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Generation of Water Resources Action Plan for Medak Nala Watershed in India Using Remote Sensing and GIS Technologies

[1]U.K. Shanwad, [2]V.C. Patil, [3]H. Honne Gowda, [4]G.S. Dasog and [5]K.C. Shashidhar

[1]Scientist (Agronomy), University of Agricultural Sciences, Raichur 584102.
[2]Chair Professor, Precision Agriculture Research Chair, King Saud University, Riyadh 11451.
[3]Former Director, Karnataka State Remote Sensing Applications Centre, Bangalore 560001.
[4]Professor (Soil Science), University of Agricultural Sciences, Dharwad 580005.
[5]Professor (Agril. Engineering), University of Agricultural Sciences, Bangalore 560065.

Abstract: Agriculture plays an important role in the economic development of Sedam taluk of Gulbarga district of northern Karnataka. Nearly 80 per cent of the total area is arable and 76 per cent of the total population is engaged in different agricultural activities. The farmers' are harvesting two crops in a year. Ground water the most important natural source that is widely used in agricultural production amounts to nearly 80 per cent of the total irrigated area. The number of tube wells at shallow depth in the area has increased rapidly in the last decade resulting in steep decline in ground water availability. The recharge of the ground water is much less than the exploitation of ground water, causing the land subsidence problem in the area. The wells have become dry posing severe problem to agriculture. The ground water draft was much higher in the area. The water from first shallow aquifer zone has to be regulated properly and more emphasis is to be given for development of deeper aquifer. Detailed ground water studies using remote sensing and geophysical technique in the study area were undertaken. An action plan is proposed for water resources development and management considering hydrogeomorphological map, drainage and surface water bodies' map, land use/land cover map and topographical features. A total of 257 boulder checks and 62 check dams have been recommended and also their sites were identified. A total of 10 Nala bunds are recommended for the storage of excess water apart from these two minor irrigation tanks were also recommended for the development of surface irrigation. There are 35 existing surface ponds out of which 26 dry ponds are recommended for expansion by desiltation so that these may also be utilized as source of surface irrigation. The balance use of surface and ground water will improve the water availability and so the productivity in the watershed area.

Key words: Remote sensing, GIS, watershed, water resources.

INTRODUCTION

Water is primary source for life and it sustains all human activities such as agriculture, industries, energy generation etc. The total quantity of water on our planet earth is nearly constant and it keeps circulating through what is called a hydrological cycle. Water from land and sea evaporates into the atmosphere, forms clouds, falls back to the earth as rain or snow which flows into a ground partly and then into rivers and streams and back to the sea. There is a great diversity and uneven distribution of water resources in space and time resulting in devastating floods in some areas whiles some areas face chronic drought. In addition to this, over exploration of groundwater for multiple unscientific agricultural practices is not a new phenomenon. The concept of balance use of groundwater is not well known with the farmers. This leads to the drying up the shallow aquifer causing land subsidence etc. there are a number of small streams and shallow tube wells existing in Sedam taluk of Gulbarga district of northern Karnataka, which fulfill the agricultural demand. The over exploitation of these have become dried up in course of time. In this regard, quantification of various components of hydrological cycle in terms of quantity and quality is of utmost importance for water resources management. Extensive hydrogeological studies have been carried out by several workers in delineating groundwater potential zones in hard rock terrain (Agarwal *et al.,* 1992; Rao *et al.,* 2001). The allocation and management of water resources is becoming a difficult task due to the increasing demands, decreasing supplies and diminishing quality. This calls for an integrated and judicious use of available water resources. Hence, there is an urgent need to have an accurate, reliable, timely data on various aspects of water resources and to update the technology of data base creation and effective means of data integration to aid the decision making process. While, remote sensing technology provides synoptic, repetitive coverage of the earth and provides useful information on water resources. For delineating the groundwater potential/prospective zones, Geographical information system (GIS) has been found to be an effective tool. In recent years, use of satellite remote sensing data along with GIS, topographical

Corresponding Author: U.K. Shahwad, Scientist (Agronomy), University of Agriculture Science, Raichur 584102.
E-mail: shanwad@gmail.com