CREATION OF MANDAL LEVEL LAND DATA BASE INFORMATION USING REMOTE SENSING & GIS: A MODEL STUDY

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ABSTRACT

Reclassification and analysis of land data means again classifying of land use land cover of certain land and analysing the data for required information. Second time classification of land for certain purpose is mainly termed as reclassification. A land-use classification is a classification providing information on land cover, and the types of human activity involved in land use. The cadastral maps and revenue data regarding the mandals for mapping was collected. Using QGIS Software, it involves the linkage of cadastral and revenue information. And finally it involves the applying of colour composition for different categories of land for selected mandals. Large land parcels are identified in selected mandals. for the future development.

Key words: Adangal Information, Arc Map Software, Identification of parcels.

Cite this Article: SS. Asadi, M. Sujatha, M. Satish Kumar and S. Sai Sree, Creation of Mandal Level Land Data Base Information using Remote Sensing & GIS: A Model Study. *International Journal of Civil Engineering and Technology,* 8(8), 2017, pp. 590–598.
http://www.iaeme.com/IJCIET/issues.asp?JType=IJCIET&VType=8&IType=8

1. INTRODUCTION

Re-classification is normally sought when an industrial unit is planned on agricultural land or when residential or commercial complexes are planned on agricultural or industrial land.

Applications for re-classification will go to the local planning authority or the Regional Deputy Director of Town and Country Planning, depending on the area. It may also facilitate the assessment of environmental impacts on, and potential or alternative uses of, land. It also has been defined as "the total of arrangements, activities, and inputs that people undertake in a certain land cover type. 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. Field visits are carried out to check the delineated units of the maps prepared maps and also secondary data related to irrigation, agriculture, landuse filed observation classes are incorporated into the landuse/landcover maps (SS.Asadi et al. 2014)."Land cover" refers to the vegetative or non-vegetative characteristics of a portion of the Earth's surface. Land cover is that which covers the surface of the earth and land use describes how the land cover is modified(SS.Asadi et al. 2015). "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., forest land). The present type of covered land was 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 level 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 use information can be used to develop solutions for natural resource management issues such as salinity and water quality. The following points below are presented to clarify the distinction between land use, land cover, and other geographic map layers:

- Land use and land cover layers are not meant to define political or administrative boundaries, although in some cases, these layers may be helpful in supplemental sources in defining land use. For instance, a state park boundary may imply certain uses of the land within the boundary.
- The land use and land cover layers will not replace planimetric feature layers of the GIS. Certain "base map" layers of the GIS will contain point and line features delineating the road network; natural and artificial drainage lines; towers, wells, and other structures; transmission lines; etc.
- Land use and land cover layers will map areas exhibiting common land use or land cover. Points and lines representing physical features and infrastructure will not be included as part of the land use and land cover classification systems. These planimetric feature layers, however, may often be displayed or plotted with the land cover or land use information to provide a geographic reference.
- The land use and land cover categories are not meant to duplicate or replace schemes for classifying plant or animal habitats or natural communities, although the land cover classes described in this document have taken into account existing approaches for categorizing natural communities.

The mandals which have better road network and mandals which are selected for study area. Land parcels are identified in those mandals for the development of townships. Land parcels selected should be of timber lands.

1.1. Description of Study Area

Table .1 shows the list of 10 mandals which are selected for 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 270 C to 450 C. The temperature amid winter months ranges from 280 C to 170 C. The normal mugginess

ranges from 68% to 80% amid summer season. The yearly precipitation in the area is around 965mm and is contributed by the south west monsoons.
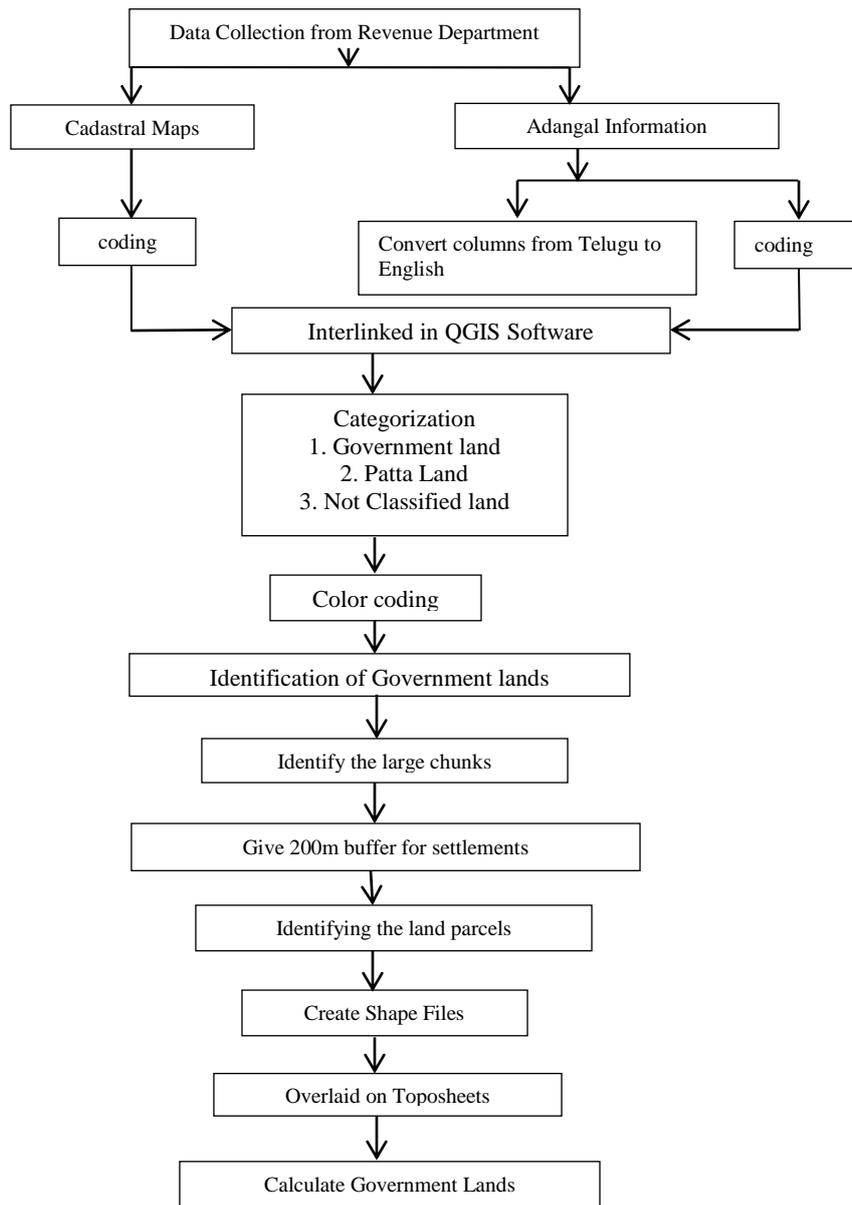
Table 1 Mandals List

Agiripalli Mandal	Nandigama Mandal
Kancihikacharla Mandal	Nuziveedu Mandal
G konduru Mandal	Pamidimukkala Mandal
Gannavaram Mandal	Pedaparupudi Mandal
Ibrahimpatnam Mandal	Vijayawada rural

2. OBJECTIVE

- Preparation of land information for the study area.
- Identification of large land parcels for the study area.

3. METHODOLOGY

Figure 1 Methodology flowchart

Cadastral data and Adangal data was collected for the study area. Adanagal 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 identification of government land and identification of major chunks. identification of land parcels in particular mandals which are nearer to the capital city. These parcels are identified for preparation of township planning. QGIS software was used for the calculation of government land of the particular parcel.

3.1. Step by Step Procedure

The process of reclassifying and analysing of land 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 these mandals land data 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 data that obtained study 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 (Agiripalli25).

- 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.

- 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 remaining all 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 study area 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.

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- 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 proposed 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 final output is exported as an image with proper dpi resolution. Figure .2 the final output image of government land inventory.

- Labelling and beautification of the final output is done in the GIS itself including the scale bar and north arrow.

- After opening all the required files, now choose an area in the entire mandal base map which having higher amount of government lands and better connectivity.

- Land parcels are selected in seven mandals which are Agiripalli, Gannavaram, Chandarlapadu, Nandigama, Kanchikacherla, G konduru and Atchampeta Mandals.

- After selecting the location of the parcel give buffer of 200 m for the existing if any are found on surroundings.

- Export the buffered shapefile as a new shapefile.

- After giving the buffer for existing settlements in the chosen location, now start digitizing the shape of the land parcel with an area of not lesser than 50 acres and area not exceeding 6000 acres.

- While digitizing the shape of the land parcel follow the existing road networks or natural bodies for getting a proper kind of shape. All the maps prepared were converted into soft copy by digitization (SS.Asadi et al. 2014). Graphics reparation, editing, composition of layout was done using Arc Info and Arc view software (SS.Asadi et al. 2015).

- It is to be noted that identified land parcel should have government land not less than   20 % and should have better connectivity.

- After digitizing the shape of the land parcel, export the shapefile into a new shapefile to a desired location. Digitization work was carried out in Arc GIS. The maps are prepared to a certain scale and show the attributes of entities by different symbols or colouring (SS.Asadi et al. 2015).

- After completion of identification of land parcels they are exported as an image with proper dpi resolution by adding additional layers consisting of ring roads, forests, natural bodies and road network etc. after performing all the operations Google base map layer is switched on and then exported as an image.

- Fig .3 shows the base map with identified land parcels in Chandarlapadu, Nandigama, Kanchikacherla, G konduru, Atchampeta Mandals and fig .4 shows the Draft Perspective Plan with identified land parcels, fig .5 shows the identified land parcels in Agiripalli Mandala and fig.6 shows the identification of land parcel in Gannavaram Mandalunder URDA region.

4. RESULTS AND DISCUSSIONS

From the figure .2 it can be clearly seen that all the land parcels with red colour are named as Government lands, purple colour lands are not classified lands, orange coloured lands are Government committed lands and forest lands are coloured in green. Patta lands are left in the classification because here major concern is about government lands. Table .2 shows the area of each land category in acres of all mandals. From the figure it can be concluded that government lands, patta lands and not classified are in same percentage in selected mandals. 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 toposheet. 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 parcels for the development of townships are identified with proper road connectivity and excluding settlements with a buffer of 200m. In the identified land parcel red coloured line represents the boundary of the land parcel. 13 land parcels are identified in the given mandals. Out of all the land parcels Chandarlapadu-3 parcel is the bigger one Ibrahimpatnam is the smaller and closest one to the capital city. Table .2 shows the percentage of government lands with respect to the total land for every parcel in all the mandals. And table .3 shows the totao area of land in all mandals.
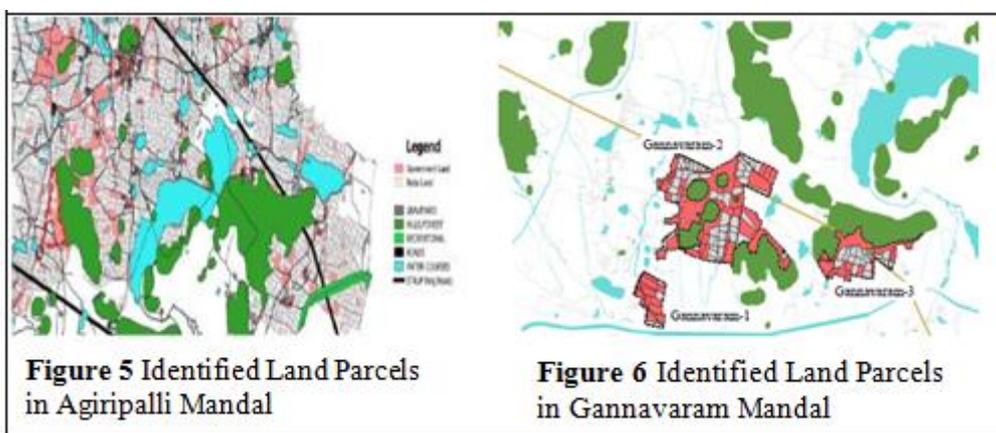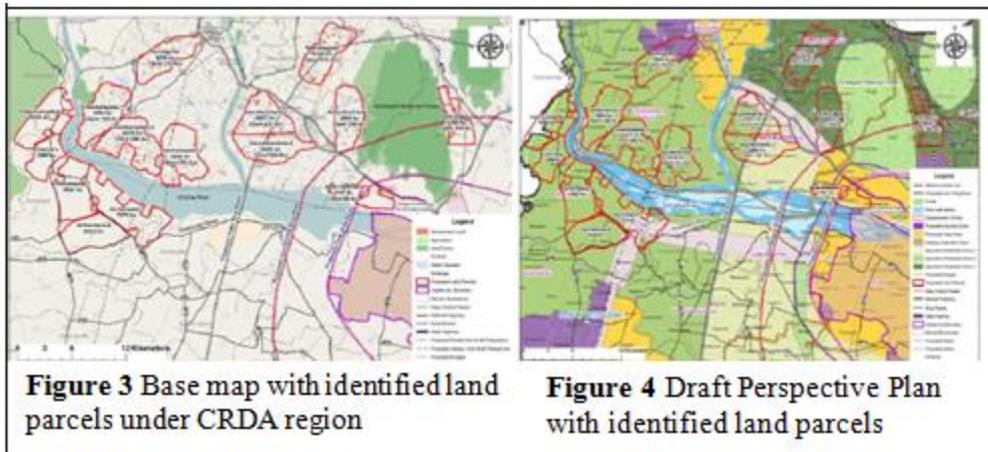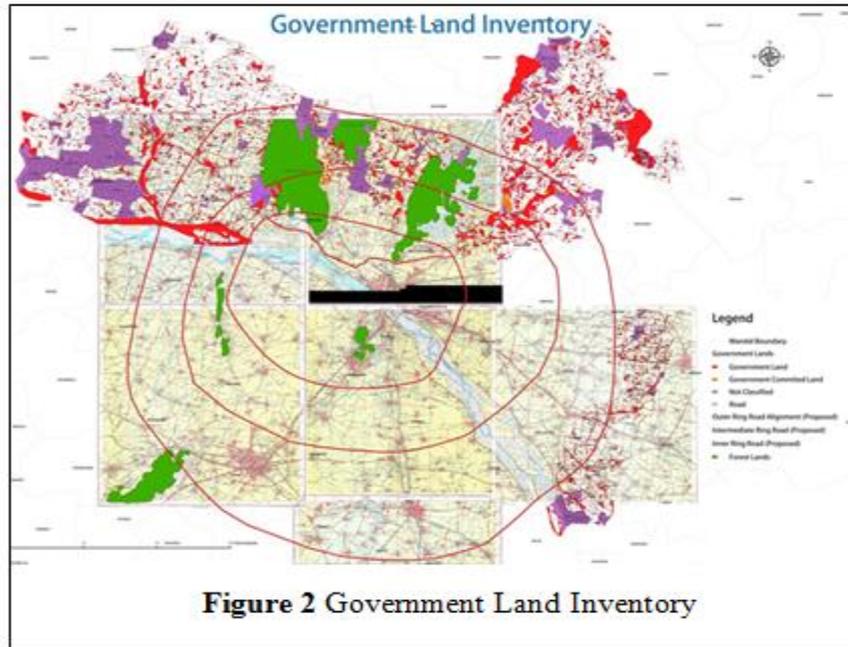
Table 2 Percentage of government lands with respect to the total land in all land parcels

Parcel No.	Name of the Parcel	Total Area(Ac)
1	Atchampeta-1	5523
2	Atchampeta-2	5328
3	Atchampeta-3	7379
4	Chamarru	3069
5	Chandarlapadu-1	5694
6	Chandarlapadu-2	6270
7	Chandarlapadu-3	6338
8	Cherukumpalem	5295
9	Ibrahimpatnam	3187
10	Kanchikacherla-1	5057
11	Kanchikacherla-2	5295
12	Kanchikacherla-3	4809
13	Nandigama	4858
14	Agiripalle	260
15	Gannavaram-1	400
16	Gannavaram-2	1120
17	Gannavaram-3	165
	Total	68102

Table 3 Distribution of lands in all mandals

Government Land	27053 Ac
Government Committed Land	1188 Ac
Patta Land	132633 Ac
Not classified Land	3361 Ac

Figure 2 Government Land Inventory

Figure 3 Base map with identified land parcels under CRDA region

Figure 4 Draft Perspective Plan with identified land parcels

Figure 5 Identified Land Parcels in Agiripalli Mandal

Figure 6 Identified Land Parcels in Gannavaram Mandal

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