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# WATER-SHED DEVELOPMENT AND MANAGEMENT IN TAMIL NADU: THE PAST, PRESENT AND FUTURE - A POLICY ANALYSIS

**KEY WORDS:** DPAP, Drought-hit, Watershed Management, Hanumantharao committee, Conservation, Civil societies.

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**ABSTRACT**

The Tamil Nadu government recently declared all districts of the state drought-hit, following a deficit in the North east Monsoon last year. In some districts like Coimbatore, Namakkal and Salem water is not available even after digging 1000 feet. A drought like situation adds to the misery of a water starved state like Tamil Nadu. To counter this type of situation across India, Drought prone area program (DPAP) was launched by government of India in 1973-74 to address drought prone areas. Under DPAP Program, Tamil Nadu covers 17 districts and 80 blocks covering approximately 29416 sq. kms. Based on the recommendations of Hanumantharao committee, the program has been under implementation on watershed basis since 1995. The allocation for the program is shared in the ratio of 75:25 between the centre and state, 80% of the cost is devoted towards watershed development activities and 20% for community organisation, training and administrative jobs. The objective behind watershed approach is to enhance soil moisture conservation, crop production, and alternative land use systems in rain fed areas through efficient use of soil water resources. This study attempts to analyse the policy of Tamil Nadu to assess how successful has DPAP been in establishing financial sustainability, efficient water delivery infrastructure, water quality assessment, timely and equitable distribution of water. Also what role does NGOs and Civil Societies have to play towards spreading greater awareness and create a knowledge network within the effected population to overcome the drought-hit areas in near future.

## INTRODUCTION:

Droughts and floods are water related disasters occurring more or less regularly in India inflicting considerable misery to humans and animals. Tamil Nadu suffers from both floods and droughts in close succession. Human activities, however, sometimes either act as causative factors or accentuate the ill effects. Here, effective proper, short, medium and long term policies and strategies can not only reduce the occurrence of these phenomena but also can reduce their ill effects. It had started in late 90's (1997), from then drought mitigation programme has grown three-times. During the years 1995-2007, the budget on DPAP was 2,739 crore. This has grown four times bigger in the years 2000-2007.As per the data collected from Union Ministry of Rural Development, 27,439 mitigating projects were finished during this time.

Richard Mahapatra stated in his article "Drought---Threatening Food Security", India's drought management approaches over the last several decades have been mainly a defence mechanism. Because mainly crisis management or post-facto measures. But we had already experienced drought induced food crisis. Therefore, serious strategies must be taken to replace the existing mechanism with an anticipatory model.

Tamil Nadu's weather is characterised by semi-arid tropical zone with erratic rainfall. First time in 1972-73,Drought Prone Area Programme was being implemented in some districts.Presently,80 notified blocks of 70 districts viz,Coimbatore,Dharmapuri ,Dindigul,Karur,Krishnagiri,Namakkal,Perambadur,Pudukottai,Ramanathapuram,Salem,Sivagangai,Tiruvannamalai,Thoothukudi,Tiruchirapaalli,Tirunelveli,Vellore and Virudhunagar have been identified as drought affected areas.

## THE SHAKY BEGINNING:

P.Sainath in his has described in his book "Everybody loves a good drought' (1996) which is a collection of newspaper articles that the poor in India are too often reduced to statistics. In the dry languages of development reports and economic projections, the true misery of poor people who live below the poverty line or displaced by various projects gets overlooked. In these thoroughly researched case studies on the poorest of the poor, we have got to see how they manage, what sustains them and the efforts often ludicrous, to do something for them. Their stories have been true face of development.

In 1995, middle of May drought has bitten hard in Tamil Nadu. In block after block people were unable to pay their dues to a variety of creditors. Pudukkotai district as a whole was not under the drought prone areas program (DPAP) run by the central government. That was a district that often got less than 800 mm of rainfall annually. It could end a bad year like this one with less than 600 mm. some district in the north and east got much heavier rainfall, but had every block under DPAP, the logic is baffling because the placing of blocks under DPAP was purely a political decision, the centre had brought only 4 of Pudukkotai 's 13 under DPAP. It seemed that high costs led to such schemes in a district where 40% of the people lived below the poverty line. The Tamil Nadu government had not declared the district

When drought affected that could mean exceeding land revenues and other dues. It felt that it could be a negative example - one that could prove expensive for the state. Demand from a different spectrum of political forces has left both centre and state unmoved. He has cited many examples in his book where he talks about water market and water lords of Ramnad.

## AIMS AND OBJECTIVES OF DPAP:-

The objectives behind the implementation of DPAP were to increase the productivity of land, water and human resources and to curtail the adverse effects of droughts on the production of crops. Over the years, the objectives of the programme and modes of implementation has been transformed into various other ways like infrastructure creation, employment generation, rain water harvesting to a greater picture that is overall socio-economic development. If we view it from an operational perspective, more emphasis on people participation and decentralization enter into the project and the machinery of implementation has been shifted from the line departments to village panchayats.

Under Drought Prone Areas Programme, watersheds are sanctioned by Government of India in batches. From 1999-2000 to 2006-07 the Government of India have sanctioned 1222 watersheds in 7 batches at a total project cost of Rs.33,670.00 lakhs, for treating a total area of 6,14,142 Ha. The Government of India and State Government have released Rs.29,604.64 lakhs. Of which Rs.27,748.71 lakhs have been spent by the District Rural Development Agency of 17 districts and a total area of 5,12,199 Ha have been treated.

During the financial year of 2010-2011 (upto March '11), the Government of India have released Rs.1,618.195 lakhs and the State Government have released its share of Rs.505.162 lakhs under DPAP and the programme is being implemented.

## COST EFFECTIVENESS:

Tamil Nadu, which comprises of 428500 hectare kilometre area, was granted for 954 projects whose total cost was 21465 lakhs, Out of which government granted 2172. 8230 lakhs, which is 103.30% of the total cost.

Bellow table shows a breakup of the cost and registered expenditure over the last few years

| YEAR | COST (Amount in Lakhs) | REGISTERED EXPENSES (Amount in Lakhs) |
|---|---|---|
| 1999 -2000 | 282.750 | 00 |
| 2000 -2001 | 61.1250 | 00 |
| 2001 - 2002 | 647.4400 | 00 |
| 2002 - 2003 | 1468.0050 | 00 |
| 2003-2004 | 1792.73750 | 00 |
| 2004-2005 | 2197. 040 | 00 |
| 2005-2006 | 1632.7110 | 00 |
| 2006-2007 | 3141.795450 | 00 |
| 2007-2008 | 2688.869650 | 00 |
| 2008-2009 | 3549. 38510 | 1068931.67 |
| 2009-2010 | 1493.402670 | 430617.37 |
| 2010-2011 | 3549.238510 | 959661.71 |
| 2011-2012 | 1493. 402670 | 405204.48 |
| 2012-2013 | 1618. 194850 | 29482.15 |
| 2013-2014 | 1364. 209620 | 8948.54 |
| 2014-2015 | 128.521690 | Not registered yet |
| 2015-2016 | 106.357920 | Not registered yet |

(Data as per department of land resources, Ministry of Rural development, Government of India)

The above table demonstrates year on year the funds allocated by the centre to the state vis a vis the registered expenses of the state government. It is evident from the above table that the state government still has ample scope to utilize the funds in affected areas. E-governance should be more effective in upgradation of data as regular basis. So, that will ensure more accountability and transparency.

**IMPACT ON LAND WATER BIOMASS:**

**Groundwater recharge** was reported from all areas under the WDP except those districts that faced prolonged drought. Increase in drinking water availability and irrigated land holding beneficiaries suggested a positive impact of the program.

**Biomass**: in 13 districts reported an increase in fuel-wood and 14 districts an increase in fodder availability across the watershed areas

**Livestock:** In the watershed areas an increase in the number of livestock (both local and improved) was reported. Poultry, sheep and cow breeding beneficiaries also increased during the project.

**Socio Economic Impact:people's Participation,work Performance, Wage And Employment:**

| STATE | | | |
|---|---|---|---|
| Treated Area (in ha) | | | |
| People's Participation | No of SHGs | | |
| | No of UGs | | |
| Training Programme | SHG | | |
| | UG | | |
| | Exposure Visits | | |
| | Others | | |
| Work Performance | SM works | Unit | No. |
| | | | Rmt. |
| | | Area (in ha) | |
| | WH Structures | Unit | No. |
| | | | Rmt. |
| | | Area (in ha) | |
| | Aff./Pasture/Horti/Pl | Unit | |
| | | Area (in ha) | |
| Wage Employment | SC/ST man days | | |
| | Women days | | |
| | Total man days | | |
| Reporting Month | | | |

(Data as per department of land resources, Ministry of Rural development, Government of India)

Land holding and crop yields across the state drought prone area program beneficiaries reported increase average operational holding 0.3 ha. Arable land 1.1 ha and irrigated holding 1.5 ha. All district reported post project increase in Kharif and Rabi yields. Cotton recorded the maximum increase in yield followed by millet, groundnut maize and paddy.

Employment and income generation: Drought prone area program generated watershed and average annual employment of 5819.73 man days per project the average annual income was reported to be around 20000 rupees following implementation of the WDP.

Capacity building and people's participation:- WDACs were established in most districts with an average of 13 members. WDACs and WDIs, WAs and WCs Were also reported to have been set up in all districts. NGO's involvement was Limited with the DRDA's exclusively implementing projects in most districts.469 UGs and 324 SHGs were reported to have been set up across all watersheds. Between 1 and 3 training sessions were organised in all route DPAP watersheds. Undertaken by Agricultural University, Krishi Vigyan Kendra, the state agricultural development and NGOs. Almost all watershed committees reported opening of bank accounts and timely disbursements reported from most areas. This enabled the achievement of up to 90% of the proposed physical targets in the project period.

As per my empirical findings (conversation with officers-in –charges of TWDA),I came to know the fact that they have closed the DPAP programme three years ago. However, according to the policy sciences, a policy should not be evaluated only in a particular time frame. It should take consideration of other related ongoing projects and their intermediate impacts and future prospects.

**POST DPAP, FUTURE PROSPECTS:**

In 1994, a Technical Committee under Chairmanship of Professor **C.H. Hanumantha Rao** was appointed to appraise the impact of DPAP / DDP and suggest measures for improvement. The committee recommended a common set of operational guidelines and expenditure norms for the three programmes of Ministry of Rural Development.

Accordingly, the Guidelines for watershed Development were framed and brought into force from 1st April 1995.

These guidelines were changed in 2001 and further in 2003 and again revised in 2011 were named"**Haryali Guidelines**". Later, the 11th Plan has stressed upon developing concerted action plans for rainfed areas in close consultation with the State Governments. Accordingly, the Common Guidelines for Watershed Development, 2008 have been issued and made effective from 1.4.2008. Since 26.2.2009, the three watershed programmes of the Department of Land Resources namely DPAP, DDP and IWDP have been consolidated as a comprehensive programme named **'Integrated Watershed Management Programme (IWMP)'.**

**Integrated Wastelands Development Programme:-**

So, at present, the Integrated Wastelands Development Programme (IWDP), Drought Prone Areas Programme (DPAP) and Desert Development Programme (DDP) are running as a consolidated single programme named **Integrated Watershed Management Programme** (IWMP) in place of all the above mentioned three Area Development Programmes. (Information related to this topic is outdated in most books). This programme comes under Ministry of Rural Development.

Integrated Wasteland Development Programme aims at tackling the non-forest wasteland in non-DPAP blocks. The basic theme of the programme is to harvest the rainwater and to bring the degraded lands into productive use. Unlike DPAP programme, flexibility is given to tackle the non-forest wastelands on a project based approach.

At present, this programme is being implemented in 96 blocks of 24 districts in TamilNadu viz., Coimbatore, Dharmapuri, Dindigul, Karur, Krishnagiri, Namakkal, Perambalur, Pudukkottai, Ramanathapuram, Salem, Sivagangai, Tiruvannamalai, Thoothukudi, Tiruchirappalli, Tirunelveli, Vellore, Erode, Theni, Madurai, Kancheepuram, Villupuram, Tiruvallur, Cuddalore and Virudhunagar.

As per Hariyali Guidelines the User Groups have identified the works and execute the works through village panchayat. The duration of the project is five years from the year it was sanctioned. The unit cost per hectare is Rs.6000/-. The cost of the works undertaken under this programme are entirely met from project fund. However contributions are collected from beneficiaries at 10%. In respect of community work and SC/ST, the contribution amount is 5% of the value of the work. These funds are deposited in a separate account maintained in the watershed and it will be utilized for

Tamil Nadu Watershed Development Agency was established in 2002 with objectives to conserve water resources and promote efficient use of water for increasing productivity of the crops.

Following are the two watershed development programmes implemented by Tamil Nadu Watershed Development Agency.

1. **Pradhan Mantri Krishi Sinchayee Yojana – Watershed Development (PMKSY-WD) and Other Intervention**

   **(Per drop more crop)**

2. **Watershed Development Fund (WDF) assisted by NABARD.**

In addition, TAWDEVA acts as the Nodal Agency for channelizing funds for the following schemes funded by the Government of India.

**1.Pradhan Mantri Krishi Sinchay Yojana – PMKSY**

The Government of India have introduced a new umbrella programme called Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) during the year 2015-16.

PMKSY will focus on:

Creation of new water sources, repair, restoration and renovation of defunct water sources, construction of water harvesting structures, secondary & micro storage, groundwater development, enhancing potentials of traditional water bodies at village level.

Developing / augmenting distribution network where irrigation sources (both assured and protective) are available or created.

Promotion of scientific moisture conservation and run off control measures to improve ground water recharge so as to create opportunities for farmer to access recharge water through shallow tube / dug wells.

**2.Pradhan Mantri Krishi Sinchayee Yojana-Watershed Development (PMKSY-WD) ( Integrated Watershed Management Program:**

Integrated Watershed Management Programme (IWMP) has been subsumed into Pradhan Mantri Krishi Sinchayee Yojana–Watershed Development (PMKSY-WD) and implemented in convergence with the existing irrigation development programmes.This scheme is being implemented through 24 District Watershed Development Agencies in 26 Districts covering 2,770 watersheds. The scheme expenditure is shared by the Central and State Governments up to 2014 – 15 in the ratio of 90:10. From 2015 -16 onwards the sharing pattern has been revised as 60:40 between Central and State Governments.

The following development activities are carried out.

| Activity | Components |
|---|---|
| Land Development | Land leveling, Contour Bunding, Stone Bunding, Retaining Wall, Summer Ploughing, Vegetative Bunding and Continuous Trenching |
| Water Resources Development | Formation of New Tank / Oorani, Farm Pond, Percolation Pond, Desilting of Existing Tanks and Supply Channels |
| Plantation | Plantation relating to Horticulture, Socio-Agro Forestry, Fodder Development, Crop Demonstration and Homestead Garden |
| Common Property Development | Construction of Check dams, Cattle ponds, Supply channels, Desilting of Ooranis, Desilting of tanks and ponds. |
| Farm Production System and Micro Enterprises | A grant of maximum of Rs.24,000 is provided to carry out farm based activities and non-farm activities to formers. |

During 2016-17 an amount of Rs.103.93 crores has been allocated by Government of India with State share and released to the District Watershed Development Agencies for Implementation.This scheme is proposed to continue during 2017 – 18 with tentative allocation of Rs.137.916 crores (including Central and State share).

**8.2.2. PMKSY – Other Interventions (Per drop more crop)**

This Scheme aims in enhancing the adoption of precision-irrigation and other water saving technologies (Per drop More crop),enhancing recharge of aquifers and introduce sustainable water conservation practices,creation of additional irrigation potential and bringing more area under cultivation.During 2016-17, an amount of Rs.55.82 crores has been allocated by Government of India with State share and released to the District Watershed Development Agencies (Rs.37.82 crores), Rural Development (Rs.6.75 crores) and Agricultural Engineering (Rs.11.25 crores) for Implementation as below:(Rs. in crores)

The achievement details districts wise work for the above amount of Rs.55.82 crores and Rs.103.93 crores totalling Rs.159.75 crores. is given below.

**Natural Resource Management Achievement Details For 2016-17**

| Sl. No. | District | Physical Achievement | | |
|---|---|---|---|---|
| | | Farm Pond | Check Dam | Others |
| 1 | Coimbatore | 26 | 13 | 145 |
| 2 | Cuddalore | 3 | 0 | 46 |
| 3 | Dharmapuri | 22 | 107 | 143 |
| 4 | Dindigul | 34 | 63 | 195 |
| 5 | Erode | 9 | 26 | 68 |
| 6 | Tiruppur | 0 | 0 | 0 |
| 7 | Kancheepurm | 20 | 136 | 476 |
| 8 | Karur | 17 | 8 | 52 |
| 9 | Krishnagiri | 68 | 122 | 381 |
| 10 | Madurai | 9 | 75 | 130 |
| 11 | Namakkal | 26 | 42 | 189 |
| 12 | Nagapattinam | 0 | 0 | 0 |
| 13 | Nilagiri | 0 | 0 | 5 |
| 14 | Ariyalur | 2 | 5 | 352 |
| 15 | Perambalur | | 384 | |
| 16 | Pudukkottai | 5 | 5 | 61 |
| 17 | Ramnad | 2 | 0 | 134 |
| 18 | Salem | 2 | 127 | 253 |
| 19 | Sivagangai | 88 | 0 | 221 |
| 20 | Tiruvarur | 15 | 0 | 0 |
| 21 | Thanjavur | 14 | 0 | 0 |
| 22 | Theni | 1 | 7 | 5 |
| 23 | Thoothukudi | 105 | 104 | 211 |
| 24 | Tiruchy | 16 | 221 | 323 |
| 25 | Tirunelveli | 35 | 118 | 4 |
| 26 | Tiruvallur | 1 | 42 | 41 |
| 27 | Tiruvanamalai | 22 | 112 | 272 |
| 28 | Vellore | 20 | 233 | 82 |
| 29 | Villupuram | 24 | 77 | 152 |

| | | | | |
|---|---|---|---|---|
| 30 | Viruthunagar | 30 | 69 | 154 |
| | **Total** | **616** | **2096** | **4090** |

** Percolation Pond, New Village Pond. Renovation of Village Pond, Rejuvenation of Abandoned Well

Livelihood Support System activities achievement details for 2016-17

| Sl. No. | District | Sprayer (nos) | Agricultural implements | Goat / Cattle | Others (Sewing machine, petty shops, vermin compost etc.) | Total |
|---|---|---|---|---|---|---|
| 1 | Coimbatore | 48 | 38 | 34 | 100 | 220 |
| 2 | Cuddalore | 119 | 130 | | 60 | 309 |
| 3 | Dharmapuri | 20 | 16 | 37 | 1 | 74 |
| 4 | Dindigul | 37 | 20 | | | 57 |
| 5 | Erode | 32 | 22 | 14 | 11.000 | 79 |
| 6 | Tiruppur | | | | | 0 |
| 7 | Kancheepurm | | | | | 0 |
| 8 | Karur | 15 | 31 | | | 46 |
| 9 | Krishnagiri | | 16 | 206 | | 222 |
| 10 | Madurai | | 17 | | 6.000 | 23 |
| 11 | Namakkal | | 35 | | | 35 |
| 12 | Nagapattinam | | | | | 0 |
| 13 | Nilagiri | 105 | 76 | 38 | 21 | 240 |
| 14 | Ariyalur | | | | | 0 |
| 15 | Perambalur | 69 | 106 | | 1 | 176 |
| 16 | Pudukkottai | 21 | 98 | | | 119 |
| 17 | Ramnad | 61 | 123 | 24 | | 208 |
| 18 | Salem | 21 | 11 | | | 32 |
| 19 | Sivagangai | 51 | 50 | 67 | | 168 |
| 20 | Tiruvarur | 82 | 110 | | | 192 |
| 21 | Thanjavur | 15 | 11 | 30 | | 56 |
| 22 | Theni | 42 | 49 | | | 91 |
| 23 | Thoothukudi | 12 | 9 | | | 21 |
| 24 | Tiruchy | 62 | 39 | | | 101 |
| 25 | Tirunelveli | 29 | 96 | 13 | | 138 |
| 26 | Tiruvallur | | | | | 0 |
| 27 | Tiruvanamalai | 48 | 38 | 34 | 100 | 220 |
| 28 | Vellore | 119 | 130 | | 60 | 309 |
| 29 | Villupuram | 20 | 16 | 37 | 1 | 74 |
| 30 | Viruthunagar | 37 | 20 | | | 57 |
| | TOTAL | 841 | 1103 | 463 | 200 | 2607 |

This scheme is proposed to continue during 2017 – 18 with tentative allocation of Rs.83.333 crores (including Central and State share).

### 8.3 Watershed Development Fund (wdf) Assisted By Nabard:

The watershed development fund projects are implemented under loan assistance from NABARD from 2004. These works are similar to PMKSY-Watershed Development works (other than District Watershed).This scheme is being implemented by NABARD and Tamil Nadu Watershed Development Agency in 168 selected watersheds. Out of this, all works in 63 watersheds have been completed through Tamil Nadu Watershed Development Agency and handed over to NABARD. Further, out of the remaining 105 watersheds, in 54 watersheds works are being carried out through NABARD and in 41 watersheds works are being carried out through Tamil Nadu Watershed Development Agency in Full Implementation Phase with 50% grant from State and 50% grant from NABARD.

| Activity | Components |
|---|---|
| **Physical Area Treatment** | Activities like Stone Field bund, Contour trenches, Water Absorption Trench; Dug well, Recharge pits, Farm pond, Percolation Pond, Sunken Pond, Agro Forestry, Agro-Horticulture, Silvi-pasture, and Grass seeding in watershed areas. |
| **Drainage line treatment** | Activities like Stone gulley plugs, Renovation of water harvesting structure, Desalting of ponds, tanks, repair of supply channels. |
| **Livelihood Support for landless women** | Income generating activities for Self Help Groups and landless Women |
| **Training** | Training to Watershed Association Communities and beneficiaries in the Watershed – through participatory Rural Appraisal and help them to develop a need based watershed specific plan. |

During 2016-17, an amount of Rs.6.35 crores has been allocated by State Government and released to the District Watershed Development Agencies for implementation.

This scheme is proposed to continue during 2017 – 18 with tentative allocation of Rs.5.88 crores by State Government.

### Tawdeva As A Nodal Agency:

TAWDEVA acts as the Nodal Agency for channelizing funds for the following schemes funded by the Government of India. (Rs. in Crores)

| Name of the Scheme | Last year Allocation 2016 - 17 | Tentative Allocation during 2017 - 18 |
|---|---|---|
| 1 National Agriculture Development Programme (NADP) | 338.11 | 370.15 |
| 2.National Mission for Sustainable Agriculture (NMSA) | 66.75 | 87.58 |
| 3.Pradhan Mantri Krishi Sinchayee Yojana (PMKSY | 159.75 | 221.25 |

### Individual Initiatives: Role Of NGOs And Civil Society.

NGOs and Civil Society plays a crucial role in watershed management as well as combating drought problems.NGOs and Civil Societies are working hand in this area programme as a care taker of marginal people and constantly monitoring on effective use of water. They have been trying to bridge the gap between government machineries and local people. They are spreading water literacy among local people and educating them. They are acting like peoples watchdogs to monitor and evaluate water assessment and distribution system.

Devendra, is the president of the Kedar Village Tank Farmers Society in Tamil Nadu. The society operates and irrigates an area of approximately 119 hectares. The society designed the structures themselves and constructed a 1.5 km long road all along the canal to maintain it and also to mobilise their vehicles and machines for their fields. This reduced the cost of transportation and the villagers could save 50 per cent of the cost of harvesting. People reported an increase in the productivity of their lands due to the availability of water even during the drought period. This has drastically changed their economic status.

Ganesan manages the water supply of Madaivini Patti, a locality in village Vairavan Patti in Madurai district, Tamil Nadu.He knows the topography of his village at the back of his hands.He maintains the kanmoy embankments and operates the sluice valves that release water in the channels.

Development of Human Action Foundation (DHAN) an organisation with an objective of bringing well-aware and educated young women and men to the development sector so that new innovations in rural development programs can be bought and carried to vast areas of the country and the people, especially the poor.

### Recommendations:

- Early warning and drought monitoring system should be strengthened.

- Drought proofing must be implemented properly.
- Rain water harvesting
- Ground water recharge structures should be created.
- Effective,efficient and economic utilization of rain water for growing crops.
- Popularization of drip and sprinkler system to save water.
- Water conservation in agroforestry systems for drought mitigation.
- Traditional water harvesting systems like nadi, tanka, baori etc should be developed and maintained.
- Development of alternative employment like brackish water fish culture.
- NREGA can be a useful instrument in mitigating drought.
- Problems of drought impacts are complex and multifaceted. Strategies to deal with these problems therefore require (a) multi-institutional and multi-disciplinary resource building approach with farmer at centre stage, (b) current status and effectiveness of drought mitigation and desertification control strategies and (c) fixing short and long term priorities.

The severity of successive droughts have increased on account of deforestation. While there is no clear evidence of change in rainfall pattern on account of deforestation, the impact of the latter in terms depletion of soil moisture, lowering of water table because of run off of rainwater and shortage of fuel wood and fodder is well established. The causes of deforestation are rooted in the pattern of development and management of resources, which had led to commercial felling of trees on a massive scale to meet the commercial and industrial demand. Groundwater has also been indiscriminately exploited in India for irrigation and therefore groundwater level is going down in many parts, and thus the problem of drought, particularly water shortage of drinking water is becoming critical. In addition problems of waterlogging and sanitation urban faced in the irrigated tracked and consequently growth in productivity levels cannot be maintained.

The Green Revolution Technology did not take into consideration the ecological consequences of mono-hybrid culture, wide use of fertilizers, pesticides and irrigation. The country is now facing the in consequences as soils are turning and productive, pests turning resistant to pesticides, water bodies are getting polluted and fish are dying. We should not put emphasis on chemical inputs but on Eco biological balance, and that's the problems of attaining higher and sustainable yields and of providing more employment achieving higher productivity progressively have to be handle simultaneously so that the chronic famine of work and famine of food, fodder, fuel stock and drinking water are eliminated.

In conclusion, we can say even if most of the recommendations suggested in the Hariyali guidelines (2003; 2008 and 2011) are successfully implemented it would lead to a substantial improvement from the current scenario. We should learn from the shortcomings of DPAP programme during the nineties when it was initially implemented and see that for future projects this hindrances are removed. So, that it leads to a better policies being formulated.

Droughts and poverty are interconnected with millions of very poor people living in drought prone areas, so what is required here is to highlight drought as the central problem of development in India. If this is not done, it will continue to be treated the way it is with a few long term projects, little investment and inadequate effort to search for scientific and technological solutions to its problems. Watershed development requires an entirely different perspective and policy effort as a whole has to be reviewed keeping droughts as the central focus.

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