9.4 SOIL AND WATER CONSERVATION

In a predominantly agricultural system, the objective of improving the productivity, profitability and prosperity of the farmers and achieving agricultural development on an ecologically sustainable basis can be attained only when conservation, development and management of the land and water resources are assured. As watersheds support the entire dry land agriculture / horticulture and also remain the catchments for tanks and reservoirs, their health is essential for development. The strength of the watershed development programmes will largely determine the growth in agriculture.

Land and water conservation is the basic responsibility of Agricultural Engineering Department. The Mission mode approach of the Government is to accomplish the goals of saving every drop of rain, providing adequate water for agriculture and conservation of life support system – land and water resources through watershed management and irrigation water management strategies.

While Soil and water conservation programme is implemented by Agricultural Engineering Department, Soil Survey and soil Testing schemes are implemented by Agriculture Department.

I. Agriculture

1. Soil Survey and Land Use Organization

The objective of the Soil Survey and Land Use Organisation is the conduct of soil survey and preparation of soil resources inventory including the nature of soil occurring in the area, their morphological, physical and chemical characteristics through field studies and laboratory analysis, classification according to internationally recognised system of soil classification and mapping their extent on standard topographic base and finally interpreting it for variety of uses. The above survey is being taken up through the four soil survey units functioning at Coimbatore, Thanjavur, Vellore and Thirunelveli. Now this scheme is being implemented through Non-plan funding. An area of 1.14 lakh ha. has been surveyed as against the target of 1.10 lakh ha. for the year 2002-03. An area of 1.10 lakh ha. will be covered during 2003-04.

2. Soil Testing Laboratories and Mobile Soil Testing Laboratories

Soil Testing Laboratories are functioning in the State to analyse the soil samples collected from the farmers’ fields in order to advise the farmers on specific fertiliser recommendations on the basis of native soil fertility. There are 19 Soil Testing Laboratories functioning in different districts to analyse 8.42 lakhs samples per annum. Besides these laboratories, 16 Mobile Soil Testing Laboratories are also doing this service at farmers’ doorstep, i.e. in villages on a notified date enabling the farmers to get on the spot analysis and advice on their soils. These Soil Testing Laboratories also help farmers in suggesting suitable reclamatory measures like application of soil amendments for the problem soils, preparing village level fertility indices and assessing
quality of irrigation water. The Central Control Laboratory functioning at Kudumianmalai has to supervise and guide the functioning of Soil Testing Laboratories. This laboratory will also analyse and check samples drawn from these laboratories so as to correlate the results and ensure the correctness of the procedures adopted. This serves to strengthen the quality control of fertilisers and also serves as a watchdog on quality parameters. Now this scheme is being implemented through Non-plan funding. A total number of 6.83 lakh soil samples have been analysed during 2002-03. It is programmed to analyse 8.1 lakh soil samples during 2003-04.

3. Preparation and Distribution of Bio Fertiliser Packets

Though fertilisers are readymade artificial manures supplying essential nutrients for boosting crop production, their continuous and indiscriminate use makes the soils sterile and results in degradation of soil potential. Hence use of different types of organic manures bio-fertilisers, etc. plays an important role as a part of Integrated Nutrient Management Package. In view of non-availability of adequate quantity of organic manures, bio-fertilisers using microorganisms to fix atmospheric nitrogen have come in handy as a result of technology development in modern agriculture. Six bio fertiliser production centres functioning at Cuddalore, Ramanathapuram, Salem, Kudumianmalai, Sakkottai and Trichy are producing 1400 tonnes of Bio-fertilisers. The above centres are also provided with automatic mixing and packing units to ensure the quality of the bio fertiliser with a longer shelf life. An amount of Rs. 250.53 lakhs is proposed for 2003-04 for the above scheme.

4. Saline and Alkaline Land Reclamation

The Saline And Alkaline Land Reclamation scheme is functioning to reclaim problem soil in Nagapattinam, Thiruvarur, Kancheepuram, Thiruvallur, Vellore, Thiruvannamalai, Salem and Namakkal district in an area of 4000 acres. An amount of Rs.0.12 lakh is proposed for this scheme. Under this scheme Gypsum and Zinc Sulphate are being supplied to the beneficiaries at 50% subsidy and an additional sum of Rs. 1000/- per acre is extended as subsidy for constructing drainage channel. During the year 2002-03, an area of 3952 acres was reclaimed. It is programmed to recover 4000 acres during 2003-04.

5. Waste Land Development

20 lakhs hectares of cultivable wasteland would be brought under cultivation through a massive "Wasteland Development Programme" to be implemented over the period of 5 years. This programmes incorporates a Micro-Watershed Development Approach with focus on soil and water conservation and is being implemented with the cooperation of the private sector through people’s participation. This will pave the way to enrich rural economy in a speedy manner. The programme on "Wasteland Development" has three main components. The first component relates to bringing fallow lands both current and permanent, owned by individual farmers under productive economic activity through agri-clinical approach. This programme
will be intensified in the year 2003-04. The second component comprises getting corporate houses and federation of self-help groups to undertake development of wasteland along with an associated rural industry. The third component focuses on promoting agri-based food processing industry with a minimum investment of Rs.1 crore in each of the 385 blocks of the State under the New Anna Marumalarchi Thittam. An amount of Rs.25 crores is provided for the year 2003-04 towards implementation of wasteland programme under participatory approach (Rs.20 crores) and Rs.5 crores for Agri-clinic approach. It has been estimated that 10 lakh rural people would be benefitted by the end of the fifth year of the project. The total cost of the project is estimated at Rs. 1630 crores. In view of the heavy funds requirement, the project will need support from an external agency. The concept paper has been prepared and posed for external agency support of World Bank.

II. Agricultural Engineering Department

Land and Water Conservation are the basic and responsibility of Agricultural Engineering Department (AED). The goals for Agricultural Engineering Department have been outlined in the Chief Minister's 15 points programme: Saving every drop of rain, more crop per drop, adequate water for agriculture, conservation of life support systems- Land and Water Resources and Livelihood security through employment generation.

The Mission for “Land and Water Conservation” will be actualised through Watershed Management and Irrigation Water Management strategies listed below with appropriate action plans.

Watershed Management

- Prevention of soil erosion and Conservation of soil moisture
- Promoting Water Harvesting techniques to impound runoff water and On Farm Water Harvesting.
- Arresting further expansion of wastelands by protecting lands from erosion hazards and promoting alternate / appropriate land use according to their capability.
- Renovation of Village Ponds, Ooranies, Temple tanks and other traditional Water storage.
- Retarding pollution by controlling sediment carried pollutants

Irrigation Water Management

- Optimising Water use and ensuring equity in Water distribution and maximising production
- Creation of farmers organisation for sustainable Water Management in Command Areas
- Creation of well irrigation facilities and stabilisation of existing facilities.
• Conservation of Water under Well Irrigated conditions by Drip and Sprinkler Irrigation systems for promotion of Horticulture crops, Sugarcane and Coconut and bringing more areas under irrigation with increased yields.

The above strategies will be converted into action plans to be carried out under State Plan and Centrally Sponsored schemes, besides convergence of programmes like SGSY, SGRY, PMGY and new Anna Marumalarchi Thittam in the respective project areas.

**Participatory Watershed Development**

An area of 32.50 lakh hectares is under rain fed agriculture. This area is the production base of crops like millets, pulses, oilseeds and cotton. Soil and Water Conservation works were initiated as part of famine relief operations in 1949 and were continued year after year as a protective measure. During Tenth Plan period, it is proposed to restructure the programme. The restructured programme will attempt to prevent soil erosion, increase soil moisture availability and create rainwater-harvesting facilities in the watersheds predominantly under rainfed agriculture, with total participation of farmers. The new approach is developed based on the experience gained from the DANIDA assisted Comprehensive Watershed Development Project.

**Participatory Approach** - The programme will be organised through the participatory approach, actively involving all sections of the community at every stage (planning, implementation, maintenance, monitoring and benefit sharing). This will facilitate sustainability by creating a feeling of belonging and ownership for resources created with project assistance. Implicit in this approach will be sharing of costs and benefits by beneficiaries. Special attention will be given to ensure the participation of women and other vulnerable groups in project activities. The role of AED will be to provide technical guidance and to facilitate implementation by the community. Hence the staff will work towards capacity building of village level institutions to enable them to manage their resources. The project will adopt low cost and farmer-friendly interventions directed towards in-situ conservation of soil and water and water harvesting. Soil and water loss is the result of improper land use. Hence the project will demonstrate effective land use practices on common and private land. A holistic farming systems approach that suits the farm unit / farming household will be followed. The intention will be to demonstrate how appropriate low cost farming practices (land based and household based, including animal husbandry and horticulture interventions) and soil & moisture conservation techniques can improve the socio economic conditions of the landless, marginal and small farmers under dry land conditions.

**Micro Watershed Development Work Plan** - The new watershed plan will incorporate measures for soil moisture conservation, soil erosion control, runoff harvesting and on farm rain water harvesting and Individual based farm developments linked with self or institutional funding. Each Micro Watershed plan will take into account the potentialities of the watershed, which is linked
to the land capability, soil type, soil depth, availability of ground water and the
preference shown by the farmers. The micro watershed plan will reflect the
felt needs of the watershed community, and will have technological inputs
from line departments and the regional research stations of Tamil Nadu
Agricultural University.

Special attention for problem soils- The new approach will pay special
attention to saline and alkali soils. Black soils will receive specific attention
through focussed research and development. Based on the research trials,
Micro Watershed work plans for black soil areas will be developed to alleviate
the problems of drainage and moisture stress. Special methods of water
harvesting like recharge wells, recharge shafts will be employed to facilitate
ground water recharge.

Soil Conservation Programme

1. Soil and Water Conservation programme

For implementation of soil conservation schemes in plains an amount
of Rs.1116.29 lakhs is proposed and it is aimed to cover an area of 50,000
ha. during 2003-04.

2. DANIDA assisted Comprehensive Watershed Development project

The Comprehensive Watershed Development project is implemented
in the districts of Tirunelveli and Thoothukudi covering an area of 42,500 ha.
in 120 villages at a total cost of Rs.4172.44 lakhs with assistance from
DANIDA. The objective of Comprehensive Watershed Development project is
• To demonstrate and popularize sustainable land use systems suitable for
degraded lands.
• Enable the land users to practise rainfed agriculture, horticulture and
forestry including conservation and judicious use of soil and water
resources on a sustainable basis
• Create short and long term employment opportunities thereby increasing
the household income in the priority areas.

The project was commenced on 5.8.94 and completed by March 2003.
An area of 34,901 hectares has been covered at a total cost of Rs. 3682.85
lakhs.

3. National Watershed Development Programme for Rainfed areas

The National Watershed Development Project for Rainfed Areas
(NWDPRA) is a centrally Sponsored Scheme being implemented in Tamil
Nadu since 1990-91, with the main objective of sustaining the production of
biomass and restoration of ecological balance in the Watershed areas. A sum
of Rs. 77.92 crores has been utilized for treating a total area of 2.26 lakh ha.
Watershed Areas Rainfed Agricultural System Approach (WARASA)
‘JANSABHAGITA’ the Restructured NWDPRA for the Tenth Five Year Plan
has been taken up as a five-year project starting from 2002-03 to 2006-07. In
the new guidelines, planning, implementation, monitoring and maintenance of
Watersheds by the village communities themselves have been made mandatory. This scheme is one of the major components of macro management mode in which the GOI’s share is 90% and balance is met by the GOTN. During the Tenth Plan, 763 numbers of micro watersheds (500 ha) have been proposed for treatment to cover 3.82 lakh ha. in 23 identified districts. The per hectare cost norm for watershed development is Rs. 4500/ for areas having less than 8% slope and Rs. 6000/ for areas having more than 8% slope. An area of 34,996 ha. was treated during 2002-03 as against the target of 42,774 ha. The target set for 2003-04 is 38,623 ha.

4. a) Soil and Water Conservation in Vaigai River Valley Catchments

The problem of sedimentation in reservoirs has become alarming, since the silt deposited in the reservoirs or tanks decreases the capacity of the reservoirs and reduces the utility and life. Sedimentation of reservoirs is a serious problem posing threat to the life of the reservoir, storage capacity of the reservoir for irrigation of the command area and generation of power. The studies on the sedimentation problems carried out in 33 reservoirs in Tamil Nadu reveal that there is a loss in capacity of more than 50% in two reservoirs and more than 30% capacity loss in 8 reservoirs. In Krishnagiri reservoir, more than 33% of storage is silted up. Out of the 40 priority micro watersheds of Vaigai catchments, Government of India have approved 26 micro watersheds for implementation of soil and water conservation works. Of this, 23 micro watersheds have been saturated. Government of India’s approval for 11 Micro Watersheds will be obtained during 2002-2003. The works bear a subsidy of 50% and the rest is treated as loan. The loan amount is recovered in ten equal annual instalments with interest with a moratorium of two years. During the Tenth Plan period, Government of India will be persuaded to include South Pennaiyar catchment for treatment under River Valley Project. An area of 3057 ha. has been covered at a cost of 494.66 lakhs and the programme in the remaining watershed is to be continued during the year 2003-04 at a cost of Rs. 600 lakhs.

b) Soil Conservation Works in the Catchment area of Kundah and Lower Bhavani River Valley Project

With a view to prevent premature siltation of reservoirs, various soil conservation measures are taken up in Kundah and lower Bhavani River Valley Project. Soil conservation works on watershed basis are taken up in the priority watershed identified by the All India Soil and Land Use Survey Organisation. During 1980, the All India Soil and Land use Survey organisation had prioritized the watersheds. Out of 176 watersheds in Kundha and Lower Bhavani Catchments, 58 watersheds were identified by AISLUS as very high and high priority watersheds requiring soil conservation treatments. Soil conservation measures were proposed based on rainfall, nature of erosion, soil texture, slope and topography of the area. The works bear 50% subsidy and the rest treated as loan, which will be recovered in 10 equal annual instalments with interest with a moratorium of two years.

An amount of Rs.68.12 lakhs is proposed for this scheme for the year 2003-04.
Soil Conservation in Tribal Areas

To improve the economic status of the tribal farmers and to bring them above poverty line, integrated development of the tribal area is taken up with multi sector approach in Kolli hills, Yercaud hills, Kalrayan hills, Aranuthumalai, Pachamalai, Jawadhu hills, and Sitheri hills. Soil and water conservation works are taken up in the lands owned by tribals at Government cost. These programmes provide livelihood security to tribal people by employment generation and crop production.

During the year 2001-02, an amount of Rs.92.59 lakhs was spent and the anticipated expenditure during 2002-03 is Rs.92.90 lakhs. An amount of Rs.92.90 lakhs is proposed for the year 2003-04 to cover an area of 621 ha.

Soil and Water Conservation under Western Ghats Development Programme

Soil and Water Conservation under Western Ghats Development Programme will be taken up in the districts of Coimbatore, Erode, Dindigul, Theni, Virudhunagar, Tirunelveli and Kanyakumari. The soil conservation works are executed with a contribution of 10% from the beneficiaries for the works executed on patta lands and a contribution of 5% for SC / ST farmers and for works executed in community lands.

During the year 2001-02, an amount of Rs.342.89 lakhs was spent and the expenditure anticipated during 2002-03 is Rs.421.92 lakhs. An amount of Rs. 421.92 lakhs is proposed for the year 2003-04 to cover an area of 2805 ha.

Soil and Water Conservation under Hill Area Development Programme

The Hill Area Development Programme is implemented in the Nilgris district. The district has been delineated into 75 watersheds. Of these watersheds, highly degraded watersheds are taken up for treatments. Soil and Water Conservation works, landslide treatment works and river training works are taken up under this programme. The works carry a subsidy of 50% and the rest is treated as loan. It is recovered from the beneficiaries in ten equal annual instalments with due interest with a moratorium of two years.

During the year 2001-02, an amount of Rs.378.92 lakhs was spent and it is anticipated that the expenditure will be Rs.422.44 lakhs during 2002-03. An amount of Rs.511.55 lakhs is proposed for the scheme during the year 2003-04 to cover an area of 132 ha.

New Schemes - 2003-04

Creation of GIS for watershed development monitoring for Theni District.

A water resource audit and watershed auditing to identify old works under various programmes will be carried out to incorporate the development works already completed so that a comprehensive data base will be available to assist planning, monitoring and evaluation. The provision is towards
purchase of required hardware and software for creating and regularly updating GIS. An amount of Rs.10 lakhs is proposed for the year 2003-04.

III. Forest Department

Soil and Water Conservation Scheme in Mettur Stanley Reservoir

Forest department is undertaking soil conservation work in forest area. Afforestation, gully plugs, checkdams etc., are being executed to check soil erosion. It is proposed to continue this scheme at a cost of Rs.70.73 lakhs towards raising of 50 ha of plantations and maintenance of older plantations.

Plan Outlay - Soil And Water Conservation -2003-04

An amount of Rs. 5383.25 lakhs is provided for Soil and Water Conservation for the year 2003-04 as follows:

<table>
<thead>
<tr>
<th>Head of Development</th>
<th>Outlay 2003-04 (Rs. in lakhs)</th>
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<tbody>
<tr>
<td>Soil Survey and Testing</td>
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<td>Soil Conservation</td>
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<td>Land reclamation -Wasteland development</td>
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<td>Western Ghat Development Programme</td>
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<td>Centrally Sponsored shared between State and Centre (Full cost)</td>
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