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Land Capability Classification of Ollukara Block Panchayat Using GIS

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Abstract

Ollukara Block Panchayat in Thrissur district, which has depletion of ground water level, is selected for the study. Land is classified into land capability classes as per IS 6748(Part-1) for the purpose of watershed management. The result shows that the area comprises of five capability classes, II, III, IV, VI and VII. In these classes, class VI and VII are not suitable for agriculture. Class II, III, and IV are suitable for agriculture. Class III comprises 28.35% of the area. The area is presently under semi critical zone based on ground water level. Proper care should be given to the study area in terms of watershed management, since the area is only marginally away from over exploited category.

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Keywords: Land Capability Classification; Ollukara Block Panchayat

1. Introduction

Kerala is a state, which is blessed with natural splendour. It has a unique climate different from surrounding states. Kerala has a beautiful topography. And has a higher annual rainfall of about 3000mm. Kerala has 44 rivers, backwaters, and innumerable ponds & wells. In spite of all the above factors, many places in Kerala are suffering from severe water scarcity problems. One can feel it as a contradiction. But this is the truth. The major reason for this is the sloping topography of the Kerala. Kerala has 44 rivers, but not even one is a major river as Ganga,

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Yamuna, etc. Changes in landuse and faulty management also lead to depletion in ground water. Here comes the importance of conservation of soil and water.

As per the 'Ground water information booklet of Thrissur district, Kerala state'[6], published by Central Ground Water Board, Kodungallur block in Thrissur district falls under over exploited category of ground water. The area has already been categorized by central ground water Authority and State Ground Water Authority as over exploited. The Ollurkara, Thalikulam, Mathilakam and Mala blocks are fall under semi critical blocks. Mohana P. et al. [2] elucidates that land suitability analysis is a prerequisite for sustainable crop production. R. K. Srivastava et al. [8] observed that Geographic Information System (GIS) has become an effective tool in planning and development of watershed. For effective planning of any watershed, it is imperative to identify the land capability class for suitable land management measures. Sachin Panhalkar et al. [4] explains the land capability is depended on different parameters such as the types of soil, its depth and texture, underlying geology, topography, hydrology, etc. These parameters limit the land available for various purposes. Sonali Bhandari et al. [7] show criteria for each land capability classes and subclasses. Sachin S. Panhalkar et al. [5] adopted USDA (1973) classification based on parameters like soil depth, soil texture, slope, erosion, land use/ land cover was considered to define land capability classes. Union overlay method is applied to preserve the geometry and attribute information of all the input parameters. In SQL environment, queries have been generated to identify individual land capability classes. IS: 6748 (Part I) – 1973 [1] illustrates a classification system, in which land is classified on the basis of cultivation. According to this system, land is classified into 8 classes and 4 subclasses for each capability class. First four classes are suitable for agriculture. And the other classes are not suitable for agriculture. Actually this system is similar to USDA system. So, decided to do land capability classification using this system.

For finding land capability classes, determination of erosion susceptibility is an inevitable factor. Erosion susceptibility of study area is found using Revised Universal Soil Loss Equation (RUSLE). Vipul Shinde et al. [9] show the use of GIS and remote sensing in the determination of the USLE parameters. V. Prasannakumar et al. [3] adopted a comprehensive methodology that integrates Revised Universal Soil Loss Equation (RUSLE) model and Geographic Information System (GIS) techniques, to determine the soil erosion vulnerability. GIS data layers including, rainfall erosivity (R), soil erodability (K), slope length and steepness (LS), cover management (C) and conservation practice (P) factors were computed to determine their effects on average annual soil loss in the area..

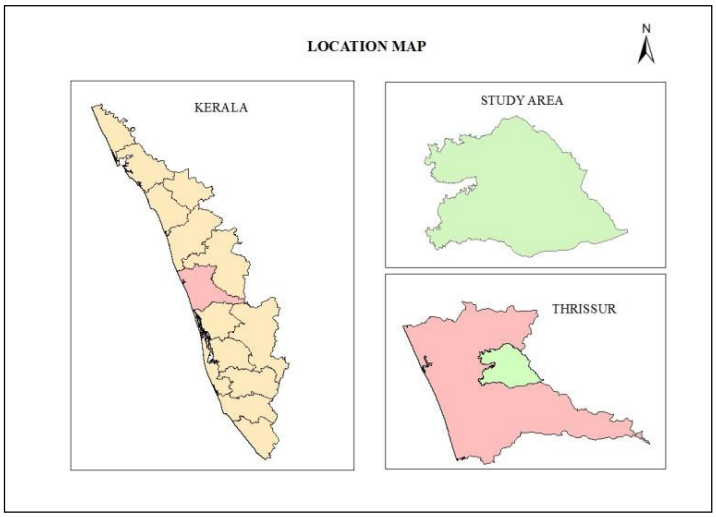

Fig. 1 Location map of Ollukara Block Panchayat

2. Study area and data description

Ollurkara Block Panchayat in Thrissur district, Kerala is selected for the study. This block Panchayat comprises Madakkathara, Nadathara, Panachery and Puthur Gramapanchayats. Total area of this Block Panchayat accounts to