CHAPTER-1

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In arid and semi-arid areas, crops are often subjected to unpredictable periods of high moisture stress between rains or to increasing moisture stresses as the soil moisture reserve gets progressively depleted. Too frequently, the plant has a finite amount of water on which it can draw and then whether it withers and dies or survive depends on its inherent capacity for its drought tolerance. About 62 per cent of India’s cropped land is under rainfed condition which contribute 40 per cent of the country’s total food grain production. This signifies the importance of management of rainfed lands for crop production. The rainfall in these regions is often insufficient, erratic and unevenly distributed. Under such situation, the success or failure of the crop depends entirely on the amount of soil moisture conserved by the farmer before crop sowing and or occurrence of rains before the sowing season.

The productivity of rainfed agricultural lands in the semi-arid areas is specially low because of raising more than one crop is often limited because of low rainfall availability for more than one crop. Thus the cropping intensity is often less than 100 per cent in semi-arid areas. The situation thus calls for adoption of appropriate moisture conservation measures which will help in-situ moisture conservation and gives an opportunity to raise a decent crop.

Management of rainfed agricultural lands on a scientific principle could be tackled through the treatment of a given hydrologically defined unit area in a holistic manner (Bali, 1988). The given or defined hydrological drainage area having a common draining point and differentiated from the adjacent area on the ridge line is called ‘Watershed’. The treatment and its further management entailing the area to be developed for suitable use of plant production is most sound scientific proposition in drier areas. This not only helps in managing rainfall resources for its in-situ conservation but also with the adoption of appropriate soil conservation measures helps in storage and conservation of rain water in ponds, anicuts, check dams for its further use. This also greatly helps in recharge of ground water substantially for its exploitation for crop production.
The soil and water conservation measures which is so adopted not only help *in-situ* conservation of rain water and collection of rain water in detention areas but also have a great-value in protecting natural resources like soil and water losses through erosion. This further leads to protection of soil and also conservation of bio-diversity on its surface, regeneration of useful range and other plant species which are either lost or in the process of extinction due to continuous erosion of soil.

Improvement in soil moisture regime over a period of time due to adoption of soil and water conservation practices further help in regeneration of soil productivity which is further conducive to the development of plants of higher order in utility (Hazra, 1997).

Watershed management is thus a holistic approach harmonises and development of lands for appropriate plant and animal production thereby helps in improving the economy of the farmer (Das, 1993). Sustainable development of agricultural land is only possible through the real sense management of land on watershed basis.

As the watershed is viewed is the holistic development of rainfed lands, it is equally important to study the effect of activities relating to different soil and water conservation measures on resource conservation and primary resource regeneration specially water availability. Which is essential for plant production. It is also all the more important to make studies on the effect of various component of crop production on the changing soil water availability situation. The ‘on-farm’ responses under actual field situation on various agronomic measures which will help in efficient use of increased rain water resources and also managing other agronomic measures which will ultimately be reflected on the increased crop yield is very important and need to be intensively studied. It is also important to study the direct effect of any soil conservation practices on crop/plant production apart from other indirect influences.

As the watershed development programmes is envisaged a holistic development, the direct and indirect gains to the community or the farmers in the form of animal production for raising standard of living and farm income is equally important. The management of recreated and regenerated resources for sustained productivity and its management for sharing the benefits equitably are also equally important so that the resources so created is effectively being used and managed by the community on long term sustained basis.
Thus the present study entitled, "Integrated natural resource conservation on watershed basis for increasing productivity", was taken up at the Tejputa village of Jhansi district in Uttar Pradesh with the following objectives:

1. To conserve, improve and utilise natural resources in a most harmonious and integrated manner;

2. To improve the crop production environment and restoration of ecological balance through scientific management of land and rainwater;

3. To reduce the disparity/inequalities between irrigated and rainfed through appropriate intervention of crop production technologies;

4. To study the impact of soil and water conservation measures on crop/plant production;

5. To study the effect of various agronomic measures on crop production in the watershed;

6. To regenerate natural resource through soil and water conservation for fuelwood and forage production for increased milk production;

7. To find out ways and means for alternative employment for landless people of the watershed and increased income;

8. To study the cost-benefit and other socio-economic aspects of the watershed; and

9. To develop village level groups/institutions for managing the created and regenerated resources in the watershed for sharing usufruct benefits and managing and protecting the sharable natural resources;