of middle reaches by sunken devices with vegetative support/pitching with local material.
11. Loose boulder structure (speed-breaker type) with vegetative support.
12. Runoff-management dugout ponds with vegetative inlets and outlets.
13. Treatment of lower reaches by limited number of dugout sunken devices for runoff-management with vegetative inlet and outlet with minimum structural support.
14. Recharge ponds/wells with stone pitching.

B. Production Systems:

1. Crop demonstrations.
2. Agro-forestry, Alley-cropping, boundary-plantation.
3. Dry-land horticulture (hardy multipurpose species).
4. Organic farming systems.
5. Over-seeding of grasses and legumes.
6. Planting hardy shrubs.
7. Planting of hardy species of trees near drainage lines.
8. Homestead gardens.
9. Household biomass production/processing systems (for marginal and landless farmers).
10. Livestock management.

SUSTAINABLE AGRICULTURE AS A MEANS TO POVERTY ALLEVIATION

-by Dr.Y.P. Anand, J.C.Pant**
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1. INTRODUCTION

Poverty alleviation in the country has so far been attempted primarily through various subsidy programmes, quite divorced from agriculture, in order to trigger off economic regeneration mostly as a non-farm activity, with or without the help of institutional finance channelised through the cooperatives or the banks. This approach succeeded wherever the beneficiary groups were properly organized and supported by the local agricultural production system, and the delivery system had imaginative managers at different levels. Even though a few of such success stories can be replicated through proper implementation, it has been observed that such measures for poverty alleviation have not necessarily resulted in raising the quality of life of the people concerned. In other words, the future strategy for poverty alleviation should be well supported by the local agricultural production system not merely for the purpose of economic development but also for improving access to nutritious food and other attributes of a good life, and to improve the quality of life of the beneficiaries. Therefore, there is need to redefine the approach to poverty alleviation and its eradication.

Food security has been an outstanding achievement of Indian agriculture so far but increasing population pressure is raising doubts about the sustainability of agriculture as it is practiced in India today. In order to make Indian agriculture sustainable, not only regional imbalances in agricultural growth have to be rectified, even the type of agriculture that is being promoted in different parts of the country has to be examined with a “microscope” to evaluate its sustainability from the standpoint of equity, productivity, quality, eco-friendliness, energy intensity and viability.

2. ESSENTIALS FOR A GOOD LIFE

A strategy of development which can provide the following to all its people alone can be considered a sound approach to economic development:

- (i) clean air to breathe;
- (ii) clean water to drink;
- (iii) water for irrigation;
- (iv) nutritious food;
- (v) sufficient clothing;
- (vi) shelter;
- (vii) productive employment; &
- (viii) health care

It is worth quoting Gandhiji here who once said “there is enough to meet everyone’s needs but not enough to meet everyone’s greed”. Curbing the greed of the high and mighty, bent upon

appropriating what is available, to launch on a fast track growth at the expense of the less fortunate members of society, must become an essential task of good governance, if essentials for a good life are to be provided to everyone. It is in this context, that sustainable agriculture as a strategy for promoting sustainable development becomes relevant to a strategy for poverty alleviation in order to make it possible to meet the essential needs of all.

3. SUSTAINABLE AGRICULTURE

Inadequate availability of drinking water in a large number of villages of the country is a recent phenomena consequent to over drawl of ground water by some people for taking recourse to high cost, high yielding agriculture. The village well and the village tank have existed in India for centuries and were always a steady source of supply of drinking water to humans, their cattle as well as for irrigating their lands throughout the year. Today, the village tanks have silted up and the village wells have dried up on account of the lifestyle changes that have taken place in our rural areas. De-silting of the village tank was done as a ritual by the village potters who provided pots of various shapes and sizes to store grains, milk, water as well as for making utensils for domestic use like “Kullhar” or drinking water. Both the village well and the village pond have dried up primarily because of the high-cost agriculture which necessitated over drawl of ground water. It needs to be appreciated that promoting practice of sustainable agriculture is essential if we have to make availability of drinking water possible throughout the country in the foreseeable future, at a reasonable cost.

Sustainable agriculture is, therefore, not a matter of choice but a necessity. India’s drive to maintain self-sufficiency in foodgrains’ production, and thereby retaining her independent stance in the comity of nations in her foreign policy, is very much dependant upon her success in promoting sustainable agriculture, to maintain high productivity levels in irrigated arable areas and to increase the same in rainfed areas. Sustainable agriculture, thus, provides a solution that is far-reaching and appropriate. It is an approach to land and water management that is ecological, economical, equitable and efficient (popularly known as 4 E’s) in such a way that whatever we take from nature is suitably returned back so that nature retains its re-generative capacity. It ensures that future generations inherit from us the same or added environmental capital than what we inherited from our fore-fathers. Sustainable agriculture is based on the principle of Low External Input and Sustainable Agriculture or LEISA as against the high yielding fast growth approach of High External Input Agriculture, or HEIA. The former may be referred to as “tikau Kheti” as against the latter which is ‘bikau kheti’. LEISA emphasizes on utilization of locally available resources- soil and water, and human intellect which is of prime importance in sustaining agriculture. It also emphasizes on the development and implementation of methodologies that ensure a process of growth that conforms to the 4 E’s. On the other hand HEIA represents the fast-track growth to agriculture which is practiced in canal irrigation dominated regions of India and countries like USA and Canada etc, that relies heavily on intensive doses of finances, fertilizers, farm mechanization, pesticides and other high-cost elements. This approach, in the long run, does more harm than good by negating all norms of the 4 E’s and perpetuating all-round disequilibrium and degeneration of the ecosystem.

4. ANIMAL POWER AND CATTLE CARE

According to an estimate, an equivalent of about 40,000 mega watts of power in the rural areas is provided by bullocks in India. In fact, the main logic of prohibition of cow-slaughter was

to propagate bullock power and to utilize the dung for rural fuel and manure. Cow milk was primarily a bye-product only for domestic use which provided a guarantee for proper nutrition to women and children of the house and the old who took care of the cows. With the arrival of diesel driven tractors the bullock power was looked down upon, though it is still the mainstay of rural energy in large parts of the country, and with the buffalo becoming the main supplier of commercial milk, the cow and its progeny, the bull got short shrift in the eyes of the development planners. In rural households also the buffalo displaced the cow and all the milk was sold leaving nothing for the women and the children. A sharp decline in the nutritional status of women and children in the rural areas can be clearly attributed to the eclipse of the cow which was revered since the ancient times. Male offsprings of cows and buffaloes both are now feeding the meat trade through the slaughter houses, and export market of meat is getting all kinds of incentives from the Government. Cattle population in India was never a burden on the land as they grazed green or dry grass and ate agricultural waste, and provided valuable dung for fuel and manure, apart from being used for draught power. A strategy to promote decline in the cattle population in order to reduce the biotic pressure on land will ultimately prove counter productive, as there is no cheap substitute available for fuel and manure in place of dung in our rural areas. The existing tractors are not able to put in their full capacity utilization due to shortage of diesel which itself has to be imported and is likely to face further shortages in future.

In the long run bullock power must be regarded as the mainstay of rural energy. The breed improvement programmes of govt. today are primarily tailored to increasing milk production and not to improvement of draught power of cattle. This, therefore, needs immediate correction. In the interest of sustainable agriculture too, cattle rearing would contribute valuable organic manure to our agricultural lands already hooked to high and still higher doses of chemical fertilizer and pesticides. Cow urine is regarded as a very effective pesticide while cow dung can be used to putrefy large quantities of waste biomass to convert it into rich manure. Panchagavya, which means a combination of five products procured from the cow i.e, ghee, curd, milk, urine, dung in appropriate proportions has been found to be the most effective and economical pesticide as a concoction when allowed to ferment for 10 days, in suppressing the pathogen and in increasing the vigour and resistance of the plants, by scientists at the University of Agricultural Sciences, Bangalore (High –five; Sept’30, 1996 Down to Earth). The water bearing capacity of our soil has been jeopardized by continuous use of chemical fertilizers and the same can now be restored only by application of bio-fertilizer and dung based natural manures. Relevant statistics relating to cattle and animal power are given in the annexure.

There is, therefore, a clear case for bringing back the cow as an essential member of the rural household. Gosewa based lifestyle is a part of our cultural tradition which could also restore the nutritional status of our women and children in the rural areas. In other words, not only has gosewa a potential for improving the nutritional status of women and children, it would also give rural women employment as well as social status, apart from, of course reviving the sagging fortunes of the bull, the prime mover of rural energy. There is now an urgent need to evolve appropriate bullock-driven rural technology to reduce the drudgery of rural life specially for women and the old persons.

5. IRRIGATED VS RAINFED AGRICULTURE

Of the approximately 140 million hectares of land under agriculture in India about 30% area is served by assured means of irrigation which produce about 60% of the total food grains in the

country. The rest 70% of area produce only 40% of the food grains. Any strategy for increasing agricultural production must address the irrigation needs of this 70% of rainfed arable area. About half of this rainfed arable area is paddy area where there is excess of water crying for proper management, while the remaining half is entirely depending on the rains and only appropriate rainwater conservation measures can provide water for drinking and irrigation purposes.

It has been established that rainwater conservation through vegetative conservation measures on the principle of watershed management is the most appropriate and sustainable means to maximize the productivity of land which would enable provision of the eight basic necessities outlined in para 2 above, to the vast majority of the farming population of the country residing in rainfed areas. One such project is the National Watershed Development Project for Rainfed Areas (NWDPR) being implemented by the Agriculture Ministry since the Eighth Five Year Plan through over 2500 watershed projects covering over 10000 villages in about 2500 development blocks where assured means of irrigation were the least in the country. These 2500 watershed projects are developing as models of sustainable agriculture to enable the farmers in these development blocks to draw appropriate lessons in the matter of methodologies for rainwater conservation, water management wherever it is in excess, appropriate vegetation to provide food grains, vegetables, fruits, fodder for their cattle, trees to provide fuel and timber as well as house building material for shelter, fibre for clothing, productive employment all-round the year, and consequently a healthy life through natural means at a low cost. This needs to be pursued on the same but expanded lines in the Ninth Five Year Plan in order to get the full benefits out of this project, as also to enable watershed development methodology to become a peoples' programme as recommended by the Standing Committee of Parliament for Agriculture in their report on Watershed Development.

The 30% arable area under assured means of irrigation in the country is also crying for attention. Over 20 million hectares of prime cultivable land has been rendered uncultivable because of water logging, salinity etc., due to faulty water management and excess irrigation. Sustainable agricultural practices here also are necessary in order to maintain the high levels of productivity attained so far by proper crop rotation and land management. The lands which have degenerated also need to be revived by means of developing models of regeneration of adequate size i.e., about 10,000 hectares, one per district of affected areas under NWDPR, to become examples for progressive farmers to follow.

6. LAND MANAGEMENT

When we talk of sustainable agriculture as a means to ecological conservation we would have to pay special attention to the management of land which is our main natural resource. The history of land management in India in recent times can be traced back to the Mughal Emperor Akbar whose Minister Raja Todarmal initiated the concept of land records and land revenue. 10% of the marketable surplus alone was recovered as land revenue, all personal consumption of the farmers being exempted from this tax. The land record and land revenue system of Todarmal was perfected by the British rulers through periodic settlement operations carried out at an interval of 40 years to record the changes in the soil texture to enable enhancement in land revenue which was linked to the quality of soil depending on its productivity. This process of maintaining land records and levying land revenue emerged as a powerful tool for land management over the centuries. Unfortunately, the Britishers delegated the responsibility of

collection of land revenue to Zamindars and Jagirdars as sinecure for their loyalty to the British crown. This resulted in recovery of land revenue becoming anti-peasant giving rise to peasantry movements during the freedom struggle which called for abolition of land revenue. After independence abolition of land revenue became a socialistic goal and in most states also, after independence abolition of land revenue became a socialistic goal and land revenue today stands abolished. This has resulted in neglect of the maintenance of land records. The neglect of the land records has in turn blunted a very powerful instrument of land management which India had inherited from the erstwhile rulers, the Mughals as well as the Britishers. With land management in disarray, measures to restore agriculture in India to a sustainable status would be that much more difficult to implement, and therefore, re-imposition of land revenue should begin to figure in the agenda of the development planners.

7. LAND LEGISLATION

In nearly all the land laws that were passed after independence by the states to promote land reforms, there was a salutary provision of at least 10% of the village lands to be left for common purposes such as grazing, village wood-lots etc. which were known as the Gauchars. Since sociologists were of the view that possession of land gives status to a person, these common lands were gradually parceled out to the landless agricultural labourers all over the country thereby leading to a situation which is now being described as the “vanishing commons”. This phenomenon has hurt the rural poor in two ways. The rural poor were heavily dependent on the village common lands for drinking water, collection of fuel, grazing of their cattle and for various easement rights as well as community matters. Due to the phenomenon of ‘vanishing commons’ the rural poor had no where to go but to migrate to the metropolises of the country, thus leading to the swelling of urban slums which are living hells on earth. The second way in which the ‘vanishing commons’ affected the rural poor was that lands that were allotted were so small in size that they gave no economic returns to the allottees, who either left them unutilized or sold them off to the nearest cultivator. Today, there are large tracts of land in the rural areas which are lying un-cultivated because of out-migration of the rural poor. Immediate attention, therefore, needs to be given to this problem of the “vanishing commons” and their intimate relation to the state of the rural poor.

Gauchar was the traditional grazing ground in each village and was treated as a sacred institution. If Gosewa is encouraged and Goshalas take on all the cattle i.e. cows and buffaloes being reared by individual families, which have stopped giving milk, these Goshalas can become the hub of village industries. The hide and the bones of cattle dying naturally would provide valuable raw material for village industries. The rich natural manure produced by the goshalas would then provide a steady supply of the same to local farmers on a sustained basis to make sustainable agriculture possible. The Goshalas and the Gauchars would be able to also provide for the return migration of erstwhile landless agricultural labour who had been earlier forced to leave for the towns and cities to make a living. There have been instances of reverse migrations from urban to rural areas such as the one that took place in Maharashtra following the implementation of the employment guarantee scheme in the early eighties. It would be worthwhile to explore such possibilities further and encourage adoption of similar and appropriate schemes by other states as well. One very salutary feature of the rural poor residing in the urban slums is that, by sheer dint of daily experience of urban life they have been shorn of their caste prejudices, unlike their kith and kin back in the villages who are still steeped in these prejudices. This reverse migration apart from decongesting the urban slums would have a

beneficial effect, in the long run of divesting the rural poor and the other village folk of their caste prejudices and superstitions to help reduce social tensions in the faction-ridden villages.

8. CROP INSURANCE

The crop insurance scheme which was in operation up till the 8th five-year plan was implemented only in the disaster prone states of Andhra Pradesh and Gujarat while the agriculturally advanced states like Punjab and Haryana did not subscribe to it. The existing crop insurance scheme seems to entail heavy subsidy from Government of India and attempts are being made to evolve a crop insurance scheme which would be fully viable on the basis of premium to be paid by the farmers. No insurance scheme can succeed if only those who suffer are beneficiaries and make contributions as members. Crop insurance in order to be viable should involve all the farmers in the country. That would be possible only if the land revenue proposed to be recovered from the farmers is treated as premium for crop insurance. This would immediately give rise to a corpus of upto over Rs. 500 crores which would be enough to implement a crop insurance scheme to benefit all the farmers in the country for all types of natural calamities as well as those like fire etc. There is, therefore, a strong case for re-instituting the concept of land revenue that was valued by the farmer as a proof of possession of land and which was by no means a hardship to him. This land revenue was in accordance to the soil type and, therefore, had a close relationship to the productivity of the soil also. This would in turn lead to improvements in the maintenance of land records which are in any case very important for the farmer for various purposes such as taking loans from cooperative societies or the banks, and would thus be a powerful tool to promote sustainable agriculture.

9. OWNERSHIP RIGHTS

The increasing population in the country has resulted in fragmentation of the landed properties owned by people. This may not have dire consequences for properties situated in the urban areas, but for agricultural lands it has grave implications. If agricultural productivity is to be maintained fragmentation of agricultural lands has to stop at a certain stage. This is not possible with the concept of individual ownership, that has now come in vogue considering that the growth of population cannot be controlled overnight. Ideal arrangement for ownership of property, would, of course, be community ownership, the models of which are emerging in the cooperative housing societies where each member is a lessee. As a long term objective this may be discussed and even legislated upon but it would not be an easy measure to translate into practice. The next best option could be family ownership that would have the desired effect of preventing fragmentation of agricultural lands. If the two-child small-family norm gets accepted throughout the country, as a measure of population stabilization, one child can cultivate the land while the other can move on to take up non-agricultural activities. This would promote the joint family as a federation of nuclear families. This would be in contrast to the nuclear family which has become the fashion of the day because of the small family norm. The joint family would prevent the lonely child from becoming a tyrant and the whole joint family would take care of all their children. This has been a traditional practice in India through the ages providing security to the young and the old alike. With longevity going up the neglect of the older generation is also emerging as a major social problem in the country and this manner of family ownership of property would go a long way in providing social insurance to the old and the disabled.

10. CONCEPT OF COMMUNITY

Very often when reference is made to Panchayati Raj institutions it is presumed that they are representing the community with all its implications. It must be understood that more than one revenue village add up to a Panchayat. In the past, the village factions have resulted in the Pradhan belonging to one revenue village alienating common lands of the other revenue villages in the Panchayat. The revenue village itself is a product of the land record system of the country, and tracing back the history of the revenue village one can visualize that a group of hamlets which settled in a given area to cultivate the lands evolved as a revenue village. It is the hamlet which is the real community, and this community still exists. Unfortunately the demarcation of Panchayats in the country has been done on population criteria without any consideration of the hamlets which constitute the revenue villages. We cannot reach out to every family in the country but we must reach out to every hamlet and if we do that, we would have succeeded in reaching out to every family through the community in that hamlet. It is this hamlet which should be the unit of our outreach for economic and social development. A hamlet based development strategy along with sustainable agricultural practices getting promoted, would inevitably lead to sustainable development for poverty alleviation.

11. SUSTAINABLE DEVELOPMENT

It was made out at the very beginning that “It is possible to meet everyone’s needs but not everyone’s greed”. A development strategy which would be aimed at meeting every ones needs alone can be described as a strategy for sustainable development. For a country like India whose economy and manpower are predominantly agricultural it is sustainable agriculture which has to be the backbone of the strategy for sustainable development. The importance of animal power and cattle-care as a source of rural energy and essential nutrition for women and children in our rural areas has already been mentioned, and the special relevance of the tradition of Gosewa in this regard has been highlighted. Sustainable agriculture thus becomes a strategy for land management to promote rainwater conservation, soil conservation as well as for the conservation of other natural resources. Sustained practice on these lines inturn would alone lead to conservation of the whole environment as well as to the eco- restoration of the degraded lands of the country. We may as well define sustainable rural development to be the accumulated result of

- a Gosewa based life style,
- a Goshala based rural industrial system, and
- a Gauchar based sustainable agriculture system, which would have a definite impact on the overall developed scenario in the country.

12. PROTECTION OF ENVIRONMENT AND ECO-RESTORATION

A study* conducted by the Geological Survey of India (GSI) on the presence of high concentrations of arsenic in the ground water in six districts of West Bengal has suggested that the heavy use of Phosphatic fertilizers may have caused local leaching of arsenate compounds from the soil and aquifers into the ground water. The study also holds over-extraction of ground water and the resulting oxidation of the source due to increased ingress of atmospheric oxygen, responsible for the crisis. The areas subjected to intensive irrigation through tube wells have been affected by arsenic. The affected districts are Malda, Murshidabad, Nadia, Bardhman, and 24 Paraganas North and South.

***Down to Earth- October, 15, 1996.**

The depth of the water table of the six districts varies from 2.44 m to 8.15 m below ground level.

Aquifers appear at different stratigraphic levels and are classified as shallow (below 50 m), intermediate (50 – 150 m) and deep (more than 150 m). While water from shallow aquifers showed higher concentration of arsenic, water from intermediate and deep aquifers have been found to be free of arsenic (although water from a borewell as deep as 240 m in the 24 paraganas (North) yielded high levels of arsenic).

While the study rules out industrial pollution as a source of the arsenic, it has focused on the geomorphological characteristics, taken on an inventory of wells to study the ground water, studied near surface sections and bore-hole logs and analyzed samples of ground water and aquifers sediments for identification of arsenic bearing mineral phases.

“The arsenic affected areas were found to lie along a north south linear belt starting from Kaliachak in Malda district to Barnipur in 24 Paraganas (south) district, a distance of about 400 Km”, states Shri S.N. Mitra of the GSI. “Except for Purbasthali in Bardhaman district – which is situated on the western side of the Hugli – most of this belt lies on the eastern side of the Bhagirathi river”. According to Shri Mitra, these districts lie within the quaternary sediments of deltaic plains of the Bengal basin (where the sub-surface comprises of only loose soil and not hard rocks). The region comprises of coalescing and superposed meander zones of palaeochannels. In other words, this low-lying area is one where several rivers originating from different sources meet, making the chemical composition of the sub-soil water highly complex. Such a geological phenomenon results in the ground water displaying even those chemicals that are not necessarily present in the same area in large quantities. While these geological factors have been provisionally identified as the source of the arsenic, the precise mechanism by which arsenic is mobilized into the water is yet to be understood clearly.

Long-term measures such as a detailed inventory of ground and surface water resources that would ensure a planned and regulated use of water, have been recommended by the GSI. The study points out that the dimensions and disposition of aquifers need to be determined. In addition, a detailed petro-mineralogical and geochemical analysis of aquifer sediments and a chemical analysis of bore-space water also needs to be done. Such an examination would help quantify the existing arsenic content.

Rainwater is the most important source of pure water on earth – both for irrigation as well as drinking purpose. Sadly, in India, we are presently not utilizing more than 45% of this water that falls on mother earth. As a result, most of the rainwater that falls on the earth is simply washed away and not conserved. Thus, the hydrological cycle, constituted by the perennial evapo-transpiration, condensation and precipitation of water in its various forms – solid, liquid and gaseous, which recycles the atmospheres’ water resources under the overall power of the Sun’s solar energy, remains untapped by us. During the course of each new cycle this water strikes the earth with renewed vigour and vengeance bringing greater destruction on the top-soil by eroding it ever so violently since there is very little vegetation covering this soil. As a result, land is not only adversely affected by loss of fertile top-soil accumulated through centuries and the consequent decline in agricultural productivity, the lower reaches also suffer from repeated spells of floods and loss of life and property. Protection of environment thus becomes a very

essential part of our strategy of sustainable agriculture. In fact, the very process of development should be such that whatever disturbance that takes place during the process is set right through the development process itself. Application of science to the development process has to be, therefore, primarily for the purpose of bringing about eco-restoration through the process of development, as well as to modify the ill effects of pollution to make the resulting effluents not only harmless but useful also.

13. REVIEW OF EXISTING LAWS RELATING TO LAND, PANCHAYATS AND FORESTS

The existing laws were framed with a certain mind set in the past which may have now become outdated in view of the rising population and the need for conservation of the scarce natural and other resources. For instance, under the land laws any one in possession of a piece of land for a period of over 12 years was legally entitled to be called the owner of that land. This was a salutary provision when more and more lands in the country had to be brought under agriculture, but now that horizontal expansion of agriculture is ruled out, this provision of law is leading to occupation of the lands of the poor by the rich and the strong in the rural areas. Similarly, in the matter of extraction of minor forest produce in the forest areas, the tribal people had certain traditional rights that also led to the protection of the forest areas by the tribals themselves. Now, under the Wild Life Act, the tribal population have to be moved out of the forests, thereby taking away their traditional rights for extraction of minor forest produce. Subsequently, they are labeled as thieves if they go back to the forests in accordance with their tribal customs. There is, therefore, an urgent need to review all these laws to examine them from the viewpoint as to whether they are friendly to local communities, whether they promote community action or prohibit the same. Similarly the legal powers conferred on the sarpanches of the Nyay Panchayats have never been used because they are not usable according to the manner of the existing legislation.

14. STATUS OF WOMEN

Many of the social ills that the country is facing today in the matter of economic and social development are due to the unequal status of women. It is now well understood that the population explosion itself is a consequence of the neglect of women and children by our society. In order to have less children, the infants born should survive, which is only possible if they are healthy at birth. This in turn is possible only if the mother giving birth to a child is healthy and of proper age. This calls for late marriages, delayed first child, spacing of at least 5 years between two children, giving up of male preference for a baby, and adequate nutrition for women and children in the family. Male domination fuelled by greed for more and more has further worsened the status of women in our society. Sustainable development which is expected to provide a minimum of requirements to all for a good life would be impossible unless the greed of the high and mighty is curbed, and for this the men in the male dominated society have to renounce their greed for more and more. It is now well established that difficulties in making available clean drinking water for the family, and fuel for the hearth, have made the lives of our women folk miserable on account of the extra miles they have to trudge for these, and the extra time they have to spend in drudgery to take care of the family. In other words sustainable development would call for **emancipation** of men from their lust to have more and more anyhow in the shortest possible time. It will also require awakening women to encourage them to rise to their full potential and share the responsibility of social development with their male

counterparts. A Panchsheel for Gender Relations as a programme for moral reawakening must, therefore, be evolved and the same is being suggested here:

PANCHSHEEL FOR GENDER RELATIONS

- 1. Equality of status.**
- 2. Respect for the views and independence of the other even in situations of interdependence.**
- 3. Gentle courtesy in personal and social relations.**
- 4. Extending maximum assistance to the other to achieve full potential.**
- 5. Abjuring possessiveness.**

WOMEN'S AWAKENING – MEN'S EMANCIPATION

15. ENERGY ISSUES IN THE CONTEXT OF SUSTAINABLE AGRICULTURE

Population growth and economic development demand increasing productivity per unit area of cultivated land. Considering the inelasticity of arable land area in India, this is being achieved primarily by adopting energy (commercial) intensive methods, namely, use of hybrid seeds, irrigation, chemical fertilizers and pesticides and mechanization of agricultural operations. But, considering India's meagre fossil fuel resources and large human/animal power base, risks of over dependence on oil imports and ecological imperatives, this strategy is unsustainable.

In 1960, only 1.6% of India's final energy consumption was used directly in agricultural sector; in 1990, it had risen to 9.2%, 58% of it being petroleum based. According to the 8th Plan document, in 1996-97, 20% of the total HSD and 23% of the total electrical energy consumption would be used directly in agricultural sector (mainly tractors and pumpsets). Indirect energy is consumed in this sector for production of fertilizers and pesticides and agricultural machinery. Fertilizer use in India has grown from 65,600 m.t. in 1950-51 to 13.87 million m.t. in 1995-96 (about 80 kg/ha net sown area). Gross energy requirements for production of nitrogen, phosphatic and potassic nutrients is about 80, 12 and 8 MJ/kg respectively and for pesticides 100 MJ/kg. It means over 2 kg coal or 1.33 kg oil per kg N-fertilizer!

India has only 5.7% of proven coal reserves and 0.4% of proven hydrocarbon reserves of the world while it has 1/6th of its population. But compared with other major agriculture producing countries, India has an abundant resources base of renewable energy; human, animal and plant. However, India's dependence on commercial energy has been growing from 19.8 m.t.o.e in 1953-54 to 101.5 m.t.o.e in 1990-91, @ 4.52% per year.

The situation of petroleum products is even more critical. Use of oil and gas grew @ 5.4% during 6th Plan but @ 6.9% during 7th Plan. Consumption of petroleum products has risen from 17.9 million m.t. in 1970-71 to 75 million m.t. in 1995-96 and is likely to reach 164 (150 as per another estimate) million m.t. in 2010-11. India's self-reliance index of oil has dropped from 70% in 1984-85, to 48% in 1992-93, and is likely to drop to 27% in 2010-11. Import bill of petroleum crude and products has risen from Rs. 7000 crores in 1960-61 to Rs. 10870.0 cr. in 1990—91, to Rs. 24095.0 cr. in 1995-96, to the likely Rs. 33420.0 cr. (\$ 9.3 billion) in 1996-97. This despite a long spell of low international prices of crude oil, which have just started to rise.

Crude prices are highly sensitive to political situation in the Middle East which has about 64% of world's oil reserves and is militarily controlled by USA. Allowing India's oil sufficiency ratio to drop below 50% is a security risk and would impose an intolerable cost of imports.

India's petroleum dependence problem is compounded by its relatively excessive use of 'middle distillates' (HSD and K.oil. So India must import not only crude but also HSD. This is a result of keeping HSD price presently only at 38% of that of petrol while their production cost is about the same. Similarly the use of scarce electrical energy in agricultural sector is charged at mere **Re. 0.33/kwh** while its supply cost is about 10 times. The result is wasteful and avoidable use of HSD and electricity in agricultural sector.

Conversely, the situation for the traditional indigenous animate energy sources is one of neglect and underutilization. India has 272.5 million cattle and buffaloe population, 85 million draught animals and 15 million animal carts. These animals are well integrated into the Indian agriculture, economy and ecology and provide not only draught power but also milk, dung and urine as manure, and a host of valuable products on death. The draught animals constitute together 40 million HP mechanical power. About 60% of the sown area covered by smaller holdings still depends on draught animals.

Similarly, the use of 'biofertilizers', namely, animal wastes, crop residues, human and municipal wastes, aquatic plants and wastes, green manuring and leguminous crops and trees, and biological N-fixation, optimally integrated into the nutrient supplies, could considerably reduce the demand for energy intensive fertilizers. Biofertilizers have the additional benefit of preventing soil degradation caused by heavy use of fertilizers and also preventing the widespread pollution caused by the leaching of fertilizers and pesticides (presently 60-70% of fertilizer is washed away and in some cases less than 1% of pesticide may be actually used up).

But for the enormous subsidies given to energy-intensive fertilizers and pesticides, HSD and electricity, Indian agriculture would be far more sustainable, self-reliant and environment-friendly. We also need to direct R&D inputs into developing the efficiency of traditional resources, e.g. a draught animal is now used only for, say, 300 hours a year on average as against easily possible 1000 hours, and an animal cart could carry 2 to 3 times the load with improvements in its design and manufacture. Simultaneously, much energy could be saved with better upkeep of pumpsets and other machinery and judicious use of fertilizers, pesticides and irrigation (such as drip and sprinkler irrigation).

But all this is possible only if the inherent limitations to the availability and increasing use of fossil fuel energy in agriculture sector are recognized and alternative strategies based on our resource base and opportunities are adopted.

16. SUMMING UP:

Promotion of sustainable agriculture through maximization of rain-water conservation and cattle care, as a strategy for prompting sustainable rural development, leading to poverty alleviation has now to be taken up in all seriousness. These measures to ensure a good life for all are not picking up in spite of policy pronouncements to this effect from time to time. The reason for this is clear to see, that we as a people do not seem to be involved in the entire development process initiated by governmental planning, in spite of the fact that parliamentary democracy is

supposed to be functioning satisfactorily in the country for the last fifty years. What exactly is missing in the whole development process? Have the planners been able to find out what the people need or are they busy making plans according to their own wisdom and assessment of what the people need? Keeping the energy scenario in India and the whole world in view, how long can the fast track high yielding agriculture, hooked to higher and still higher doses of imported chemical fertilizers and pesticides, be sustained? Has the so called decentralization process been able to involve the rural poor and the urban poor in preparing plans for their own development? The rural landless migrating to urban slums today number about 10 crore and lead the most miserable existence possible, next to the vulgar display of urban wealth. While the census figures mention that 27 to 30% of urban population resides in these urban slums, this figure for Mumbai is 50% and for Delhi it is 40% and is likely to increase rapidly. How long will this inequality co-existing cheek by jowl for such a long time not flare up into uncontrollable violence? Such a process may well start from Mumbai and then Delhi is not far away. Is it known that there is no primary health care system to serve the urban poor living in the slums? The only way to improve the quality of life in the urban slums is to decongest them to say, half their existing population. How can reverse migration from urban slums to the rural areas be triggered off? The only way this seems possible is to generate employment in the rural areas through village industries based on agricultural produce which in turn can be sustained only if there is an assured market for products of village industries. In other words, the only way our towns and cities can be saved from certain disaster is to create assured markets for the products of village industries. Can the capitalist entrepreneurs of our country be convinced of this logic of creating assured markets for village industries as the only way to save the cities? Why has the nutritional status of women and children in rural areas and urban slums declined so precipitously during the last 50 years? It is now realized that the population explosion, in large measure is a consequence of poor health and nutritional status of women and children in the country.

These are uncomfortable questions, but if an attempt is made to answer them it may throw up an alternative development strategy more in tune with the traditions and culture of this country known as India, that is Bharat. This paper developed by a few concerned individuals could provide an inkling to what an alternative development strategy might look like. India is a vast country with immense diversity and different development models for different regions could emerge through this alternative development strategy. What should be the mechanism to evolve such different development models to suit the requirements of different regions of the country in a manner which will enable the involvement of the local people in planning and implementing them? This is a question we would like to leave to the top planners and experts of our country to answer.

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NOTE: This paper was prepared in May-June, 1997 and was sent to the then Prime Minister Shri Deve Goda, as well as Deputy Chairman, Planning Commission Shri Madhu Dandavate. Shri Madhu Dandavate was kind enough to acknowledge receipt of this paper.

Sheet 1

ECONOMIC IMPORTANCE OF DRAUGHT ANIMALS IN INDIA		
Present Population	APPROX 73 million equivalent to 27 million MW of power	
Area cultivated 60.65%	Approx 85.93 million ha	
Replacement rate	10 bullocks\tractor	
Present population equivalent to	7.3 million tractors	
Annual saving of diesel due to use of draught Animals	Approx.23.75 million tones worth Rs.21, 500 crores at the prevailing subsidized rate	
Present market value Of draught animals @ Rs. 8000/pair	Rs. 28,200 crores	
Present value of investment on animal drawn equipment @ Rs. 3000/pair	Rs. 10,950 crores	
Present value of animal carts 14.3 million @ Rs. 7000/cart		
Replacement value of existing draught animals implements and carts by 7.3 million tractors equipment @Rs.2.5lakhs/ tractor and set of equipment	Rs. 182,500 crores	
Draught animals provide approx. 100 millions tonnes of dry dung/year 5 million tonnes of wood/year	Approx. Rs. 5000 Crores/year	
Provide by-products hides, skin, bone, horn etc.	Approx Rs. 100 crores/year	

Sheet 2

AVAILABILITY OF TRACTORS, DRAUGHT ANIMALS, AGRICULTURAL WORKERS IN INDIA							
For doing proper tillage operation in time, ideally the farm power availability should be as under:							
Tractors		66/1000ha		@15 ha/tractor			
Draught Animals		1000/1000 ha		@ 2 ha/pair			
Agriculture Worker		Cultivator + Agricultural Labourers					
Number per 1000 ha							
Sl.No.	State	Tractors 1994	Power tillers	DAPI98 1994	Agricultural Workers 1991		
1	All India	10.56	0.669	467	1312		
2	Andhra Pradesh	4.26	0.219	583	1766		
3	Assam	1.43	1.46	962	1675		
4	Bihar	5.25	0.138	N.A.	2718		
5	Gujrat	7.57	0.142	303	846		
6	Haryana	42.98	0.002	233	758		
7	Himachal Pradesh	2.11	0.003	1609	2032		
8	Jammu & Kashmir	2.7	0.149	1028	N.A.		
9	Karnataka	2.79	0.947	359	1036		
10	Kerala	2.39	1.92	105	1408		
11	Madhya Pradesh	4.95	0.086	548	974		
12	Maharashtra	3.02	0.131	380	1023		
13	Orissa	0.82	0.19	830	1170		
14	Punjab	57.29	-	7	803		
15	Rajasthan	6.48	0.002	192	595		
16	Tamilnadu	6.3	1.45	567	2247		
17	Uttar Pradesh	16.32	0.009	729	1731		
18	West Bengal	0.66	2.56	498	2038		
19	Meghalay	0.03	1.46	775	2545		
20	Manipur	0.87	6.84	2628	3228		
Source: Srivastava, N.S.L, (1996), CIAE Bhopal							
Based on Livestock Census Report 1987, Census of India 1991, and Machinery Division DOAC GOI							