ABSTRACT
The effective information system is necessary to make available all kinds of data related to the Mandal, easily and concisely for planning at regional level. It helps in regular updating of database over the years to ensure better availability of Mandal information. The main objective of the study is to develop a Mandal information system providing complete information for decision-making based on their existing resources and capabilities. Hence, an attempt has been made to assess the standard of each infrastructure facility in Ongole mandal, Prakasam district. For this purpose, type of housing, roads, water supply and sanitation, electricity, telephone, transportation facilities have been identified as the major fields of the basic infrastructure. Detailed information about the infrastructure in Ongole mandal has been used for the development of the information system in ARCGIS environment. High-resolution satellite data from IRS-P6, LISS-IV –MX Resolution of 5.8m satellite has been used for the preparation of large scale base, drainage, transportation and land use/land Cover maps (1:10,000 Scale) supported with extensive field survey.

KEYWORDS: Planning, Mandal information system, Remote Sensing, GIS.

1. INTRODUCTION
Planners and decision-makers at Micro level have to depend upon spatial and non-spatial data for optimal interpretation. Hence, the planners need to have at their disposal sophisticated data management systems to handle such spatially correlated data. Mandal level studies are one of the most efficient ways to understand the farming systems in rural areas and also help in identifying the socio-economic and institutional constraints faced by the farming community. The emergence of Remote Sensing and Geographic Information System as a powerful tool for spatial analysis and storage has in effect alleviated the problem by computerization of the spatial data. This new technology can reduce the time and cost to the planners in organizing the data in arriving at precise conclusion and decisions. Mandal Level Information System, generated in the present project which integrates the spatial village maps with non-spatial or tabular information, has demonstrated its potential for grass-root level development planning taking into consideration the local needs and constraints.

2. IMPORTANCE OF MANDAL INFORMATION SYSTEM
Mandal Information has been defined as the “process of recording and dissemination information about the villages resources information, census, utilities, land use and use of land its associated resources”. A good administration system should permit the integration of village information and land use with sociological, economic and environmental data in support of physical planning. The availability of up-to-date large-scale spatial data provides the basic framework within which development schemes can be planned and assessed and acceptable designs implemented. Mandal level information system would allow planners and citizens to quickly and efficiently create and test alternative development scenarios and determine their likely impacts on future land use patterns vis-à-vis ever-increasing population allowing public officials to make more informed planning decisions. In short, use of (MLI) in local government administration would increase efficacy, save time, improve accuracy, generate revenue, automate tasks, provide better decision support as well as being economical.

3. STUDY AREA
The study area selected for the project is Ongole mandal, Prakasam District of Andhra Pradesh in India. Prakasam is an administrative district in the state of Andhra Pradesh with the district headquarters located at Ongole. There are a total of 56 mandals in this district occupying an area of 17,626 km² with a population of 3,054,941 (as of 2011census). Some of the main towns in Prakasam district are Markapur, Chirala, Addanki, Kadudur, Giddalur, Podilli, Dornala, Cumbum, Kanigiri and Chimakurthi. Prakasam district occupies an area of 17626Km² with various agricultural, mining and quarrying, manufacturing and other household industries. However, the study area Ongole mandal is located at Longitude of 79° 53’34.57” to 80° 2’ 29.70’’ and Latitude of 15° 55’38.85” to 15° 41’ 10.18’’. Area of Ongole mandal is 220.29 sq.kms (approximately) .it has a total population of 204,904 as per 2011 census.

3.1 LOCATION MAP OF THE STUDY AREA:

![Location map](image)

4. ARCGIS
ArcGIS has a high-level geographic data model for representing spatial information as features, rasters, and other spatial data types. ArcGIS supports an implementation of the data model for both file systems and DBMSs. The file-based models include GIS datasets, such as coverages, shapefiles, grids, images, and Triangulated Irregular Networks (TINs). The geodatabase model manages the same types of geographic information in a DBMS, providing many of the management benefits offered by a DBMS. Both the file-based data models and the DBMS-based geodatabase model define a generic model for geographic information. This generic model can be
used to define and work with a wide variety of different user or application – specific models. By defining and implementing the behaviour of a generic geographic data model, geographic information in ArcGIS provides a robust platform for any GIS application. ArcGIS enables large volumes of imagery to be made quickly accessible to a wide range of applications and users. ArcGIS provides the infrastructure that supports multiple workflows associated with collection, management, production, and exploitation of imagery. This includes the ability to serve imagery quickly through dynamic, sersideside image processing which complements a rich capability for image management and dissemination.

5. Objectives
A- To develop a standardized data model for Land use/Land cover on 1:10,000 Scale for object oriented mapping of a studied area.
B- To prepare the digital thematic map namely, base, drainage, transportation and land use/land cover, using satellite images on ArcGIS platform and to maintain a spatial digital database.
C- To create a Mandal Information System using ARCGIS software.

6. Methodology
For analysis and interpretation, two types of data products are needed, namely that is basic data and ground data
1. Basic data:
A) Satellite data
B) Toposheets
C) Local knowledge
d) Area map on any scale to transfer details
E) Reports and other literature of the study area
2) Ground data: Ground data is very much essential to verify and to increase the accuracy of the interpreted classes and also to minimize the field work.
3) Data analysis: For analysis and interpretation of satellite data, the study can be divided into three parts:
A) Preliminary work
B) Field work
C) Post field work
A. Preliminary work includes:
- To see the limitation of satellite data
- To lay down the criteria for land use classification to be adopted
- To fix the size of mapping units, which depends upon the scale
- Interpretation of different land use/land covers classes
- Demarcation of doubtful areas
- Preparation of field land use/land cover map

B. Field work:
- Type of ground data to be collected
- Selection of sample area for final classification
- Checking of doubtful areas
- Change in land use/land cover due to wrong identification, fresh development, nomenclature.
- General verification

C. Post field work:
- Reinterpretation and analysis or correction of doubtful areas
- Transfer of details on base map

7. Creation of Mandal Information System (MIS) is structured by grouping the activities into seven groups, the seven group activities are
- Development of data model for LU/LC on 1:10000 scale.
- Scanning and Digitization of Maps.
- Georeferencing and Registration.
- Field Work, Field data collection and GPS survey for GCPs.
- Generation of Thematic Maps.
- Data base Design and Management
- Home page Design for web-based VIS.

8. DATA MODEL FOR LAND USE / LAND COVER (ON 1: 10000 SCALE)
A modern nation must have adequate information on many complex interrelated aspects of its activities in order to make decisions. Land use / Land cover is only one such aspect, but knowledge about land use and land cover has become increasingly important as the Nation plans to overcome the problems of haphazard, uncontrolled development, deteriorating environmental quality, loss of prime agricultural lands, destruction of important wetlands, and loss of fish and wildlife habitat. Land use data are needed in the analysis of environmental processes and problems that must be understood if living conditions and standards are to be improved or maintained at current levels.

9. RESULTS
9.1 Base map
Base Map is prepared by using Survey of India topographic maps on 1:25,000 scale. All the settlements, road network, water bodies and forest areas are taken into consideration. By comparing the Survey of India topographic maps with that of the satellite image the size of all the settlement areas are increased and updated. The aerial extent of the study area is 220.29 sq.kms. (Fig.4)

9.2 Drainage map
Drainage All the water bodies are divided into dry and wet areas. These wet (water spread) areas changes from time to time and some new tanks are found in the satellite images. For this reason, the drainage map is updated from the satellite. The drainage system existing is Dendritic Drainage pattern (Fig.5)

9.3 Transport map
In the study area all the settlements are connected either by Metalled road or Un-Metalled road and National Highway -5 is passing through this study area. The image shows (Fig.6)

9.4 Landuse/ Landcover Map
The land use/land cover categories such as built-up land, agriculture, forest, water body and wastelands have been identified and mapped from the study area (Figure 2). Major part of the study area is covered with single crop and double crop (19%). About (7%) of the study area is under built-up land. From the satellite data the agriculture area (74%) could be clearly delineated as, single crop, double crop, vegetation and plantations. Though single crop and double crop has been observed at various parts of the study area and plantations are observed at some places of the study area (8%). Water bodies occupied (3%). Under this category land with scrub (5%), land
without scrub (5%) Based on the land use/land cover categories (Figure 2), infiltration rates of water are less at built-up land areas. Consequently groundwater potentials at these places are low, whereas the places where water bodies are present have high potentials and moderate potential at remaining categories (John R Jensen, 2006) Present land use/land cover map showing the spatial distribution of various categories and their aerial extent for the present study. The spatial distributions of various land uses are interpreted based IRS-P6, LISS III-MX (Resolution 5.8m) data.

9.5 Major Crops in the study are
Paddy, Jowar, Bajra, Redgram, Bengalgram, Chillies, Cotton, Groundnut, Sunflower and Tobacco.

10. DATABASE FORMAT DEVELOPED FOR MANDAL LEVEL INFORMATION SYSTEM & INCORPORATED IN ARCGIS SOFTWARE
1. Agriculture information
2. Land information
3. Industries information
4. Pensions information
5. Telephone information
6. Watersheds information.
7. Banks information
8. Basic village facilities
9. Birth and death ratio
10. Classification of workers
11. Distance from the nearest facility
12. Education information
13. Health & safety
14. House holds information
15. Infrastructure utilities
16. Literacy information
17. Marketing details
18. Natural water resources
19. Population
20. Power supply
21. Ration cards details
22. Social welfare hostels
23. Telephone information
24. Watersheds information.
25. Other information
11. CONCLUSION
This research paper has demonstrated the ability of ARCGIS Software in capturing spatial-temporal data. Attempt was made to capture as accurate as possible on 1:10000 scale, Classifying land use land cover upto Vth –Level and developed the common legend for land use land cover mapping. The information can be used to assess the capability of the area for its shortcomings and hence to improve the productivity capacity and this will play an increasing role in the way future environmental proposals and decisions are made, India has developed an operational mechanism for natural resources. Developments in space-based earth observation and weather watch capabilities in future may help refining existing models/approaches for prediction of such events and their management. Recent advances in satellite sensor spectral, spatial and radiometric capabilities have strengthened the operational scenario of remote sensed based land use / land cover change information at village and mandal level which is important for modeling the environmental changes. Hence high resolution satellite data IRS-P6 LISS-IV –MX Resolution of 5.8m has been used in this case study and database has been developed and incorporated in the software for “Development of Mandal Level information system using ArcGIS”.

REFERENCES:
3. Panchayat level resource mapping by NRSC