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Integrated development of natural resources in hill and valley eco-system through rain water management technology

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ABSTRACT

The watershed area of 2216.83 ha was treated with peripheral bund/ marginal bund, submergence bund, check dam, water storage structure and masonry structure from 1997-98 to 2000-01 with different soil and water conservation measures, thereafter, the holistic management approach diffused in the operational area. The uncultivated area changed into cultivation of groundnut and other crops during rainy season and 1992.00 ha area changed into double cropping system. 'The cropping intensity increased from 89.95% to 188.21%. Area under, groundnut cultivation increased upto 1910 ha and covered 87.61 % area of pilot project during rainy season. The farmer's dugout 611 stony open dug well in pilot area of six villages for collection of recharged ground water. Ground water table rose up to the extent of 3.22 m. The recharged ground water is available for protective irrigations up to mid March. The 99.98 % cultivated land has been saturated under protective irrigation facility from recharged and harvested rainwater. The area under groundnut, urd and maize during rainy season and wheat, gram, mustard, potato and winter vegetables during winter season has increased whereas the area under jower and, sesame declined due to diffusion of groundnut. The initial prodcuctivity of groundnut, maize, wheat, gram, lentil, mustard, radish, tomato, carrot, onion and potato were raised from 7.0 to 27.5 q/ha, 9.0 to 27.0 q/ha, 7.0 to 40.5 q/ha, 0 to 18.7 q/ha, 6.5 to 11.0 q/ha, 0 to 21.5 q/ha, 0 to 187.0 q/ha, 90 to 295.5 q/ha, 0 to 155.5 q/ha, 0 to 307.0 q/ha and 0 to 300.0 q/ha, respectively. Thus the average productivity of watershed enhanced appreciably from 8.46 q/ha to 35.21 q/ha. The transport facilities improved from bullock carts .to tractors and motorcycles. The conservation practices generated through rainwater management technology are being followed by most of, the farm families on cultivable land of six pilot villages. In addition to this the village situated in the vicinity of project area also followed the generated technologies. Number of tractors increased from 17 to 103 in the pilot area. Likewise, diesel operated pump sets increased from 11 to 709 in the operational area of watershed for lifting of water from water-impounded structures. The demography of cows increased from 2110 to 5379, buffaloes 2205 to 4328 and goats from 1848 to 3567 in the watershed area during 2003-04 over the base year of 1997-98 with the development of natural pasture land of *Digitaria biformis, Digitaria trifomiis* and *Paspalam*.

Key words : Climatologically, Edaphically, Topography, Precipitation, Hillocks, Water whed area, Rain water management

INTRODUCTION

More than 70 per cent population of India derives its livelihood and environmental securities directly from natural resources like soil, water, vegetation, livestock and village enterprises. Escalating demographic pressure has reduced per capita cultivated land from 0.48 ha in 1951 to 0.14 ha by now. Livelihood needs of rural communities are expected to be realized from increased productivity without degrading qualities of natural resources. The management of natural resources in hilly area of Bundelkhand is very difficult task because it is a part of great Central Indian Plateau, consisting mostly of valleys all round hills, ravines and crags. These odd situations is highly confined the crop production. Climatologically, edaphically and socially this zone is quite different from other zones of Uttar Pradesh. It is characterized by semiarid climate, undulating topography, residual soil of erodible nature, deepwater strata underlain with hard impermeable rocks, poor crop husbandry including low fertilizer use and irrigation. The annual precipitation is of the order of 1014 mm, which is largely concentrated from mid June to mid September. The total rainy day is about 60. During rainy season, the residual nature of soil and rocks reduce the infiltration rate and consequently leads to high. runoff. Since the irrigation facilities are available only in 30 per cent of the cultivated area and rest of the 70% area is rainfed in the region, the only approach which can take to improvement of dry land agriculture in the zone is rain water management approach in which the rainfall received during the rainy season is conserved in soil and excess runoff is harvested, stored and recycled for life saving irrigation followed by improved crop production technology.

MATERIALS AND METHODS

The site of the operational area of Rain Water Management Project is located in Babina block of Jhansi district of Uttar Pradesh between the catchments area of Pahuj river and Dongri dam. The operational area of rainwater management typically represents soil, climate and socio-economic condition of Bunqelkhand region. Water surplus is 168.11 mm mostly available from July to September. Water deficit in operational area is 766.15 mm. It measured by the amount of which the actual evapotranspiration (AET) falls short of the potential evapotranspiration (PET) and expressed as WD = (PET

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