Ref. No. 17309/2000/PMU.I/3 Date: 23-08-2002

Shri. S. K. DAS., I.F.S.,
Principal Chief Conservator of Forests.

CIRCULAR NO. 05 / 2002 / PMU -1/3

Sub : NEERU - MEERU Works - Water shed treatment of area -Saturation Level treatment-Andhra Pradesh Community Forest Management - Community Participation in Management of Forests - Integration of Programmes-Creation of durable assets capable of generating Income and employment - Certain guidelines - issued -Regarding.

The Government of Andhra Pradesh have taken up a massive Watershed programme under " Neeru - Meeru " since May 2000 giving a lot of importance to community participation in it in order to conserve scarce water resources which is the surest way to prosperity. The Forest Department of Andhra Pradesh has accordingly taken up Soil and Moisture Conservation (SMC) works in the form of Continuous Contour Trenches (CCTs), Staggered Trenches, Rock Fill Dams, Check Dams, Percolation Tanks etc.

2. The Forest Department of Andhra Pradesh has also implemented the Phase-I of Andhra Pradesh Forestry Project (APFP) from 1994 to September, 2000, funded by the World Bank where in the community participation in regeneration of degraded forests has been the main component.

3. Although the implementation of the Neeru-Meeru programmes in the forest area has been satisfactory in general given the allocation of the budget, the task assigned and the understanding of the situation prevailing at the time of starting the programme. However, after implementation of the project over a period of more than two years in the department and for a period of four years by the undersigned in the Forest Development Corporation and after a close interaction with Sri T. Hanumantha Rao, Chairman, Technical Committee, Water Conservation Mission, I am of firm conviction that what we are doing for harvesting the water in our forest areas by digging CCTs and erecting Rock Fill Dam/Check Dam / Percolation Tank, is hardly good enough to impound 5 to 10% of the available water. This has been once again reiterated by Sri T. Hanumantha Rao when he addressed the Conservators of Forests and other senior officers of the Department on 03.08.2002 in the Committee Hall of PCCF's office.

4. In view of what he has presented on that day which is supported by supply of technical papers and in order to enrich the VSS area with forests and water resources with far reaching consequential benefits to the society, the following guidelines are issued :-

   (1) The VSS area should be demarcated for the purpose of Watershed with the concept of ridge to valley. The VSS area may have one watershed or more than one watershed or may be even a part of a watershed.

(2) Once the watershed area is demarcated on the ground and marked on topo-sheet, the water flow stream should be identified. The water flow stream may be of 1st order, 2nd order, 3rd order etc. The 1st order stream is one which begins at the upper slope of the watershed area and generally the depth of it is quite shallow where as the 2nd order stream is the confluence of two 1st order streams and so on.

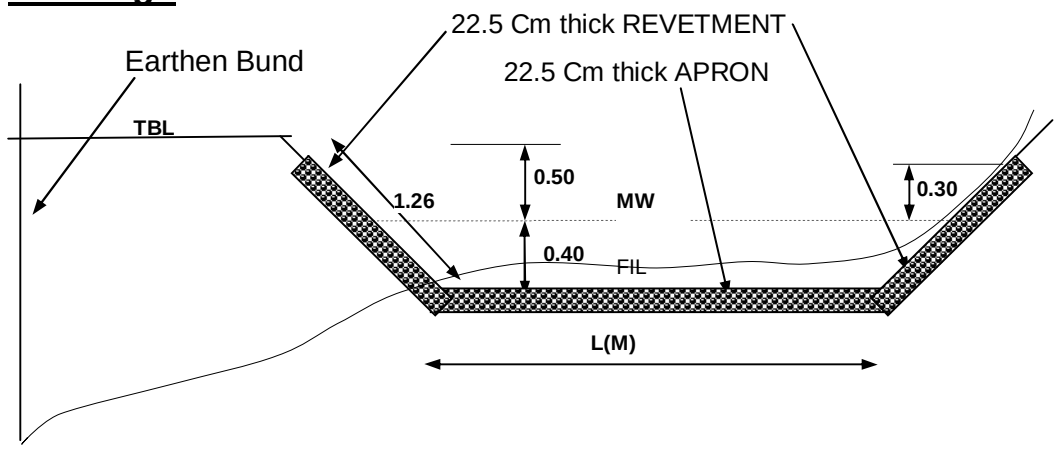
(3). Once all the streams – 1st order, 2nd order, 3rd order etc., are identified in the watershed, action should be taken from the 1st order stream first for harvesting of available rain water by erection of earthen bund or sunken gully pits. In general, we have to dispense with the Rock Fill Dam (RFD) as it is not so cost effective for harvesting water compared to other structures.

(4). In the first order stream, the earthen bund may be a very small one having a catchment area of only 5-10 hectares or much less. The following steps should be taken to erect the earthen bunds: -

Scrapping of the earth to a dept of 15 cm - 20 cm and a width of 1m to 2m or more on the site of the construction of the earthen bund should be done first and this soil should be kept in a separate heap to be utilized at the end of the formation of the bund for spreading over the bund so that the top soil which contains a number of grass seeds and seeds of other species will germinate on the top surface of the bund which will prevent the soil erosion. After digging, trench area should be ploughed or soil scuffled by spade. This is necessary in order to get a good consolidation of soil of earthen bund with ground when soil of earthen bund is rammed layer by layer by tractor/ Roller during the formation.

A typical design of the bund is given below. It may be seen from the design on one side of the bund; there is a passage for water to spill over the bund. This is called by-wash which is 30 cm to 100 cm lower than the level of the bund depending on the size of the bund and this is absolutely necessary for the survival of the bund.

Drawing I



(5). Sunken Gully Pits: Sunken Gully Pits are trenches excavated across the Gully of 1st order and 2nd order streams in order to impound water in the trenches.

The dug out earth may be kept in the trapezoidal shape at a distance of 50 cm (berm) from the trench giving a passage of water as in earthen bund and seed of Kanuga, Seethaphal and Neem may be sown on the dug out earth.

The frequency or the interval between two Sunken Gully Pits will depend on the slope - more the slope more the number of such Sunken Pits.

After every 3 Sunken Gully Pits, one silt trap pit may be provided covering gully which may be of the size of width of the Gully x 1 mm x depth (60 cm).

De-silting has to be done to these Gully Pits by the VSS members and silt may be applied to NTFP plants.

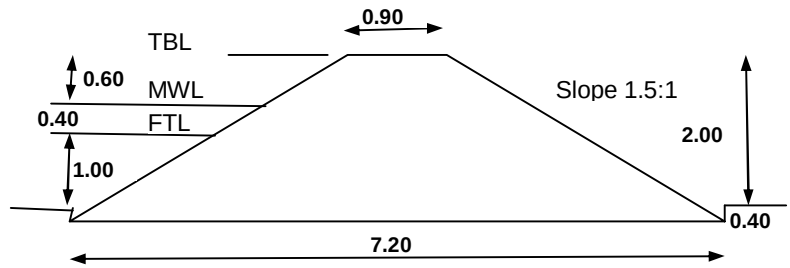
(6). 2nd Order Stream: The method of the treatment of 2nd order stream will be almost the same as given in the 1st order stream. The only difference here will be that the construction of the earthen bund may be of higher dimension.

(7). 3rd & 4th Order Stream: These are to be treated with erection of big earthen bunds may be in combination with only few check dams, when it is considered a dire necessity. In fact, there is hardly any need for construction of any check dam.

(8). There is a very common but false apprehension in the minds of many that earthen bunds are weak and may give away at the time of monsoon due to the force of flowing water. In this regard it has to be remembered that the famous reservoirs like Nagarjunasagar in Nalgonda and Cumbum tanks in Prakasamdistrict of Andhra Pradesh are constructed with earthen bunds and the beauty of the earthen bund is that with the passage of time the bunds become stronger while incase of check dam with the passage of time it becomes weaker.

(9). The other significant advantage of earthen bund is that at the time of erection of earthen bund, seeds of useful NTFP species like Kanuga, Palmyrah and Neem can be dibbled which come up very well in such freshly dug up soils. typical cross section of the earthen bund is also given.

Drawing II



TYPICAL CROSS SECTION OF BUND (Not to Scale)

(10). The most important factor is that while designing the water harvesting structures, the quantity of available rain water should be calculated first and according to the available quantity of rain water the water harvesting structure in the form of percolation tank, sunken gully pits etc. should be planned, designed and erected. In order to make the above points very clear a simple example is given below:

(a) Total Watershed area 100 hectares

(b) Annual rain fall 600 mm.

(c) Water loss due to percolation = 10% (App.)= 60 mm

(d) Water loss due to evaporation &

Others = 50% (App.) = 300 mm

(e) Rain water available as run off 40% (App.)= 240 mm

(f) Total quantity of available water in 100 hectares

= 10,000 m^2X 100X0.24 m = 24,000 m^3

(11). From the above, it is seen that the total quantity of available water which may be impounded in this watershed is equal to 24000 cubic metres. The facts from hydrology about the capacity / efficacy of the different types of water harvesting structure in a rainy season are that CCTs will get filled 10 times, percolation tanks 4 times, check dams 4 times. The water harvesting structures should be designed to impound required quantity of water with reference to the objective and equally important point is that it should start from upper reaches of water shed to lower reaches uniformly spread over the area almost up to the boundary point of the RF block.

Up to a depth of 500 m from the boundary of the RF in the lower reaches of the watershed, big percolation tanks will naturally become perennial if the water harvesting is done properly from ridge to valley. **Drawing-III** will illustrate the above points.

(12). Once the area is totally treated with watershed, important programme like raising of valuable NTFP species plantations at the lower side of the watershed should be taken up in a planned manner for a period of 5-10 years in order to augment the income to the members of the VSS and improve the composition of the species in quality. The whole idea is to convert unused / over used eco-system into durable asset capable of generating income and employment to the VSS members and to the local people.

Let us assume that the available area at the lower side of the watershed for raising valuable NTFP species plantation is 100 hectares where there is no valuable tree growth. This area can be divided into several sectors for raising valuable NTFP species plantations and clonal plantations of Eucalyptus, Bamboo, Teak etc. The espacement of NTFP species is generally large i.e.,

5 mX5 m, 7 mX7 m, 10 mX10 m, and therefore the intermediate space can be utilized for raising medicinal plants. While choosing the NTFP species, the following species may be preferred.

(1) Tamarind graft

(2) Usiri graft or seed origin (amla)

(3) Kunkudu (Soapnut)

(4) Kanuga (Pongamia)

(5) Neem

(6) Neredu (Jamun)

In agency area, Tapasi (Sterculia urens) should be raised. Jack fruit trees are also very popular / common

Only in case of Seethaphal, the espacement may be 3 m X 3 m.

(13) The above plantations should be raised in a series i.e., every year @ one hectare less or more for a period of five years or more in a contiguous patch for each species. Similarly, the Eucalyptus clone, Teak, Bamboo etc. may be raised in a series for a period of 5 -10 years.

(14). It should be noted here that once the area is treated with watershed at saturation level as outlined above, a few percolation tanks at the valley site of watershed will definitely become perennial water sources and therefore the VSS members will be in a position to take up watering of NTFP plants during the summer months, if necessary. A typical design of such watershed area with NTFP and other plantations is illustrated in **Diagram-IV**.

(15) It will not be appropriate to assume that all the areas will be identical. But on one point on which there are no two opinions is that all the forest areas should be treated **with saturation level watershed treatment in the form of per-colation tanks,** CCTs and staggered trenches from the ridge to valley and the boundary lines well demarcated by CRTs. The CCTs and CRTs must be provided with septa at regular intervals in order to safeguard any error/ omission in laying out the contour line in case of CCTs, while septa are must in case of CRTs as the boundary line of the forests is never on the contour line. The width of septum should not be less than 1 m which may be increased to 1.5 m in case of soft sandy soil.

(16) The Conservators of Forests are requested to prepare the VSS wise scheme in two parts – Part-I should contain saturation level watershed treatment of the area whereas the Part-II should deal with raising of NTFP and other valuable species with series concept indicating the physical target and financial requirement.

(17) The scheme thus prepared may form a part of the Micro-plan. Such schemes need not be confined to the VSS areas only but all the forest blocks can be covered in course of time.

Drawing III

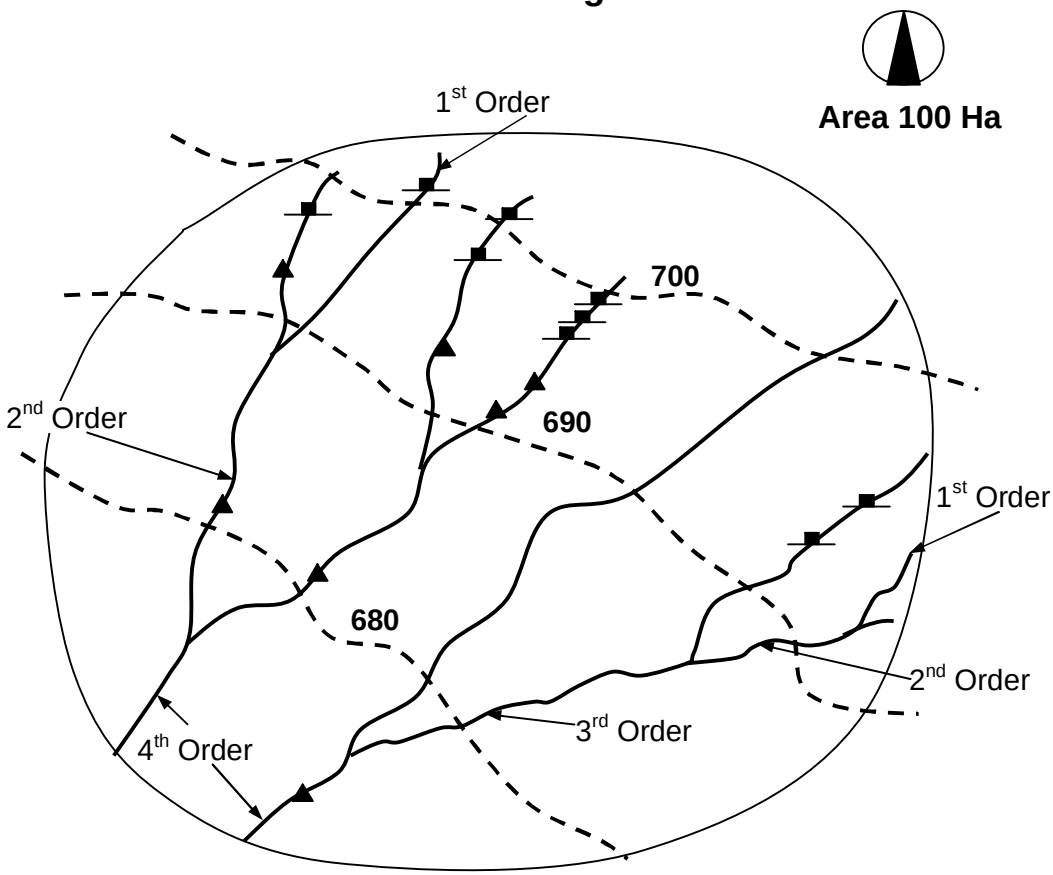
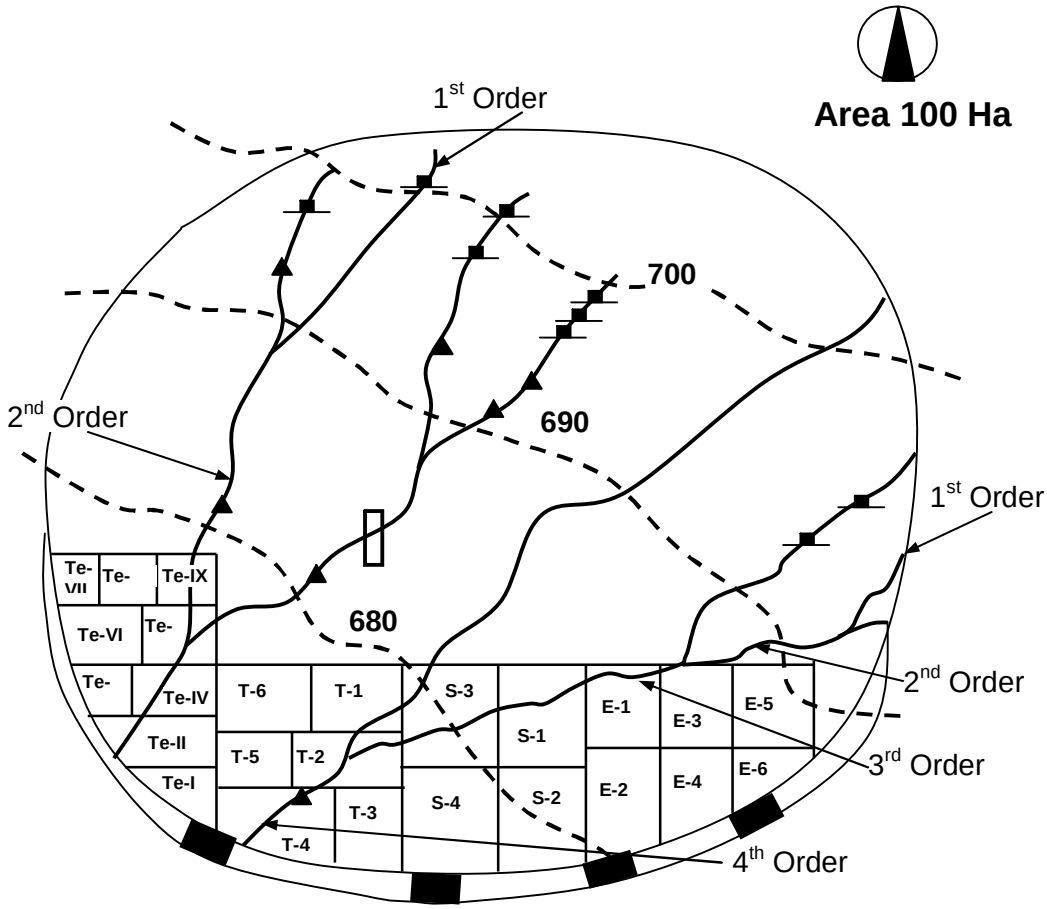

Area 100 Ha
1st Order
700
690
2nd Order
1st Order
680
2nd Order
3rd Order
4th Order
Gully Sunken Pits
Percolation tanks 1,2,3 & 4
Contours
Streams

Diagram – IV



Septum DPTs

Check Dam

Gully Sunken Pits

Percolation tanks 1, 2 ,3 & 4

Contours

Streams

Te-I to IX Teak for 9 years in series

T-1 to T-6 Tamarind graft plantation for 6 years in series

S-1 to S-4 Soapnut plantations 4 years in series

E-1 to E-6 Eucalyptus clonal plantations in a series of

Sd/- (**S.K.DAS**)
Principal Chief Conservator of Forests