

Action Plans for Land and Water Resource in Guntur District Using Geographical Information System

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Abstract: The development of natural resources on a sustained basis with out deterioration with constant increase in productivity is the mainstay of mankind. The natural resources are considered as more efficient and appropriate for necessary survey and investigation for the assessment of the natural resources and subsequent planning and implementation of various developmental programmes. The Remote Sensing and GIS tools could be helpful in getting the precise and valuable spatial information in understanding the present scenario contemplating with the past data and predicting the future trends. The main objective of the study is to create the spatial information for natural resources in COMMAND AREA and to develop methods for its efficient utilization and sustainable management utilizing remote sensing and GIS techniques. The thematic layers are derived from IRS-ID PAN + LISS-III merged satellite imagery and Survey of India (SOI) topomaps using visual interpretation technique. These maps are converted to digital format using AutoCAD software and further integrated using Arc/Info and Arc View GIS software for the generation of final outputs.

Keywords: GIS, Spatial Information, thematic layers, Topomaps

1. INTRODUCTION

To improve the management of natural resources, with an improvement of water and Land quality, greater knowledge about their quantity and quality is required. There is also a need for regular and systematic of geographical, hydrological and hydro- geological data, together with a system for processing the quantitative and qualitative information for the various types of water bodies. Moreover keeping an adequate inventory of water availability is one of the desirable prerequisites for the quantification of water – user rights, for the formulation of water quality standards, for the adjustment of economic incentive systems and for the development of many other administrative measures. The study area is for sure helpful in micro level natural resources management planning and in sustainable development for this remote sensing and GIS techniques.

2. STUDY AREA

The district is bounded on the North by Krishna and Nalgonda districts, on the West by Prakasam and Mahaboobnagar districts, on the South by Prakasam district, on the East by Krishna district and Bay of Bengal. It is situated between 15-16 and 16-50 of the Northern Latitude and 70-10 and 80-55 of the Eastern Longitude.

3. STUDY OBJECTIVES

- To study the present status of water resources, land resources, ground water potential using satellite data, collateral data and field data.

- To prepare the digital thematic maps namely Base map, Transport network map, Geomorphology map, Land use/ Land cover, Soil map etc. using satellite imageries on ARC/INFO GIS platform. This constitutes the spatial database.
- Preparation of action plan for land resources and water resources of the study area for sustainable development.

4. RESULTS

1. The study of the project is only for the baseline information of Guntur District, The thematic layers like Topographical Map, Village Map, Transportation Map, Mandal Map, Land use Land cover Map, Soil Map and Geomorphology map have been developed using GIS data, The digital maps are useful for further studies in recommending best suggestions for land and water resource action plan.
2. It is established that remote sensing technology and GIS to are of critical nature and Generation of resource information system like, land and water resources which will become handy for the planners for their effective monitoring and management.
3. GIS is to combine with the modules available in other programming language like java, to make the planner and end user with out any scientific knowledge for the effective resource management.
4. This study recommends effective soil and water conservation measures to increase the subsurface aquifer capacity and identifies suitable cropping patterns, which

Methodology

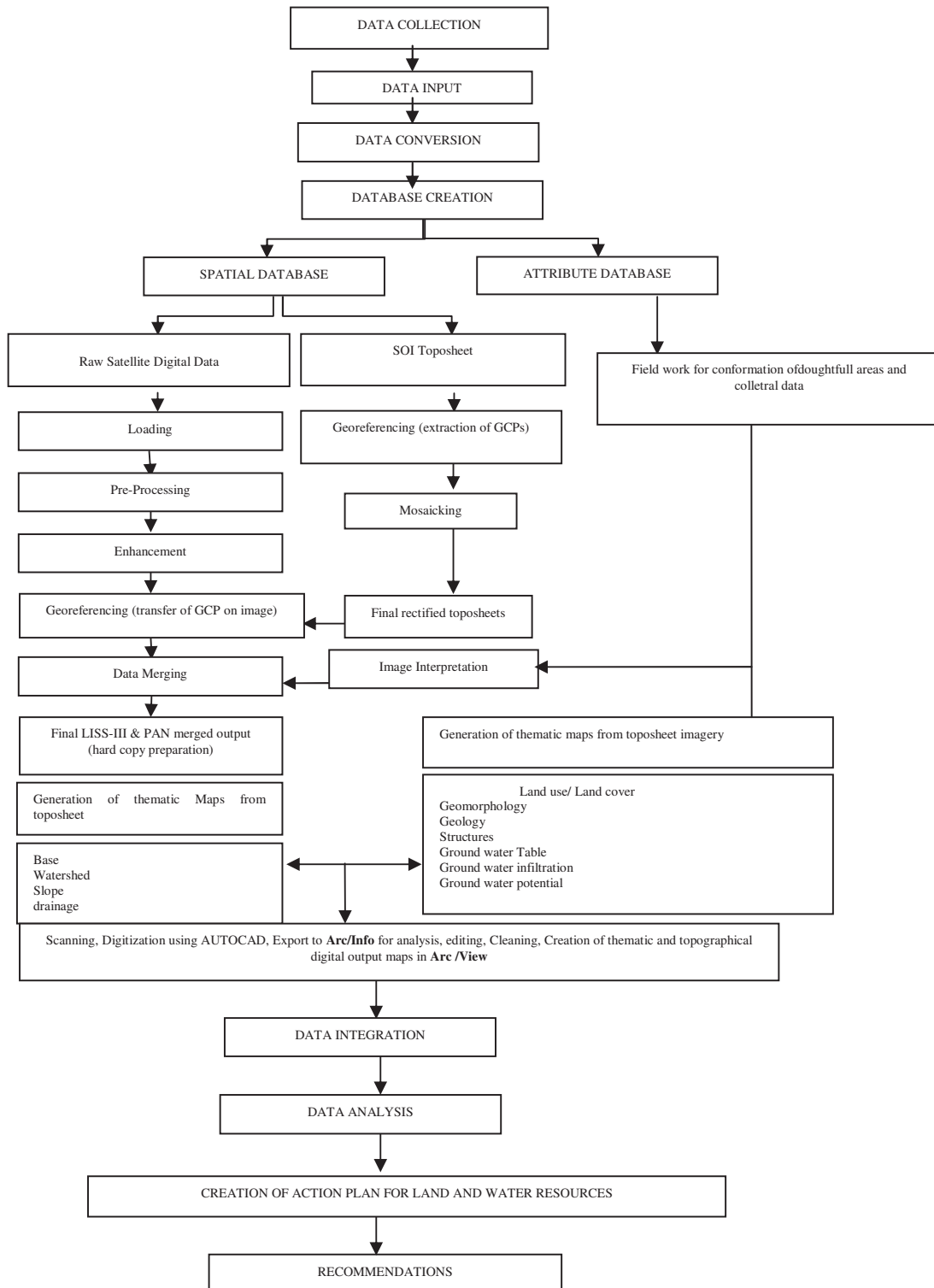


Fig. 1.1. Methodology Flowchart for the Study Area

help in reduced soil erosion, increased moisture conservation and improved productivity of the soil. The physical characterization of an area is also useful to plan the basic minimum needs of farmers, thereby improving their socio-economic conditions and helps in evolving a broad national policy which can be applied by decision makers for sustainable development of any given study area.

5. THE GENERAL ACTION PLANS ARE LISTED BELOW

5.1 Action Plan for Land Resources

In view of these semi-arid climatic conditions of the study area the following measures are recommended for general soil conservation.

- Crops like Paddy, red gram, Bengal gram, chilles, Fruits and vegetables are recommended. Individual bunds of land parcels may be planted with acacia-nelotika (nalla tumma), acacia- senegal, neem, papaya, wild drumstick, and tamarinds are suggested.
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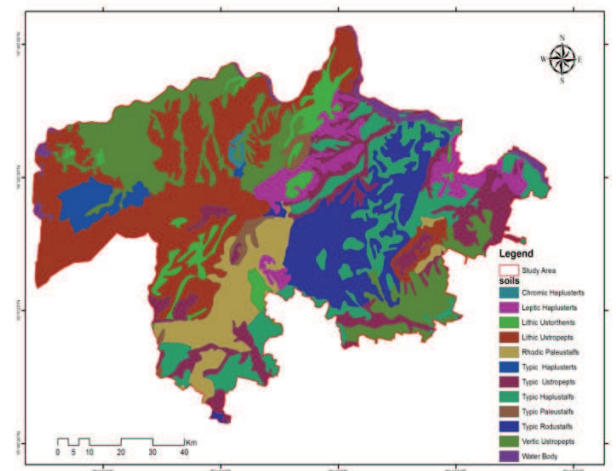
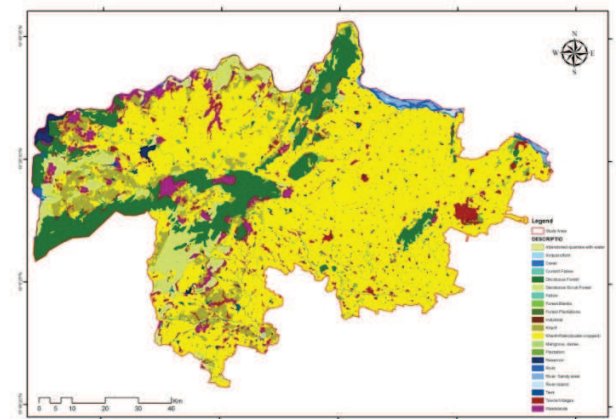
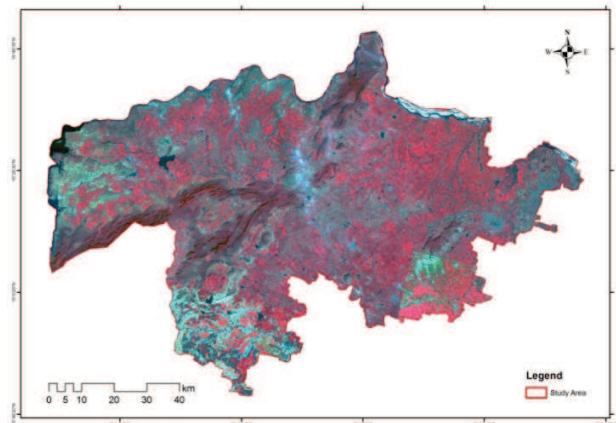
Commons in each village may grow fodder species like stylo santhes hamata, stylo santhes scabra, dalichas lab-lab, vigna, unguiculata, and sorghum sudanense.

5.2 Action Plan for Water Resources

1. Water allocation for agriculture in the study area can be made keeping in mind the irritability of land, food requirement and equity issues in sharing the water and related infrastructure.
2. Mechanisms must be evolved and developed in sharing the reservoir and tank waters during deficit rainfall years, normal rainfall years and above normal rainfall years.
3. New technological options in recycling of water, water harvesting, soil and water conservation and multiple use of water are to be adapted on a big scale. The technologies include micro filtration at household level to desalination of water for drinking water supplies.
4. Rainwater harvesting and storage for further economic use of the study area must be made mandatory of all the households, public and private institutions both in the rural and urban dwellings.
5. Restoration of age-old tanks and lakes are highly essential by removing silt and maintaining it with fresh

water to ensure proper groundwater recharge and ecological development.

6. Conjunctive use of different water sources to be made mandatory for all command areas for efficient use of water.



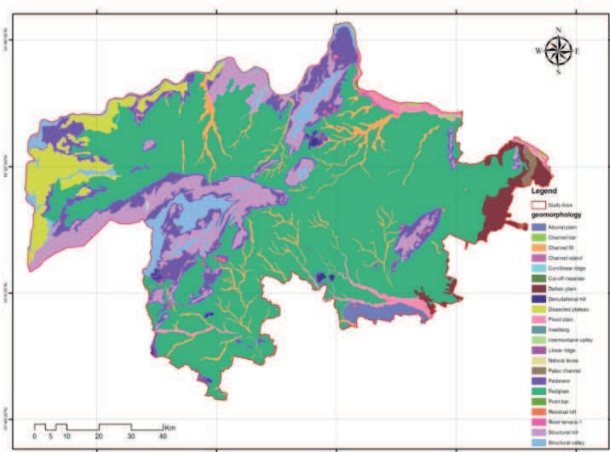


Fig. 1. Showig Satellite Map, Land Use / Land Cover Map, Soil Map and Goemorphology Map of Study Area

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