7. AGRICULTURAL ENGINEERING

1. Introduction

The Government is committed to achieve higher growth rate in the primary sector and taking all efforts to usher in **"Second Green Revolution"** for improving farm productivity and farmers' income. To achieve the above vision, the Agricultural Engineering Department is continuing its efforts in conserving and developing the natural resources of land and water in the State. Programmes for promoting agricultural mechanisation to overcome the difficulties due to shortage of farm workers in the rural areas are given due importance on a mission mode. On farm development works for increasing water use efficiency in command areas and soil & water conservation works for preventing land degradation are taken up. Front end advanced technologies are being adopted for recharging the ground water.

2. Agricultural Mechanisation

The availability of farm workers in rural areas is reducing due to migration of the labourers to non-farm sectors. The shortage of farm workers causes difficulties in carrying out timely farm operations and serious set back to the efforts in increasing the agricultural production. To overcome these hurdles and to increase the farm power, a focused approach is being taken to make available required machinery / implements for agricultural operations through Agricultural Mechanisation Programmes. During the year 2011-2012, three pronged strategies were adopted to achieve the goal of Agricultural Mechanisation at a faster pace as given below;

i. **Purchase of heavy duty high value machinery to the Agricultural Engineering Department for custom hiring at first level** – 25 High Power Tractors, 20 Paddy Combine Harvesters, 2 Paddy Transplanters, 22 Trucks and 9 Rotary Drills have been purchased at a total cost of ₹ 1500.46 lakhs for custom hiring to farmers.

ii. **Procurement of medium sized agricultural machinery / implements by the PACCS for custom hiring to farmers at second level** – a sum of ₹2536.50 lakhs has been released as 50% subsidy assistance to PACCS to purchase agricultural machinery/ implements for custom hiring to farmers.

iii. **Subsidy assistance to Farmers, Farmers Group and Self Help Group to acquire agricultural machinery / implements at third level** – Subsidy assistance of ₹ 2705.85 lakhs has been released to Farmers, Farmers Group and Self Help Groups to purchase agricultural machinery and implements under the NADP scheme.

During 2012-2013, farm workers group will be formed and trained in operation and maintenance of farm machinery required for taking up agricultural operations in addition to the purchase of machinery for custom hiring and provision of subsidy assistance to farmers for purchase of agricultural machinery and implements.

2.1. Agricultural Mechanisation Programme under the Centrally Sponsored Scheme of Macro Management of Agriculture.

The scheme of popularising agricultural machinery / implements in agriculture is being implemented under the Centrally Sponsored Scheme of Macro Management of Agriculture with the financial assistance from the Centre and State Government on 90:10 basis. Under this scheme, subsidy assistance is provided to farmers to purchase

Tractors, Power Tillers and Rotavators as per the norms of the Government of India guidelines. During 2011-2012, a sum of ₹1037.98 lakhs has been given as subsidy assistance to farmers to purchase of 2517 agricultural machinery such as Tractors, Power Tillers and Rotavators. During 2012-2013, the Agricultural Mechanisation Programme is proposed to be continued with higher allocation under the Macro Management of Agriculture.

2.2. Agricultural Mechanisation Programme under National Agriculture Development Programme (NADP)

To promote the use of agricultural machinery and implements in agriculture, the Agricultural Mechanisation Programme is being implemented in a larger scale under the NADP. Under this scheme 50% subsidy assistance is provided to farmers for purchasing agricultural machinery / implements subject to the ceiling limit prescribed for each implements and a maximum ceiling limit of ₹4.00 lakhs to purchase high cost farm machinery. During 2011-2012, subsidy assistance of ₹2705.85 lakhs has been given to farmers for purchasing 8598 Nos. of agricultural machinery and implements. During 2012-2013, it is proposed to continue the programme with a higher allocation.

2.3. Demonstration of Newly Developed Agricultural Equipments and Machinery

To popularise the use of newly developed agricultural machinery / implements among the farming community, demonstrations are conducted at the farmer's fields. The programme is implemented with 100% assistance from Central Government. During 2012-2013, it is proposed to conduct 475 demonstrations of agricultural machinery and implements.

2.4. Training Programme to Farmers in the Field of Agricultural Mechanisation.

To create awareness among farmers on the use of newly developed agricultural machinery / implements, training programmes are conducted to farmers for handling and maintenance of the machinery with 100% financial assistance from central Government. The training programmes on machinery and implements used for Paddy and Sugarcane Cultivation, Plant Protection equipments and Conjunctive use of water through Sprinkler & Drip Irrigation systems are imparted to the farmers. During 2011-2012, 105 training programmes have been conducted at a cost of ₹32 lakhs. During 2012-2013, it is proposed to conduct more number of training programmes to farmers.

2.5. Training to rural youth on "Operation and Maintenance of the newly developed Agricultural Machinery / Implements".

The Agricultural Mechanisation Programme is being implemented in a mission mode to popularise the use of the newly developed agricultural machinery / implements in Agriculture to improve farm power and increase agricultural production. In order to improve the technical know- how of the farmers in handling and maintenance of the newly developed agricultural machinery / implements, trainings are imparted to the rural youth on various aspects of operation, repair and maintenance of agricultural machinery / implements promoted under the Agricultural Mechanisation Programme. During 2011-2012, six months training programmes are conducted at six workshops of the Agricultural Engineering Department at Tiruvarur, Vellore, Coimbatore, Trichy, Madurai and Tirunelveli at a total cost of ₹30.53 lakhs. The six months training programme to rural youth is proposed to be continued during 2012-2013 also.

3. Custom Hiring of Agricultural Machinery to Farmers

- The department is having a fleet of minor irrigation machinery viz., 26 Rotary Drills, 13 Percussion Drills, 21 Mini Drills, 79 Hand Boring Sets, 7 Long Hole Equipments and 37 Rock Blasting Units for hiring out to the farmers for minor irrigation activities such as sinking of new Borewells and revitalisation of dried up open wells.
- 9 Rotary Drills have been purchased at a cost of ₹472.20 lakhs during 2011-2012.
- Services of 18 Resistivity Meters and 3 Electrical Loggers are provided to farmers for locating well sites and aquifers.
- 94 Bull Dozers, 165 Tractors and 2 Hydraulic Excavators are available in the Agricultural Engineering Department for hiring out to farmers at nominal hire charges for taking up works such as land levelling, land shaping and ploughing.
- 31 Paddy Combine Harvesters are available in the department for hiring out to farmers for harvesting of Paddy.
- 25 High Power Tractors, 20 Paddy Combine Harvesters, 2 Paddy Transplanters along with 22 Trucks have been purchased at a cost of ₹728.26 lakhs during this year 2011-2012 for hiring to farmers.
- All the above machinery are also used for relief work at the time of flood and natural calamities.
- The programme of custom hiring of agricultural machinery to farmers will be continued during the year 2012-2013.
- The details of machinery available for custom hiring in each district and the hire charges are furnished in the Table.

3.1 Online booking of Agricultural Machinery under Custom Hiring.

In order to simplify the procedure for allotting agricultural machinery to farmers, a new facility has been launched for online booking of agricultural machinery under custom hiring. This system would help the farmers to know the availability of agricultural machinery and booking from their mobile phone. This will save time in allotting the machinery to the farmers and will pave way for efficient, quick and transparent system for custom hiring.

3.2. Encouragement of formation of farm workers group to ease the farm work.

The dearth of farm workers in the rural areas causes a serious set back to the efforts in increasing the agricultural production in the State. To overcome the hurdles due to the shortage of farm workers, it is proposed to form farm workers group and train them in operation and maintenance of farm machinery for taking up agricultural operations for paddy, pulses etc. on need base. These groups of farm workers could be engaged in various farm operations by the farmers duly paying nominal charges.

4. Water Management

In Tamil Nadu, 80% of the water potential is utilised for irrigation. But the Water Use Efficiency of the conventional irrigation methods is abysmally low at about 35 – 50% only. As the industrial and domestic need of water is increasing day by day, the water availability for irrigation gets reduced. Hence judicious management of irrigation water has become imperative to improve Water Use Efficiency significantly.

4.1. Command Area Development and Water Management Programme of Accelerated Irrigation Benefit Programme.

The Centrally Sponsored Scheme of Command Area Development and Water Management Programme of Accelerated Irrigation Benefit Programme is implemented with the financial assistance from the Central and State Government on 50:50 sharing basis. Under this scheme, On Farm Development works are taken up with farmer's participation to improve Water Use Efficiency in canal irrigated areas. On-farm development works such as construction of field channels, rotational water supply and construction of field drains are taken up in the command areas. One time functional grant at the rate of ₹1000/- (State share of ₹450/-, Central share of ₹450/- and Farmers share of ₹100/-) per hectare is given to farmers council for the maintenance of assets created under the programme. During 2011-2012, On Farm Development works have been completed in an area of 26413 hectares at an expenditure of ₹ 6884.90 lakhs in six commands viz., Wellington Reservoir Project (Cuddalore district), Thirukoilur Anicut Project (Villupuram district), Kodiveri Anaicut Project (Erode district), Gundar-Chittar -Karuppanadhi Project (Tirunelveli district), Vaigai Project (Madurai, Sivagangai, and Ramanathapuram districts) and Kodaganar Reservoir Project (Dindigul and Karur districts). During the year 2012-2013, it is proposed to continue the programme in eight commands viz. Vaigai Project (Madurai, Sivagangai, Ramanathapuram districts), Kodaganar Reservoir Project (Dindigul and Karur districts), Kalingarayan Anaicut Project (Erode district), Varadhamanathi Reservoir Project (Dindigul District), Manimuktha Nathi System Project (Villupuram and Cuddalore districts), Cheyyar Anaicut System (Thiruvannamalai district), Ellis Anaicut Project (Villupuram district) and Pelandurai Reservoir Project (Cuddalore district).

4.2. World Bank Aided TN IAMWARM Project

To increase irrigated agriculture productivity and Farm Power in Tamil Nadu, the scheme of Irrigated Agriculture Modernisation and Water bodies Restoration and Management (TN IAMWARM) Project is being implemented with assistance from World Bank. The project is spread over the period of six years from 2007-2008 to 2012-2013 and implemented by the Public Works Department, Agriculture, Agricultural Engineering and various other departments. The project outlay earmarked for the components of Agricultural Engineering Department in 51 sub-basins under this project is ₹135.79 crores.

The scope for improving Water Use Efficiency lies mainly in expanding the area under Micro Irrigation. Hence, to conserve and use water more efficiently, popularisation of Micro Irrigation Systems of Drip and Sprinkler Irrigation among the farmers is being taken up on a massive scale under the project. As Micro Irrigation Scheme is one of the most important interventions required to enhance farm productivity, 100% subsidy assistance is given to small and marginal farmers and 75% subsidy assistance to other farmers for putting up drip and sprinkler irrigation systems under Micro Irrigation Scheme. During 2011-2012, an area of 7408 hectares has been covered with drip and sprinkler irrigation system under the IAMWARM project with a subsidy assistance of ₹1917.19 lakhs. It is proposed to continue the Micro Irrigation Scheme to cover an area of 6100 hectares during 2012-2013. Besides, other components like farm ponds, water harvesting structures, improved water conveyance through pipes for command areas, publicity, IEC activities, capacity building, etc. are also taken up under this IAMWARM project. During 2011-2012, various components have been implemented at

a cost of ₹3291.06 lakhs. This project is to be continued during 2012-2013 also.

5. Ground Water Recharge:

Water is the critical input for all growing sectors including agriculture and the area under well irrigation is constantly increasing over years which had resulted in over exploitation of ground water. In view of this, the ground water table is lowered below the economic pumping level besides sea water intrusion into the inland aquifer in the coastal region. Therefore, it is absolutely necessary to take up Rain Water Harvesting programmes in a massive manner for recharging the ground water aquifers to the extent possible.

5.1. Rain Water Harvesting and Run off Management Programme

To improve the moisture regime of the watershed for increased land use, Rain Water Harvesting and Runoff Management structures such as check dams, percolation ponds, farm ponds, new village tanks, ooranies and recharge shafts are constructed in all districts except Chennai and the Nilgiris. Under this programme, the beneficiaries are required to contribute 10% of the cost of works executed in community lands in cash (it is 5% in case of SC/ST), which will be deposited in the name of the Village Development Association **/** Watershed Association and the accrued interest will be utilised for the maintenance of assets created in community lands. Works in patta lands are taken up with 90% assistance and the remaining 10% is collected as beneficiary share (it is 5% in case of SC/ST) in the form of cash / labour / material. During 2011-2012, 578 Rain Water Harvesting structures have been constructed at a cost of ₹ 499.59 lakhs. During 2012-2013, it is proposed to continue the programme at an outlay of ₹500 lakhs.

5.2. Scheme for Artificial Recharge of Ground Water

To augment the ground water aquifer for improving the ground water table, artificial ground water recharge structures such as check dams, village tanks, ooranies, percolation ponds with recharge shaft are constructed to harvest rain water. The programme is taken up with 100% assistance from the Government. During 2011-2012, a sum of ₹2500 lakhs has been sanctioned for the construction of 559 Artificial Recharge Structures. During 2012-2013, it is proposed to implement the programme with a higher allocation.

5.3. Construction of Farm Ponds under the Integrated Development of Pulses Villages in Rainfed Areas

The harvesting, conservation and management of the rain water is very important in dry land to reduce the impact of the moisture stress and bring about sustainability in pulses production. During 2011-2012, 506 new farm ponds have been constructed under the National Agricultural Development Programme at a cost of ₹365.14 lakhs for giving supplemental irrigation to pulse crops so as to enhance the production and productivity in five districts namely Krishnagiri, Dharmapuri, Vellore, Tiruvannamalai and Thoothukudi. During 2012-2013, the programme is proposed to be taken up in the eight districts viz. Krishnagiri, Dharmapuri, Vellore, Tiruvannamalai, Thoothukudi, Tiruppur, Dindigul and Salem.

6. Soil & Water Conservation.

In Tamil Nadu, the land available for agriculture is subjected to soil erosion of varying degrees which results in degradation of cultivable land. The state has harnessed almost the entire available irrigation potential for agriculture. The land and water resources of the state are to be conserved and developed intensively to protect and improve

the soil health. Hence, Soil and Water Conservation programmes are taken up in a larger scale to prevent soil erosion, to prevent land degradation and to improve soil moisture regime for sustainable increase in agricultural production.

6.1. Soil & Water Conservation in River Valley Project Catchments

The Centrally Sponsored Scheme of River Valley Project is implemented under the Macro Management of Agriculture with the financial assistance from the Centre and State Government on 90: 10 basis. Under this programme, Soil and Water Conservation measures are taken up in the inter-state river valley catchments of Tamil Nadu with the objectives viz., prevention of soil loss to reduce siltation of multipurpose reservoirs, prevention of land degradation, improvement of land capability, improvement of soil moisture regime and promotion of land use to match land capability. Soil and water conservation measures such as silt detention structures, contour bunding, farm ponds, water harvesting structures, drainage line treatments, horticultural plantations, agro forestry are taken up in the catchment areas approved by the Soil and Land Use Survey of India (SLUSI) and approved by Government of India. The Soil and Water Conservation measures are taken up with 100% assistance and however, work to individual farmer such as land levelling, farm ponds etc., are executed with 25% farmer's contribution. During 2011-2012, soil and water conservation measures have been completed in South Pennaiyar and Mettur river valley catchments in Dharmapuri and Krishnagiri Districts with a total expenditure of ₹1235.78 lakhs. During 2012-2013, it is programmed to continue the programme in Dharmapuri, Krishnagiri and Erode districts.

6.2. Soil & Water Conservation in Tribal Areas under Integrated Tribal Development Programme

Development of tribal agricultural lands by adopting suitable soil and water conservation measures is the objective of this programme. The programme is implemented in the tribal areas of Jawadhu hills (Vellore and Tiruvannamalai districts), Kalrayan hills (Salem and Villupuram districts), Shervaroy hills and Arunuthu hills (Salem District), Sitheri hills (Dharmapuri district), Kolli hills (Namakkal district) and Pachamalai (Salem and Tiruchirapalli districts). Soil and water conservation measures such as land shaping, pipe laying, construction of contour rubble bunds, contour stone walls and check dams are taken up by the department in the lands of the tribal farmers with 100% assistance from the Government. During 2011-2012, soil and water conservation programmes have been taken up in 1406 hectares at a cost of ₹344.73 lakhs. During 2012-2013, it is proposed to continue this programme at an outlay of ₹403.85 lakhs.

6.3 Soil & Water Conservation under Hill Area Development Programme

With the aim of restoring and maintaining the ecology of the Nilgiris, Hill Area Development Programme is being implemented in the Nilgiris District. Under this scheme, Soil and water conservation measures such as stream training works, bench terracing, drainage line treatment works, collection wells, water harvesting structures, terrace support works, silt detention structures and landslide preventive measures are being taken up by the Agricultural Engineering Department in the Nilgiris District. The beneficiary contribution is 10% of the cost of works if taken up in their patta lands and it is 5% in case of SC/ST beneficiaries. For community works, 5% of the cost of works is collected as beneficiary contribution. The landslide treatment measures are executed with 100%

assistance. During 2011-2012, Soil and Water Conservation measures under Hill Area Development Programme have been completed at a cost of ₹508.85 lakhs. During 2012-2013, it is proposed to continue soil & water conservation works and landslide preventive measures in the Nilgiris.

6.4. Soil & Water Conservation under Western Ghats Development Programme

Soil & Water Conservation Measures under Western Ghats Development Programme are being implemented to ensure eco-restoration, eco-development and eco-protection in Western Ghats areas of Coimbatore, Tiruppur, Madurai, Dindigul, Theni, Virudhunagar, Tirunelveli and Kanyakumari districts. Soil and water conservation measures such as contour rubble bunds, gabion structures, check dams, drainage line treatment works, water harvesting structures, farm ponds, percolation ponds, village ponds, land shaping are taken up under this programme. The beneficiary contribution is 10% of the cost of works if taken up in their patta lands and it is 5% in case of SC/ST beneficiaries. For community works, 5% of the cost of works is collected as beneficiary contribution. During 2011-2012, Soil & Water Conservation programmes have been completed at a expenditure of ₹598.52 lakhs in Coimbatore, Tiruppur, Virudhunagar, Tirunelveli and Kanyakumari districts. During 2012-2013, it is proposed to continue the programme for Soil and Water Conservation works at an outlay of ₹703.19 lakhs.

7. 'Thane' Cyclone Rehabilitation works:

Six hundred power operated chain saws have been purchased at a cost of ₹300 lakhs under State Scheme and distributed to Horticulture and Agriculture Departments for cutting and removal of fallen trees in the Thane Cyclone affected areas of Cuddalore & Villupuram Districts.