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WATERSHED DEVELOPMENT PROGRAMMES IN TAMILNADU

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Abstract

The concept of watershed management is as old as the concept of crops grown under irrigated conditions and this concept led to development of tanks/reservoirs for increasing the production to meet the demand of ever growing population. The execution of works based on the availability of funds, needs of the people, available natural resources in the area, etc., to meet population demands and requirement of food need. Most watershed projects in India are implemented with the twin objectives of soil and water conservation and enhancing the livelihoods of the rural poor (Sharma and Scott 2005). A watershed is a geographical area that drains to a common point, which makes it an attractive unit for technical efforts to conserve soil and maximize the utilization of surface water and subsurface water for crop production (Kerr et al. 2000).

***Keywords**: watershed management, bunding, ploughing, drip and sprinkler irrigation, dryland farming, livelihood*

Objectives of Watershed Activities

The main objective of the present study is to understand the functions and implementation of watershed development programmes in TamilNadu. Watershed activities include soil and moisture conservation measures in agricultural lands (contour/field bunding and summer ploughing), drainage line treatment measures (loose boulder check dam, minor check dam, major check dam, and retaining walls), water resources development management (percolation pond, farm pond, and drip and sprinkler irrigation), crop demonstration, horticulture plantation and afforestation (Palanisami and Suresh Kumar 2005). The aim has been to ensure the availability of drinking water, fuelwood and fodder and raise income of, and employment opportunities for, farmers and landless laborers through improvement in agricultural production and productivity (Rao 2000). Today, watershed development has become the main intervention for natural resource management. Watershed development programs not only protect and conserve the environment but also contribute to livelihood security.

Watershed Development in Tamil Nadu

Profile of the State

Agriculture is the major occupation in the state as it provides livelihood support to 56% of the population. Incidentally, about 56% of the total cropped area of the state is under irrigated condition while around 44% of the area is under dryland farming. Land use pattern in the state has witnessed significant changes over the years. The net sown area has declined from 48% of the total geographical area during 1979-80 to 42.8% in 1999-2000 and further to 38.5% in 2005-06. Tamil Nadu agriculture is dominated by marginal and small farmers. The marginal farmers account for 74.3% of the total holdings operated only in about 30% of the total area while the semi-medium, medium and large farmers account for

a small proportion of 10% of the holdings operated in a higher proportion of 46.1% of the total area. The number of marginal farmers has been increasing over the years.

Tamil Nadu state which accounts for 7% of the population of the country is endowed with only 3% of water resources in India. The water potential of the state is 46,540 Mm3. The groundwater potential available for future development was estimated at 3,142.27 Mm3 as of January 2003.The development of groundwater has led to increased "drought proofing" of the state's agricultural economy. Out of 385 blocks in Tamil Nadu, 180 blocks have almost exploited the potential and out of the 1.8 million wells in the state, about 12% are dried up or abandoned due to groundwater overexploitation (GoTN 2002). In some pockets of the state, the average well failure rate is 47% for open wells and 9% for bore wells (Palanisami et al. 2008).The overexploitation of groundwater in many areas of the state has resulted in lowering of the water table below the economic pumping level.

Watershed Development Programs

In order to increase the ariculture production and improve the living conditions of the farmers depending on the rain-fed lands, the watershed development programs are being widely implemented in the state. There are 19,331 micro-watersheds identified in the state of which, approximately 4,000 have already been treated. The important programs are

1. Restructured National Watershed Development Project for Rain-fed Areas (NWDPRA)
2. Watershed Development Fund assisted by NABARD.
3. Integrated Wasteland development Programme (IWDP)
4. Drought Prone Areas Programme (DPAP)

Restructured National Watershed Development Project for Rainfed Areas (NWDPRA)

National Watershed Development Project for Rainfed Areas (NWDPRA) is being implemented in Tamilnadu from VIII Five Year Plan (1990 – 91) onwards. The project is shared between centre and state on 90:10 basis. Under Restructured NWDPRA for XI Five Year Plan period (2007-2012), it is proposed to take up 500 watersheds in 22 districts, where the area has less than 30% assured means of irrigation in arable lands and having slopes less than 8%.

Objectives

- Conservation, development and sustainable management of natural resources including their use.
- Enhancement of Agricultural productivity and production in a sustainable manner.
- Restoration of ecological balance in the degraded and fragile rain fed eco-systems by greening these areas through appropriate mix of trees and shrubs.
- Reduction in regional disparity between irrigated and rainfed areas.

- Creation of sustained employment opportunities for the rural community including the landless.

Area of Implementation

During the X Five Year Plan project, the scheme was implemented in Tamil Nadu with community approach in 755 watersheds in 155 blocks in 23 districts. During the XI Five Year Plan project, the scheme will be implemented in 22 districts excluding Coimbatore district which has been saturated and as there is no new watershed available for treatment. The scheme is implemented under the Chairmanship of the Collectors through District Watershed Development Agency at District level and through Watershed committees / Associations at Village level.

Progress in Implementation

So far, 2,68,116 Ha. of land has been covered at the expense of Rs.131.413 crores.

Physical / Financial Achievement under NWDPRA

S. No.	Year	Financial	(Rs. in Lakhs)		Physical	(In Ha)
		Allocation	Release	Expenditure	Target	Achievement
1.	2002-03	1,407.067	1,407.067	1,407.067	31,268	29,227
2.	2003-04	1,525.000	1,525.000	1,525.000	33,888	33,888
3.	2004-05	2,089.063	2,089.063	2,089.063	46,424	46,424
4.	2005-06	1,990.160	1,990.160	1,990.160	44,227	44,227
5.	2006-07	3,738.700	3,738.700	3,738.700	83,082	83,082
6.	2007-08	2,391.300**	2,391.300	2,391.300	29,227	29,227
	Total	**13,141.290**	**13,141.290**	**13,141.290**	**2,68,116**	**2,68,116**

*** Rs.10.76 crores allotted for undertaking preparatory works under XI Five Year Plan (2007-08)*

Strategic Plan for XI Five Year Plan

Year	Extent to be treated in 500 Nos. of new watershed area (in Ha.)	Fund requirement for new watershed area (Rs. in crores)
2007-08	25,000	15.00
2008-09	50,000	30.00
2009-10	50,000	30.00
2010-11	50,000	30.00
2011-12	75,000	45.00
Total	**2,50,000**	**150.00**

The flow of funds to SC and ST is 19% and 1% respectively.

Action Plan for 2008-09

Under XI Five Year Plan, during 2008-09, it is proposed to treat an area of 50,000 ha. at an estimated cost of Rs.30 crores as detailed below.

Sl. No.	Name of the Component	Amount (Rs. in Crores)
I	**Management Component**	
	1. Administration cost 10%	3.00
	2. Community Organization 17.5%	5.25
	3. Training 5%	1.50
II	**Development Component**	
	1. Natural Resource Management 50%	15.00
	2. Farm Production System for land owning 15%	4.50
	3. Livelihood Support System 2.5%	0.75
	Total	**30.00**

Watershed Development Fund assisted by NABARD

Watershed Development Fund in Tamil Nadu has been created to treat 100 watershed projects at a cost of Rs. 60 crores with the assistance of National Bank for Agriculture and Rural Development (NABARD). The scheme has been in operation since 2004-05 and the duration of the scheme is six years.

Objective of the Scheme

1. To spread the message of participatory Watershed Development.
2. Involvement of Government, NGOs/Voluntary organization in implementation.
3. Constitution of Watershed Association & watershed committee to develop the watershed based on the local needs.

Project Period

1. Capacity Building Phase (50 to 100 Ha. to be covered) - 18 months.
2. Preparation of feasibility study report - 6 months.
3. Full implementation Phase - 4 years

Total period - 6 years.

Components of Watershed Development Fund

As per new Guidelines being made operational since 21.11.2007.

1. Capacity Building Phase of Watershed Development Fund is 100% grant component being released by National Bank for Agriculture and Rural Development (NABARD).
2. Full Implementation Phase of Watershed Development Fund is 50% Loan to State Government & 50% Grant by NABARD.
3. Interest rate is 4.5%
4. Repayment period 9 years (3 years after availing Loan)

Area of Implementation

At present the programme is being implemented in the following 20 Districts in the State. Cuddalore, Dharmapuri, Dindigul, Kancheepuram, Karur, Krishnagiri, Madurai, Namakkal, Perambalur, Pudukottai, Ramnad, Sivaganga, Theni, Thoothukudi, Tirunelveli, Tiruvallur, Tiruvannamalai, Vellore, Villupuram, Virudhunagar.

Apart from the regular watersheds that are being approved by the State Steering Committee, there are 5 PPID projects (Pilot Project for Integrated Development of Backward Blocks) in 5 Districts namely Ramnad, Dindigul, Thoothukudi, Trichy and Nagapattinam which is being completely funded by NABARD.

Allotment of Fund for Different Component

Unit cost per Ha.	-	Rs. 6,000.00
Physical treatment	- 70%	Rs. 4,200.00
Administrative overheads	- 10%	Rs. 600.00
Livelihood support for Landless Farmer & Women	- 7.5%	Rs. 450.00
Community Organisation &Training programme	- 12.5%	Rs. 750.00

Project Implementation

During 2004-05 and 2005-06, 100 watersheds were selected by the State Steering Committee. In the first 2 years period of the project, Capacity Building Phase is done during the first 18 months and Feasibility Study Report is done in the next 6 months with the assistance from NABARD. From the third year the project is handed over to TAWDEVA by NABARD to carry out works in the Full Implementation Phase. Among the projects selected during 2004-05, 10 projects which have completed Capacity Building Phase and Feasibility Study Report stage were handed over to TAWDEVA by NABARD in 2005-06. After completing the works these watersheds were handed to NABARD in 2007-08.During the year 2007-08, no Full implementation Phase projects have been handed over to TAWDEVA by NABARD.

During the year 2009-10, treatment works would be taken up in the current 23 Full Implementation Projects to treat an area of 1875 ha with a financial commitment of Rs.112.50 Lakhs.

Integrated Wasteland Development Programme

The Integrated Wasteland Development Programme (IWDP) has been under implementation in Tamil Nadu since 1993-94 in non-DPAP blocks to develop non-forest wastelands on the principles of watershed development. The basic theme of the programme is to harvest the rainwater and to bring the degraded lands into productive use.

From 1st April 1995, the programme has also been brought under the purview of the Common Guidelines like Drought Prone Areas Programme, presently it is governed by Hariyali Guidelines. 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.

The unit cost for a hectare is Rs.6,000/-. The cost of the works undertaken under this programme is entirely met from project fund. However, contributions are collected from beneficiaries at 10%. In respect of community works and SC/ST, the contribution amount is 5% of the value of the work. Presently, the expenditure is shared between Central and State Government in the ratio of 11:1

At present, this programme is being implemented in 96 blocks of 24 districts 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.

The works taken up under the Integrated Wasteland Development Programme are of a special nature and involve a variety of activities such as:-

Land Development: Land Leveling, Contour Bunding, Silt Application, Stone Bunding, Retaining Wall, Summer Ploughing, Vegetative Bunding and Continuous trenching.

Water Resources Development: Cattle Pond, Farm Pond, Formation of Oorani, Desilting of Tanks, Formation of Supply Channel and Desilting, Check Dams, Percolation Pond and Development of Drinking Water Resources.

Plantation Activities: Agro Forestry, Horticulture Plantation, Fodder Development, Crop Demonstration, Community Nursery, Social Forestry and Homestead Garden.

Since the inception of the programme 85 projects have been sanctioned in 24 districts at a cost of Rs.27,364.21 lakhs to tackle a total degraded land of 4,75,239 hectares. Out of 85 Projects, 5 projects have since been completed. The area treated was 18151 hectares at a cost of Rs.1086.39 lakhs.

The details of ongoing 80 projects are given below.

(in lakhs)

No. of Ongoing Projects	80
Project cost	26,220.39
Government of India	24,241.69
Government of Tamil Nadu	1,978.62
Amount Released (upto March 2009)	19,933.05
Government of India	18,528.34
Government of Tamil Nadu	1,404.71
Expenditure (upto March 2009)	18,007.28 (90%)
Area to be treated for the released amount upto March 2009 (Hect)	3,52,389
Area Treated (Hect) (upto March 2009)	3,06,854 (87%)

During the year 2008-09, the Government of India have released Rs.3,460.07 lakhs and the State Government have released its share of Rs.255.17 lakhs under IWDP and the programme is being implemented.

Drought Prone Areas Programme

The Drought Prone Areas Programme (DPAP) is being implemented in Tamil Nadu since 1972-73. The basic objective of the programme is to minimize the adverse effects of drought on the production of crops, productivity of land, water and human resources thereby ultimately leading to drought proofing of the affected areas. Since 1995-96, this programme is being implemented as per the guidelines of Government of India on Watershed basis with peoples' participation.

Presently 80 notified blocks of 17 districts viz., Coimbatore, Dharmapuri, Dindigul, Karur, Krishnagiri, Namakkal, Perambalur, Pudukkottai, Ramanathapuram, Salem, Sivagangai, Tiruvannamalai, Thoothukudi, Tiruchirappalli, Tirunelveli, Vellore and Virudhunagar have been identified by the Government of India as drought prone areas and efforts are on to mitigate the adverse effects of drought conditions.

On the operational side, as per the Hariyali guidelines the responsibility of implementation has shifted from line departments to Village Panchayats wherein the user groups identify the works and execute the works through Village Panchayats. Government of India and State Government share the expenditure in the ratio of 75:25. The unit cost for a hectare is Rs.6,000/-. The cost of the works undertaken under this programme is entirely met from project fund. However, contributions are collected from beneficiaries at 10%. In respect of community works and SC/ST, the contribution amount is 5% of the value of the work.

The works being taken up under this Drought Prone Areas Programme are of a special nature and involve a variety of activities such as:-

Plantation Activities:	Horticulture Plantation, Fodder Development, Crop Demonstration, Community Nursery, Homestead Garden, Agro Forestry and Social Forestry.
Land Development:	Land Leveling, Summer Ploughing, Vegetative Bunding, Contour Bunding, Stone Bunding, Retaining Wall, Continuous trenching and Silt Application.
Water Resources Development:	Formation of Supply Channel and desilting, Check Dams, Cattle Pond, Farm Pond, Percolation Pond, Formation of Oorani, Desilting of Tanks, and Development of Drinking Water Resources.

Under Drought Prone Areas Programme, watersheds are sanctioned by Government of India in batches. The duration of the project is five years from the year it was sanctioned.

From 1999-2000 to 2006-07 the Government of India have sanctioned 1222 watersheds in 7 batches at a total cost of Rs.33,670.00 lakhs, for treating a total area of 6,14,142 Ha. Upto 31.03.2009 the Government of India and State Government have released Rs.25,357.69 lakhs. Of which Rs.23,417.56 lakhs have been spent by the District Rural Development Agency of 17 districts and a total area of 4,28,938 Ha have been treated. The details of ongoing 1222 watersheds are given below.

(in lakhs)

No. of Ongoing Watersheds	1222
Project cost	33,670.00
Government of India	25,252.50
Government of Tamil Nadu	8,417.50
Amount Released (upto March 2009)	25,357.69
Government of India	19,174.73
Government of Tamil Nadu	6,182.96
Expenditure (upto March 2009)	23,417.56
Area to be treated for the released Amount upto March 2009 (Hect)	4,65,970
Area treated (Hect) (upto March 2009)	4,28,938

Source: www.tn.gov.in

During the year 2008-09, the Government of India have released Rs.3,549.24 lakhs and the State Government have released its share of Rs.998.50 lakhs under DPAP and the programme is being implemented.

Influence of Watershed Development Programmes in TamilNadu

The watershed development programs involving the entire community and natural resources influence

- productivity and production of crops, changes in land use and cropping pattern, adoption of modern technologies, increase in milk production, etc.,
- attitude of the community towards project activities and their participation in different stages of the project,
- socioeconomic conditions of the people such as income, employment, assets, health, education and energy use,
- impact on environment,
- use of land, water, human and livestock resources,
- development of institutions for implementation of watershed development activities, and
- ensuring sustainability of improvements.

It is thus clear that watershed development is a key to sustainable production of food, fodder, fuelwood and meaningfully addressing the social, economical and cultural conditions of the rural community.

Biophysical Impacts

The watershed development activities have significant positive impacts on various biophysical aspects, such as investment on soil and water conservation measures, soil fertility status, soil and water erosion, expansion in cropped area, changes in cropping pattern, cropping intensity and production and productivity of crops.

The study revealed that the watershed treatment activities improved conservation of soil and moisture, improvement and maintenance of fertility status of the soil (Sikka et al. 2000; Ramaswamy and Palanisami 2002; Palanisami and Suresh Kumar 2002) and reduced soil and water erosion. The organic carbon increased by 37% due to watershed intervention (Sikka et al. 2000) and most studies revealed that there was a significant reduction in soil and water erosion.

An impact and evaluation study of the soil conservation scheme under DPAP indicates that only marginal impacts were realized in terms of land use pattern, crop pattern, yield rate, etc. (Evaluation and Applied Research Department 1981).

Environmental Impact

The watershed development activities generate significant positive externalities which have a bearing on improving agricultural production, productivity, and socioeconomic status of the people who directly or indirectly depend on the watershed for their livelihoods. The environmental indicators include water level in the wells, changes in irrigated area, duration of water availability, water table of wells, surface water storage capacity, differences in number of wells, number of wells recharged/defunct, differences in irrigation intensity and Watershed Eco Index (WEI).

The impact assessment studies conducted by different agencies and scientists across regions over a period of time imply that watershed development activities have generated significant positive impacts on the environment.

The rainwater harvesting structures constructed in the watershed help enhance the surface water storage capacity. Structures like minor and major check dams, percolation and farm ponds, and renovation of irrigation tanks help in a big way to enhance the surface water storage capacity. Evidence shows that, on average, about 92 ha.cm additional capacity were created and varying from 63 ha. cm to 136 ha. cm. In addition to the fixed capacity, repeated storage will be available for different fillings once already stored water is percolated. A maximum additional storage capacity of 359 ha.cm was created in the Tiruppur block of the Coimbatore District of Tamil Nadu.

Socioeconomic Impacts

The watershed development technologies aimed not only to conserve the natural resources but also to improve the socioeconomic conditions of the rural people who depended on them for their livelihoods. The impact of various watershed treatments is however widespread. The changes in various biophysical and environmental aspects will

have significant impacts on the socioeconomic conditions of the people. Watershed development programs are designed to influence the biophysical and environmental aspects thereby bringing changes in the socioeconomic conditions (Deshpande and Rajasekaran 1997).

The socioeconomic indicators like changes in household income, per capita income and consumption expenditure, differences in employment, changes in lives of persons migrated, peoples' participation, household assets and wage rate at the village level were considered for the impact assessment.

The watershed intervention helped the rural farm and nonfarm households to enhance their income level. Evidence shows that the rural labor households in the treated villages derive Rs 28,732 when compared to Rs 22,320 in control villages, which is 28.73% higher in the Kattampatti watershed. Similarly, the per capita income is also relatively higher among households of watershed treated villages. The proportions of difference among households across villages worked out to 13.17% in the Kattampatti watershed and 70.44% in the Kodangipalayam watershed (Palanisami and Suresh Kumar 2005). In addition, increases in employment generation, social empowerment, and reduction in out-migration are also seen in many watersheds.

Conclusion and Suggestions

Today, watershed development has become the main intervention for natural resource management and rural development. Watershed development programs not only protect and conserve the environment but also contribute to livelihood security. The importance of watershed development as a conservation program is being recognized, not only for rain-fed areas but also for high rainfall areas, coastal regions, and the catchments areas of dams. With the large investment of financial resources in the watershed program, it is important that the program becomes successful.

Most farmers across the country reported that the sustainability of agriculture is possible by harnessing rainwater and improving the groundwater, which is possible through soil and water conservation measures. Farmers also reported that soil erosion can be minimized and irrigation potential can be improved through soil and water conservation structures (Sastry *et al.*, 2003).

People's participation in watershed activities was also poor except in case of wage earners/subsidy beneficiaries.By nature, people attend to their individual direct benefits rather than indirect/long term benefits. People's participation, involvement of panchayat raj institutions, local user groups and NGOs alongside institutional support from different levels, such as the Union Government, the State, the District and block levels should be ensured to make the program more participatory interactive and costeffective. Convergence of various rural development programs in and around the watershed could be ensured to promote the holistic development of watersheds.

Though funds are allocated based on entire watershed area of 500 ha or so, the treated area in watershed is very low due to lack of proper planning, supervision and monitoring, official machinery/infrastructure facilities, etc. Thus,sporadic efforts were made to improve natural resources like soil, rainwater and vegetation. Even there were no entry and exit policies leading to improper selection/execution and no maintenance after withdrawal. Thus, entire programme came to original status. Nevertheless, farmers, landless people and officials in the country suggest strongly that natural resources – soil, rainwater, and vegetation should be maintained for improvement in groundwater and microclimate for sustainable growth of agriculture in the country.

References

1. Sharma, B.R., Scott, C.A. 2005. Watershed management challenges: Introduction and overview. In: *Watershed management challenges: Improving productivity, resources and livelihoods,* ed. Sharma, B.R.; Samra, J.S.; Scott, C.A.; Wani, S.P. IWMI and ICRISAT publication. New Delhi: Malhotra Publishing House, pp. 245-257.
2. Kerr, John; Pangare, Ganesh; Pangare, V.L.: George, P.J. 2000. *An evaluation of dryland watershed development projects in India*. EPTD Discussion Paper No. 68. Washington, D.C.: International Food Policy Research Institute.
3. Palanisami, K.; Suresh Kumar, D. 2005. Leapfrogging the watershed mission: Building capacities of farmers, professionals and institutions. In: *Watershed management challenges: Improving productivity, resourcesand livelihoods,* ed. Sharma, B.R.; Samra, J.F.; Scott, C.A.; Wani, S.P. International Water Management Institute (IWMI) and ICRISAT Publication. New Delhi: Malhotra Publishing House, pp.245-257.
4. Rao, C.H. 2000. Watershed development in India: Recent experiences and emerging issues. *Economic andPolitical Weekly* 35(45): 3943-3947.
5. GoTN (Government of Tamilnadu). 2002. *Watershed Atlas of Tamilnadu*. Agricultural Engineeing Department,Chennai.
6. Palanisami, K.; Vidyavathi, A.; Ranganathan, C.R. 2008. Wells for welfare or illfare: Cost of groundwater depletion in Coimbatore, Tamil Nadu, India. *Water Policy* 10 (4): 391-407.
7. Sikka, A. K.; Subhash Chand, Madhu, M.; Samra, J.S. 2000. *Report on evaluation study of DPAP watersheds in Coimbatore District*. Udagamandalam, India: Central Soil and Water Conservation Research and Training Institute.
8. Ramaswamy, K.; Palanisami, K. 2002. Some impact indicators and experiences of watershed development in drought prone areas of Tamil Nadu. In: *Watershed management - Issues and policies for 21st century,* ed. Palanisami, K. India: Associated Publishing Company, pp. 182-191.
9. Evaluation and Applied Research Department. 1981. An evaluation report on soil conservation scheme under the DPAP in Ramanathapuram District. Chennai

Evaluation and Applied Research Department. 1991. Report on the evaluation of soil conservation works executed in Sholur micro watersheds in Nilgiris District under HADP. Chennai.

10. Deshpande, R.S.; Rajasekaran, N. 1997. Impact of Watershed Development Programme: Experiences and issues. *Artha Vijnana* 34 (3): 374-390.