SUSTAINABLE WATERSHED DEVELOPMENT STUDIES FOR EFFECTIVE MANAGEMENT OF MICRO WATERSHEDS AND TRADITIONAL RAIN WATER HARVESTING STRUCTUES IN RURAL AREAS OF COASTAL DAKSHINA KANNADA DISTRICT, KARNATAKA

PROJECT REPORT

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ABSTRACT

Coastal Dakshina Kannada, being the second wettest part of the country is blessed with numerous watersheds of various dimensions thanks to its undulating topography. Agriculture being the livelihood of the people, the tradtional rainwater harvesting structures (TRWHS) such as ponds and tanks played an important role in their life and culture. Cattle race and other slush sports associated with the agricultural activities demonstrate the commmunity participation in the maintenance and preservation of these structures which became customary in their life. But, in due course of time agricultural activtities have been reduced and the traditional rainwater harvesting structures have been abandoned. The rehabilitation of these age old traditional rain water harvesting structures and the effective management of watersheds may bring back its glory to the past and improve the living conditions of the people. Any studies to rejuvinate the silted and abandoned TRWHS and development of micro and mini watersheds in this area may help improved agricultural yield with reaping benefits.

Mulki River basin, being a typical midland draining closed river basin of coastal Karnataka sprawling in an area of about 351 sq. Km., dotted with many industrial establishments and developmental activities has been studied for a sustainable watershed development. The study area found to receive an average annual rainfall of about 4228 mm and storm water of about 14.84 x 10^8 cubic meters. From the hydro meteorological analysis, a runoff of about 6.83 x 10^8 cubic meters from the basin was found to be drained out other than 5.06 x10^8 cubic meters of water as evapotranspiration. The rainfall data analysis of last three decades shows a decreasing trend over the years indicating a future possible crisis in water availability. However, by proper rainwater harvesting and appropriate infiltration and preservation techniques this water could be stored for utilisation during the dry seasons of the year. Development of Micro- and mini-watersheds and rejuvenation of TRWHS being the suitable options in this area for the same, delineation of the same

have been carried out through the cost effective methods of utilizing open source data availed from Wikimapia, Google maps and Google Earth imageries. About 100 micro- and mini-watersheds, along with more than 100 silted tanks have been identified and delineated, which could be utilized for the sustainable development of groundwater and surface water in the study area. A case study of four silted tanks at different terrain has also made in order to analyse the cost-benefit effect on such a developmental project in the study area. Total volume of water stored in the Silted tank is found to be 1.2 x 10^6 cubic meters which can be used to fulfil the irrigational needs accounting to 35.73 x 10^6 cubic meters. Vertical Electrical Sounding found to be an effective method in determining the depth of silt accumulation in the tanks, other than locating the subsurface aquifers. These studies also revealed the significance of Traditional rainwater harvesting structures in the recharging of subsurface aquifers.

The studies and analysis carried out using advanced surveying techniques such as Total Station, Global Positioning System (GPS), Tablet PC aided GPS, Geographic Information System (GIS) and Surfer plotting revealed that these methods are fast and cost effective in the delineation and mapping of TRWHS other than estimation of its storage capacity. The studies also revealed that the GPS surveying is the fast and best suitable cost effective method in mapping the tanks and TRWHS in village level resource mapping. With a little bit of training any lay man can carry out this survey with GPS mounted in tablet PC for village level resource mapping and can help the sustainable development of micro and mini watershed in any area.