



PREPARATION OF BASE MAP INFORMATION USING REMOTE SENSING & GIS FOR CHANDARLAPADU AND VEERULLAPADU MANDALS

SS.Asadi

Associate Dean Academics & Professor, Department of Civil Engineering, K L University,
Vaddeswaram, Guntur(D.t), A.P, India

S.Sai Sree

M-Tech Student, Department of Civil Engineering, K L University, Vaddeswaram,
Guntur(D.t), A.P, India

M.Sujatha

Assistant Professor, Division of Ecology and Environment, KL University, Vaddeswaram,
Guntur(D.t) A.P, India.

M.Satish Kumar

Professor, Department of Civil Engineering, Kallam Haranadha Reddy Institute of
Technology, Choedavaram, Guntur(D.t) A.P, India.

ABSTRACT

A map or chart showing certain fundamental information, used as a base upon which additional data of specialized nature are compiled or overprinted. Also, a map containing all the information from which maps showing specialized information can be prepared. A map showing plane metric, topographic, geological, political and/or cadastral information that may appear in many different types of maps. The information is drawn with other types of changing thematic information or a map showing land parcels that is used as the fundamental data layer to which other data layers are referenced. QGIS software was used for preparation of base map for Chandarlapadu and Veerullapadu Mandals.

Key words: Arc Map Software, Government Land, Patta Land, Not classified Land.

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1. INTRODUCTION

A GIS with data organized with a land parcel as the fundamental data layer to which other data layers are referenced. Mainly the base maps will show about the land use and land cover classifications of any particular area. Field visits are carried out to check the delineated units of the maps prepared maps and also secondary data related to irrigation, agriculture, land use filed observation classes are incorporated into the land use/land cover maps (Asadi.SS et al. 2014). A land-use classification is a classification providing information on land cover, and the types of human activity involved in land use. It may also facilitate the assessment of environmental impacts on, and potential or alternative uses of, land. Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. It also has been defined as "the total of arrangements, activities, and inputs that people undertake in a certain land cover type. One confusing issue that has not been effectively resolved in existing classification schemes is the distinction between "land use" and "land cover." Most existing schemes group these two geographic variables together since they are closely related. There are, however, key differences that create confusion when they are blended together in a single classification scheme and map. "Land cover" refers to the vegetative or non-vegetative characteristics of a portion of the Earth's surface. "Land use" describes some human activity on the surface. The concept of land cover is best understood when applied to natural surfaces where no activity has occurred (e.g., unharvested forest land). The type of land cover present is determined directly by observation. This observation may use satellite imagery or aerial photography for certain levels of classification detail and positional accuracy. For very detailed levels of mapping, however, on-site inspection may be required. Land use types may also be determined through observation by deducing human activity or disturbance based on the appearance of the landscape. As in the case of land cover, land use classes may also be determined, in many cases from satellite imagery or aerial photographs. Land cover is that which covers the surface of the earth and land use describes how the land cover is modified (Asadi.SS et al. 2015). Land use information can be used to develop solutions for natural resource management issues such as salinity and water quality. For instance, water bodies in a region that has been deforested or having erosion will have different water quality than those in areas that are forested. Forest gardening, a plant-based food production system, is believed to be the oldest form of land use in the world. The major effect of land use on land cover since 1750 has been deforestation of temperate regions. More recent significant effects of land use include urban sprawl, soil erosion, soil degradation, salinization, and desertification. Land-use change, together with use of fossil fuels, are the major anthropogenic sources of carbon dioxide, a dominant greenhouse gas. The definition of land cover is fundamental, because in many existing classifications and legends it is confused with land use. When considering land cover in a very pure and strict sense it should be confined to describe vegetation and man-made features. Consequently, areas where the surface consists of bare rock or bare soil are describing land itself rather than land cover. Also, it is disputable whether water surfaces are real land cover. However, in practice, the scientific community usually describes those aspects under the term land cover.

2. DESCRIPTION OF STUDY AREA:

The atmosphere of the study area was tropical in nature with hot summers and moderate winters. The times of April to June are the summer months with the temperature running from at least 27°C to 45°C. The temperature amid winter months ranges from 28°C to 17°C. Latitude and longitude values of Veerullapadu mandal was 16°49'11.51"N. Latitude and

longitude values of Veerullapadu Mandal was $80^{\circ}23'53.02''E$. $16^{\circ}36'11.37''N$ and $80^{\circ}16'17.11''E$.

2.1. OBJECTIVE

Link the data collected from revenue department in QGIS Software and create base map for Chandarlapadu and Veerullapadu Mandals.

3. METHODOLOGY

Cadastral data and Adangal data was collected from revenue department. Adangal information was available in Telugu language in the form of excel sheets. These excel sheets are modified and converted into English language for better understanding. Both cadastral information and adangal information's were linked in QGIS Software for identifying government lands. In QGIS Software colour coding was given to categorized land for easy identification of land category. Figure .1 shows the flow chart of government land identification.

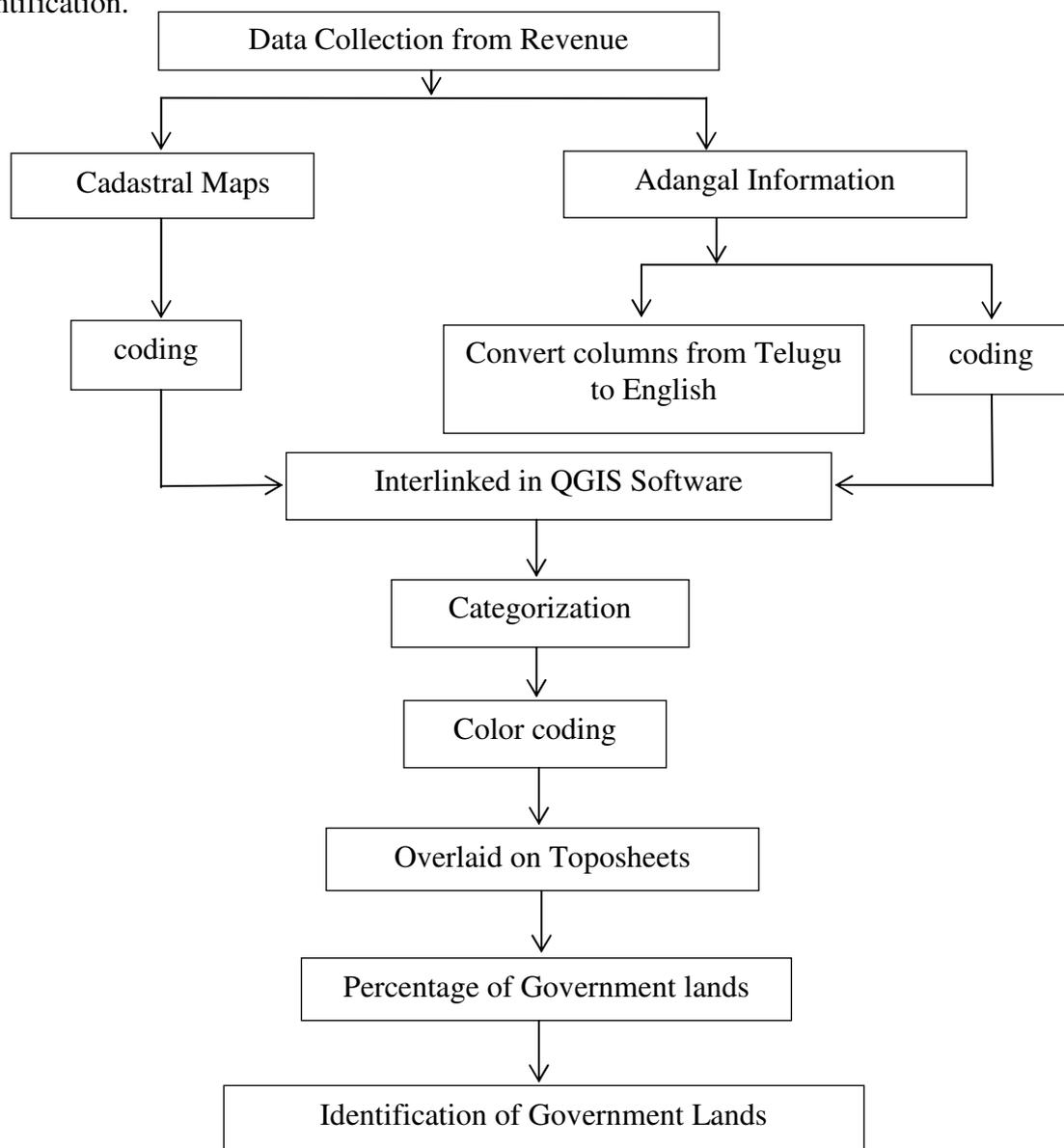


Figure 1 Methodology flowchart

3.1 STEP BY STEP PROCEDURE:

The process base map preparation involves a big process. Firstly it involves the collection of required information such as cadastral maps and revenue data regarding the mandals for which mapping is to be done. And next it involves the linkage of cadastral and revenue information using appropriate platform. And finally it involves the applying of colour composition for different categories of land.

Various steps involved in the reclassification and analysis of land data for base map preparation are explained in piecemeal manner:

- For mapping the classified information of the land data one should require the cadastral drawings and revenue information including the information about land type and ownership etc. Cadastral Maps or Cadastre is a technical term for a set of records showing the extent, value and ownership (or other basis for use or occupancy) of land. It provides a ready means of precise description and identification of particular pieces of land and it acts as a continuous record of rights in land.
- Initial process in this work starts at the revenue data, the obtained available data for selected mandals are available in Telugu language. ArcGIS Software is unable to read Telugu format data. So for this study QGIS software is selected, which has same options and uses like ArcGIS software and which can also read Telugu language.
- Revenue information obtained contains vast information regarding the parcels of land for particular mandal. This information is available in excel format. This revenue data includes all the characteristic information, revenue information, ownership information for all the land parcels in that mandal
- Firstly it requires the cleaning of the data i.e., removal of excess information and excess symbols if any are present in the data.
- It includes a column called survey number which needs to be cleaned and making clear for immediate understanding of information. This column should be made free from excess symbols like (/, -).
- After cleaning of the information the next step is to translate the village name column from Telugu to English.
- After translating the information and cleaning, those two columns are interlinked using the concatenate option in excel. This option will merge multiple column data and create a new column by holding the information in those two columns. Columns here merged are village name and survey no. After merging the two columns an output will be seen in this way (Chandarlapadu25).
- The name for the column created should be named as coded (should be same in both the revenue data and cadastral drawings), for the purpose of interlinking the revenue data with cadastral drawings in GIS software.
- Interlinking between data and drawings will be done only when the fields on which they are being interlinked should be same. It will keep only the matching records in both digital data and revenue data. Unmatched records will be left as null values for all fields being appended into the target table from the join table.
- After performing all the steps using revenue data, open the cadastral drawings in QGIS software and import the revenue data into GIS software.
- After importing the both the data 's into the software, cross checking of attribute table in cadastral drawings should be done to check whether there should be a same column

in both drawings and the data for the purpose of interlinking. After that the both data's should be joined using join tool in QGIS.

- The revenue data after interlinking with the drawings gets stores in the attribute table of the cadastral drawings in their respective fields.
- After interlinking of both the files the categorisation work should be done i.e., the land data should be classified based on the characteristics of the land.
- The columns in the revenue data table contains the characteristic information of the land parcels, on which the categorisation will be done.
- The column on which the categorisation is to be done contains the information in Telugu language. QGIS is able to read the Telugu data, so the categorisation can be done in an ease manner.
- Different kinds of land cover classes in the mandal are seen after the classification. All the classes are again classified and shortlisted into three classes. They are:

1. Government land

2. Patta Land

3. Not Classified land

- All the classes under government land category should kept with the same colour composition for visualizing all the similar classes under government land category into a single class.
- In the same manner all the classes in patta land and not classified lands are also given with same colour composition.
- Apart from these three classifications there will be another land use classification called "Roads". They should be given with some another symbol of classification.
- After classifying the land data into different classes the percentage of land in each class is calculated using some in-house scripts in QGIS software. All the maps prepared were converted into soft copy by digitization (Asadi.SS et al. 2014). Graphics reparation, editing, composition of layout was done using Arc Info and Arc view software (Asadi.SS et al. 2015).
- After getting the final output, all the land cover classes in a mandal can be visualized.
- The same procedure from first to last is repeated for another mandals.
- Care should be taken at certain steps such as preparing coded column, interlinking, classification and reclassification etc.
- The colour coding's given for government land, patta land and not classified lands should be same for all the mandals.
- After performing the classification with the available data, the entire drawing is overlaid on a base map i.e., toposheet.
- As the output generated is for mandals it is not possible to overlay the entire output on a single toposheet, so multiple toposheets as per the location of mandals are mosaicked and then the output is overlaid on the toposheets.
- Mosaicking of toposheets is done with the help of georeferencing. Georeferencing is the process of assigning real world coordinates to pixel data. The main objective of this step is to provide spatial locations to the raster data so that it can get earths coordinates to become a GIS dataset.

- After overlaying the final output on toposheet an additional layer ring roads are added to the base map so that anyone will read the map easy manner.
- After performing all the steps from first to last for all the mandals final output will be generated on the screen.
- Percentage of government lands from all the classified mandals is calculated from the obtained output. The maps are prepared to a certain scale and show the attributes of entities by different symbols or colouring (Asadi.SS et al. 2015).
- The final output is exported as an image with proper dpi resolution. Figure .2 the final output image of base map prepared for Chandarlapadu and Veerullapadu mandals.
- Labelling and beautification of the final output is done in the GIS itself including the scale bar and north arrow.
- Figure .3 shows the detailed base map prepared for Chandarlapadu mandal.

4. RESULTS AND DISCUSSIONS:

From the figure 2&3 it can be clearly seen that all the land parcels with grey colour are named as Government lands, purple colour lands are not classified lands and forest lands are coloured in green. Patta lands are left in the classification because here major concern is about government lands. From the figures it can be concluded that not classified lands are in major percentage when compared to government lands, patta lands. Major chunks or timber lands of government category are identified in the map and proposed for the development. The location of the parcels can be note from GIS and can also be seen in underlying top of sheet. All the ownership details, revenue details and administrative boundary details of the government land parcels can be studied from the attribute table. Mapping is a central function of Geographic Information System, which provides a visual interpretation of data. With the help of this mapping land use land cover of any area can be easily understood. GIS store data in database and then represent it visually in a mapped format where everyone are able to get a clear idea of the land use land cover of any area.

Land Category	Chandarlapadu Mandal Area in Acres	Veerullapadu Mandal Area in Acres
Government Land	3522 Ac	4088 Ac
Patta Land	19139 Ac	36748 Ac
Not classified Land	167 Ac	357 Ac

Table 1 Manadal wise Distribution of land categories

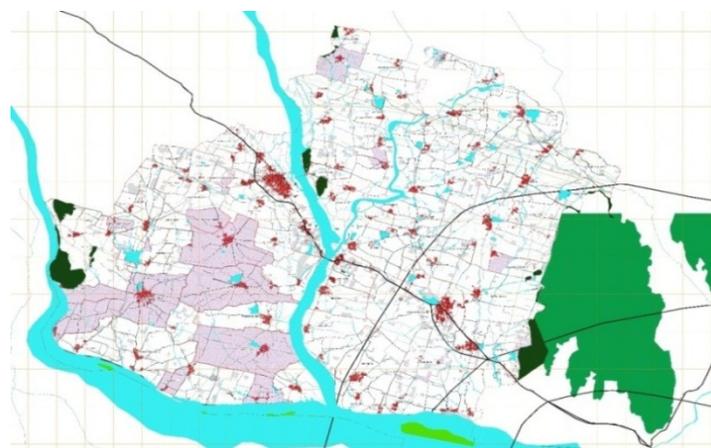


Figure 2 Base map for Chandarlapadu and Veerullapadu Mandal



Figure 3 Base map For Chandarlapadu Mandal overlaid on Toposheet

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