



GENERATION OF THEMATIC LAYERS IN MOTHKURI WATERSHED USING IN GEO-SPATIAL TECHNIQUES NALGONDA DISTRICT TELANGANA STATE

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ABSTRACT

A Geographic Information System (GIS Software) is designed to store, retrieve, manage, display, and analyze all types of geographic and spatial data. GIS software lets you produce maps and other graphic displays of geographic information for analysis and presentation. Once all of the desired data have been entered into a GIS system, they can be combined to produce a wide variety of individual maps, depending on which data layers are included. One of the most common uses of GIS technology involves comparing natural features with human activity. GIS maps can be used to show information about numbers and density. For example, GIS can show how many doctors there are in a neighborhood compared with the area's population. GIS technology makes updating maps much easier than updating maps created manually. Updated data can simply be added to the existing GIS program. A new map can then be printed or displayed on screen. This skips the traditional process of drawing a map, which can be time-consuming and expensive. A working GIS integrates five key components: hardware, software, data, people, and methods. The mothkuri watershed different thematic maps generated in Arc GIS namely, land use/land cover, Geomorphology, Settlement, Geology, Transportation, Drainage, Surface Water bodies, Action plan maps are generated from satellite digital hardcopy. The standard basic elements and key elements for visual interpretation are applied on this satellite hardcopy digital image so as to extract the entropy or information extent in accordance with the above thematic maps. At the end of the interpretation process the above thematic maps in the form of paper based maps are ready for subsequent scanning and automated digitization and then created a digital database for GIS data analysis and modelling.

KEYWORDS : Remote sensing, GIS, Thematic layers, Watershed, Spatial data, Attribute data

INTRODUCTION

A thematic map is a map that focuses on a specific theme or subject area. This is in contrast to general reference maps, which regularly show the variety of phenomena geological, geographical, political together. The contrast between them lies in the fact that thematic maps use the base data, such as coastlines, boundaries and places, only as points of reference for the phenomenon being mapped. General maps portray the base data, such as landforms, lines of transportation, settlements, and political boundaries, for their own sake. Thematic maps emphasize spatial variation of one or a small number of geographic distributions. These distributions may be physical phenomena such as climate or human characteristics such as population density and health issues. Barbara Petchenik described the difference as "in place, about space." While general reference maps show where something is in space, thematic maps tell a story about that place (e.g., city map). Thematic maps are sometimes referred to as graphic essays that portray spatial variations and interrelationships of geographical distributions. Location, of course, is important to provide a reference base of where selected phenomena are occurring. Thematic maps three primary purposes.

- They provide specific information about particular locations
- They provide general information about spatial patterns
- They can be used to compare patterns on two or more maps

Common examples are maps of demographic data such as population density. When designing a thematic map, cartographers must balance a number of factors in order to effectively represent the data. Besides spatial accuracy, and aesthetics, quirks of human visual perception and the presentation format must be taken into account. In addition, the audience is of equal importance. Who will "read" the thematic map and for what purpose helps define how it should be designed. A political scientist might prefer having information mapped within clearly delineated county boundaries (choropleth maps). A state biologist could certainly benefit from county boundaries being on a map, but nature seldom falls into such smooth, man-made delineations. In which case, a dasymetric map charts the desired information underneath a transparent county boundary map for easy location referencing.

OBJECTIVES: The following are the objectives of the study:

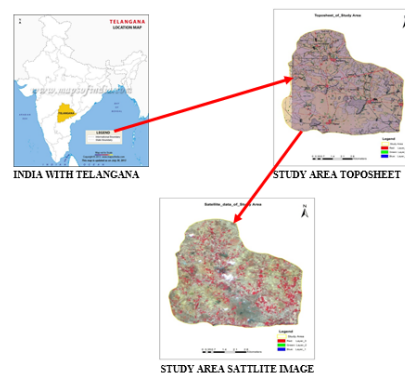
Generation of thematic layers such as settlement locations and transport network, drainage and surface water bodies, Geomorphology, slope, aspect, land use and land cover of the Mothkuri watershed using RS & GIS techniques

DATA AND METHODOLOGY:

The study involves preparation of various thematic layers on 1:50,000 scale using SOI toposheets, IRS P6 LISS IV/CARTOSAT data, for the year 2011-12. The base map is prepared from SOI toposheets and updated on Satellite Image. The various GIS software are used such as ERDAS 9.2, Arc GIS 10.2.2 in the preparation of digital layers of various thematic maps. On Screen interpretation would be used to extract thematic layers. Interpretation would be made in conjunction with the topographical map and also supported by adequate ground truth data for accurate output. Field work would be carried out with the help of GPS to identify the training sets. Required thematic layers - Geology, Geomorphology, Hydrology (drainage), Soils, Slope, Land use / Land cover will be derived from the image. The Cadastral boundary will be overlaid on the action plan. Methodology developed by NRSC would be applied to classify the land use categories and suggest appropriate recommendations.

Study Area

Mothkuri is located in Nalgonda District of Telangana. The Mothkuri watershed is situated It lies between 17°28'51.14° and 17°25'58.53°N latitude and 79°17'3.63° and 79°14'2.69°E longitude and the total area is 5541.82 ha. It is located on the banks of Bikkeru a tributary of Musi River which itself is a tributary of river Krishna. The population of Mothkuri Mandal as per 2001 census is 55638 and 2011 census is 55699 with a very less growth of 0.11%. Tobaccos, Paddy, Sugarcane, and Groundnut are the major crops that are cultivated mostly in the area.

LOCATION MAP OF STUDY AREA

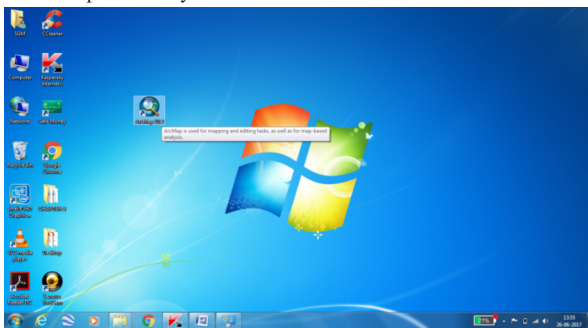
Types of thematic layers and Data

- **Points:** Are used for showing occurrence or relative locations (rather than size or dimension), of features such as trees and fire hydrants, or (from a large scale perspective) buildings or cities.
- **Lines:** Composed of connected points or nodes, can represent routes, pathways or boundaries, or for uses not requiring detailed polygons, such as rivers or roads.
- **Polygons:** Consist of a series of nodes and lines enclosing an area, representing things such as state boundaries, lakes, and tracts of land.
- **Spatial data:** Displaying boundaries, roads, or some other geographic feature(s). Spatial data is geo-referenced in a real world coordinate system and may contain limited attribute information associated with its features.
- **Attribute data:** Descriptive information about a set of features and the information needed to create the "theme" in a thematic map. It can be a statistical data set collected through surveys, Census data, or any other information that describes the features represented in your spatial data set. Attribute data must be geographically referenced, or related via one or more common identifiers to a physical location. An example would be number of crop acres per county. The county name or other unique identifier is then used to link the attribute data (i.e. the number of acres) with the appropriate county outline on the map.

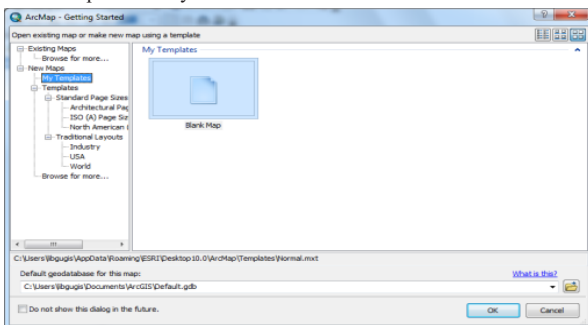
Generation of thematic layers in Arc GIS

Arc GIS is the main platform to generate Maps with the Thematic layers. Prerequisites to generate any maps in ArcMap is to obtain following thematic layers.

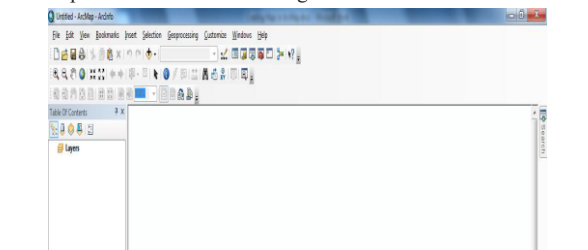
STEP:1 To launch ArcMap, please click: **Start -> All Programs -> ArcGIS -> ArcMap 10**. By default, a start-up splash window will appear once ArcMap has loaded. Click **OK** to proceed. You can ignore all other options. They are redundant



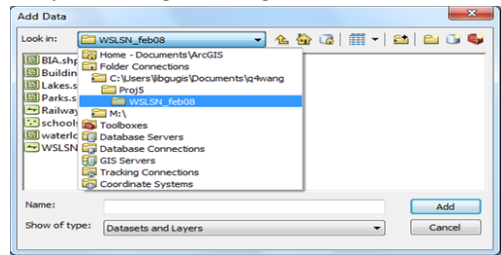
STEP:2 To launch ArcMap, please click: **Start -> All Programs -> ArcGIS -> ArcMap 10**. By default, a start-up splash window will appear once ArcMap has loaded. Click **OK** to proceed. You can ignore all other options. They are redundant



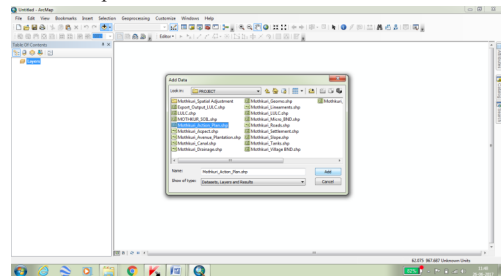
STEP:3 There are two ways to add data: Click the **Add Data** button which opens a window similar to Figure.



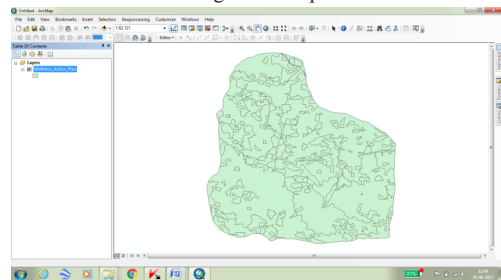
STEP:4 To browse to the file you want to play with, you can link to the folder containing all these files by clicking the **Connect to Folder** button in Figure 3, then browse to add the folder that contains your files and click **OK**. After that, you can locate the files listed below and add them in at one time by holding the **Ctrl** or **Shift** button when you are clicking mouse button to make selections. Please click the **Add** button just like any other file explorer dialogs in Windows to close the dialog



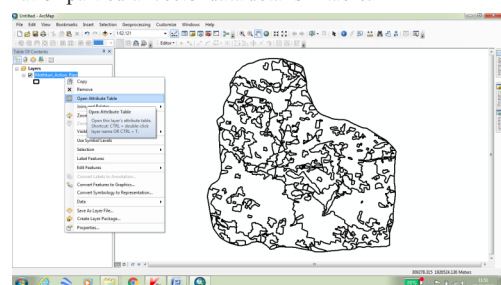
STEP:5 Open the required folder, in which the required Mothukur Action Plan shape file has been saved and Click on the shape file to add the file to ArcMap



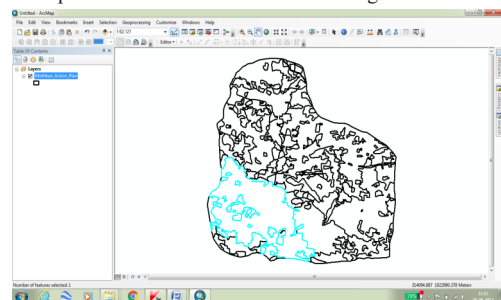
STEP:6 The selected file will appear on the ArcMap window user interface. Change the colours in the table of content in particular vector layer selected after the showing in Arc Map Window interface.



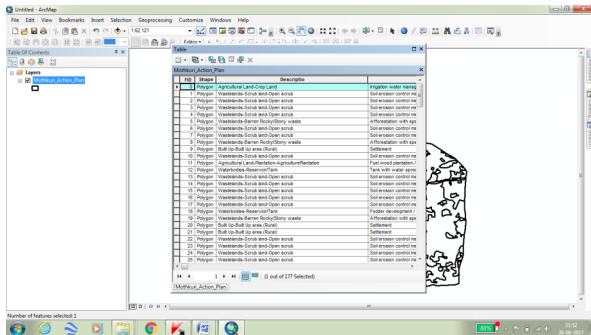
STEP:7 Right click on the selected Layer and select 'Open Attribute Table' in Arc Map Window interface. This Open Attribute Table more information particular vector data details in table.



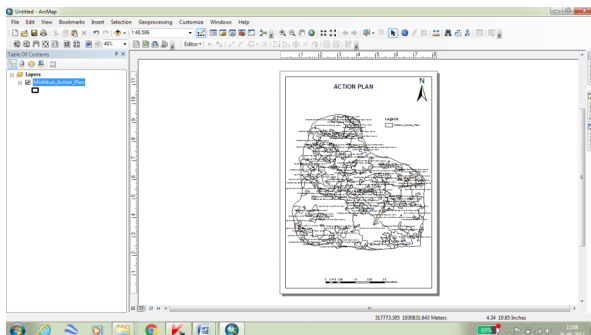
STEP:8 The selected attributes in the table are shown on the map. The vector data particular area select the different usage



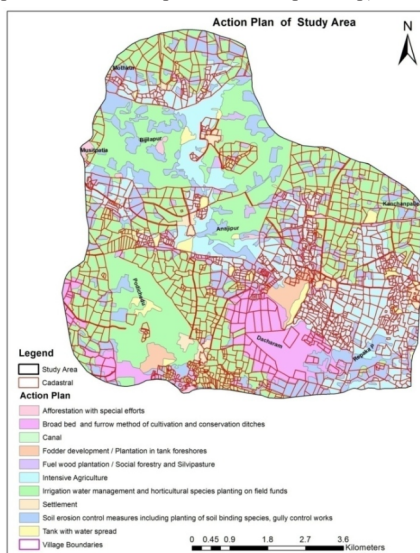
STEP:9 Attribute table window appears for the selected layer. Select the attributes in the first row of the table and close the window



STEP:10 The Output Map in the Data frame has North arrow, Legend, Scale Bar, and Title Finally the Arc Map window interface layout view selected. Added the insert to North Arrow, Legend, Scale Bar, and Title.



STEP:11 Finally below the thematic map generated Action plan map of Study area. Action plan map of study area different vector layers added in the same area final map showing in the Arc map window interface (Land use/Land cover map, Geology map, Water bodies map, Hydro-geomorphology map, Transportation map, Settlement map, Slope map, Stream Order map and Linear Aspect map)



CONCLUSION

The mothkuri watershed different thematic maps generated in Arc GIS namely, land use/land cover, Geomorphology, Settlement, Geology, Transportation, Drainage, Surface Water bodies and Action plan maps are generated from satellite data digital hardcopy. Different maps different usage for example transportation map find out the distance of national highway, state highway, district and village roads(metal, un-metal roads). You can also combine data to produce a "thematic map", a useful way to visualize statistical or other tabular data

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