

A Spatial and Temporal Study on Land Use Land Cover of Keesara Mandal, Telangana State



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Abstract

Land use and land cover data are essential for planners, decision makers and those concerned with land resources management. Information on Land use / Land cover in the form of maps and statistical data is very vital for spatial planning, management and utilization of land for agriculture, forestry, pasture, urban- industrial, environmental studies, economic production etc. Remote sensing systems have the capability for repetitive coverage, which is required for change detection studies. Keesara is a Mandal in Rangareddi District of Telangana State, India. Keesara Mandal Head Quarters is Keesara town. Keesara is belongs to Medchal revenue division. Total population of Keesara Mandal is 177,288 living in 44,242 Houses, Males are 90,006 and Females are 87,282. The total urban population is 159,002 and rural population is 38,143, the average Sex Ratio of Keesara Mandal is 970 as per 2011 census. The materials necessary for the study as far as possible have been collected from the publications, records and latest publications of land use and land cover. Modern GIS techniques and image interpretation have used in the study area. Besides, an attempt is made to illustrate the facts and results with the help of suitable and latest cartographic techniques and software techniques.

Keywords: Land Use Land Cover, Spatial, Urban, GIS, Remote Sensing and Cartography Techniques.

Introduction

Land use refers to the type of utilization to which man has put the land. Land cover is refers to evaluation of the land with respect to various natural characteristics. Land use and land cover data are essential for planners, decision makers and those concerned with land resources management. Today, with the growing population pressure, low man-land ratio and increasing land degradation, the need for optimum utilization of land assumes much greater relevance. Land use inventory surveys, periodically, are a must to make available the information on the type, spatial distribution, location, aerial extent, rate and pattern of change of each category of land use / land cover on the land.

Urban Land Use: Urban areas being dynamic it becomes very essential to take note of urban land use changes through Geoinformatics tool.

Information on Land use / Land cover in the form of maps and statistical data is very vital for spatial planning, management and utilization of land for agriculture, forestry, pasture, urban- industrial, environmental studies, economic production etc.

Remote sensing nowadays has become a modern tool for mapping and analysis of land use and land cover for micro, meso, and macro level planning. Remote sensing systems have the capability for repetitive coverage, which is required for change detection studies. For ensuring planned development and monitoring the land utilization pattern, preparation of land use and land cover map is necessary.

Objectives of the Study

1. To study the spatial distribution of land use and land cover in the study area during 1991 and 2016.
2. To study the temporal variation of land use and land cover in the study area during 1991 and 2016.

Study Area

Keesara is a Mandal in Rangareddi District of Telangana State, India. Keesara Mandal Head Quarters is Keesara town. Keesara is belongs to Medchal revenue division. As part Telangana Districts re-organization,

Keesara Mandal re organised from Rangareddi District to Medchal district. Keesara Mandal is bounded by Ghatkesar Mandal towards South, Shamirpet Mandal towards North, Bommala Ramaram Mandal towards East, Bibinagar Mandal towards East. Keesara consist of 28 Villages and 12 Panchayats. Haridaspalle is the smallest Village and Nagaram is the biggest Village. It is in the 481 m elevation.

Total population of Keesara Mandal is 177,288 living in 44,242 Houses, Males are 90,006 and Females are 87,282. The total urban population is 159,002 and rural population is 38,143. The Average Sex Ratio of Keesara Mandal is 970. As per Census 2011 out of total population, 84.5% people lives in urban areas while 15.5% lives in the rural areas. The average literacy rate in urban areas is 85.5% while that in the rural areas is 67.7%. Also the Sex Ratio of Urban areas in Keesara Mandal is 972 while that of rural areas is 958. The population of Children of age 0-6 years in Keesara Mandal is 20377 which is 11% of the total population. There are 10474 male children and 9903 female children between the age 0-6 years. Thus as per the Census 2011 the Child Sex Ratio of Keesara Mandal is 945 which is less than Average Sex Ratio (970) of Keesara Mandal. The total literacy rate of Keesara Mandal is 82.76%. The male literacy rate is 77.54% and the female literacy rate is 68.82% in Keesara Mandal. Schedule Caste (SC) constitutes 10.6% while Schedule Tribe (ST) was 2.5% of total population in Keesara Mandal as per the

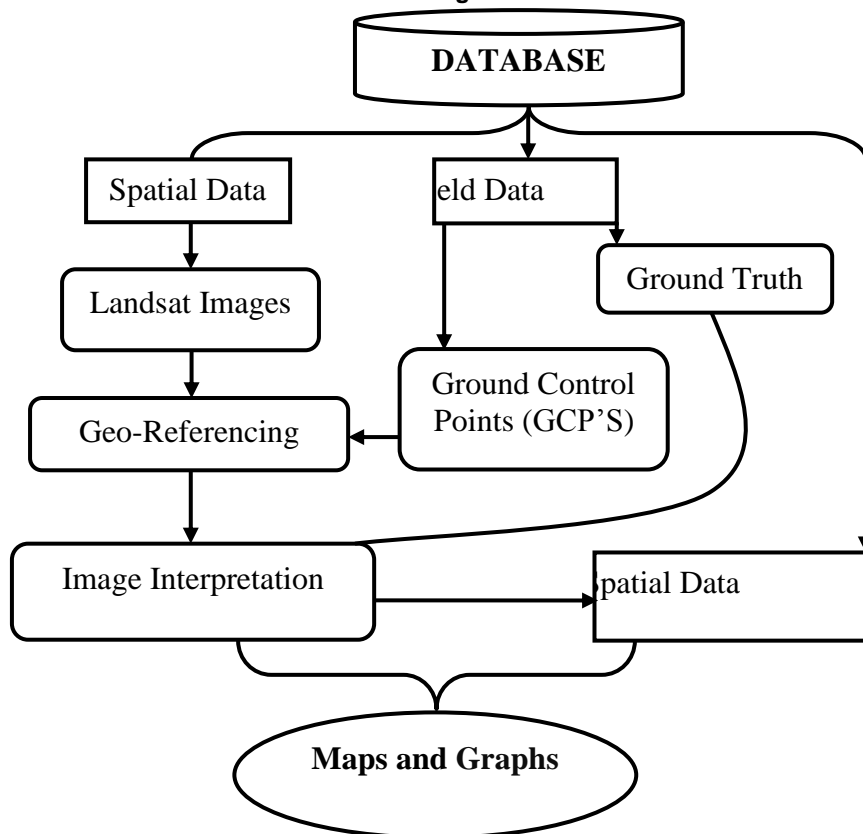
2011Census. It is too hot in summer. Keesara summer highest day temperature is in between 28 °C to 46 °C. The annual rainfall ranges from 516 mm in 2011 to 1110 mm in 2010. The annual rainfall departure ranges from -38 % in 2011 to 33 % in 2010. The southwest monsoon rainfall contributes about 78 % of annual rainfall. It ranges from 428 mm in 2002 to 927 mm in 2010.

Methodology and Data Base of the Study Area:

The materials necessary for the study as far as possible have been collected from the publications, records and latest publications of land use and land cover. Modern GIS techniques and image interpretation have used in the study area. Besides, an attempt is made to illustrate the facts and results with the help of suitable and latest cartographic techniques and software techniques. The methodology adopted in the present work is shown in Fig.1. the outcome of the data processing and analysis were presented in form of digital maps, layout and attribute tables

1. Geo referencing of Landsat digital data by extracting the Ground Control points (GCPs).
2. Digital Image enhancement of Landsat image.
3. Landsat image is FCC mode and is used for interpretation to extract the land use and land cover information by applying both pre visual interpretation ground truth.
4. Plotting all the information of non spatial data in the form of graph and diagrams for better interpretation and analysis.

Figure1



Remarking An Analisation

The total area of study area is 106.46 sq. Kms. The land use and land cover classification of study area is divided into five classes. They are Agriculture Area, Built-Up Area, Forest Cover, Water Bodies and Other Lands.

Table - 1 Land use land cover classification in 1991

Land Use and Land Cover	Area in Sq. KM
Agriculture Area	19.03
Built-up Areas	1.40
Forest Cover	3.75
Water Bodies	1.94
Other Lands	80.34
Total	106.46

Figure 2

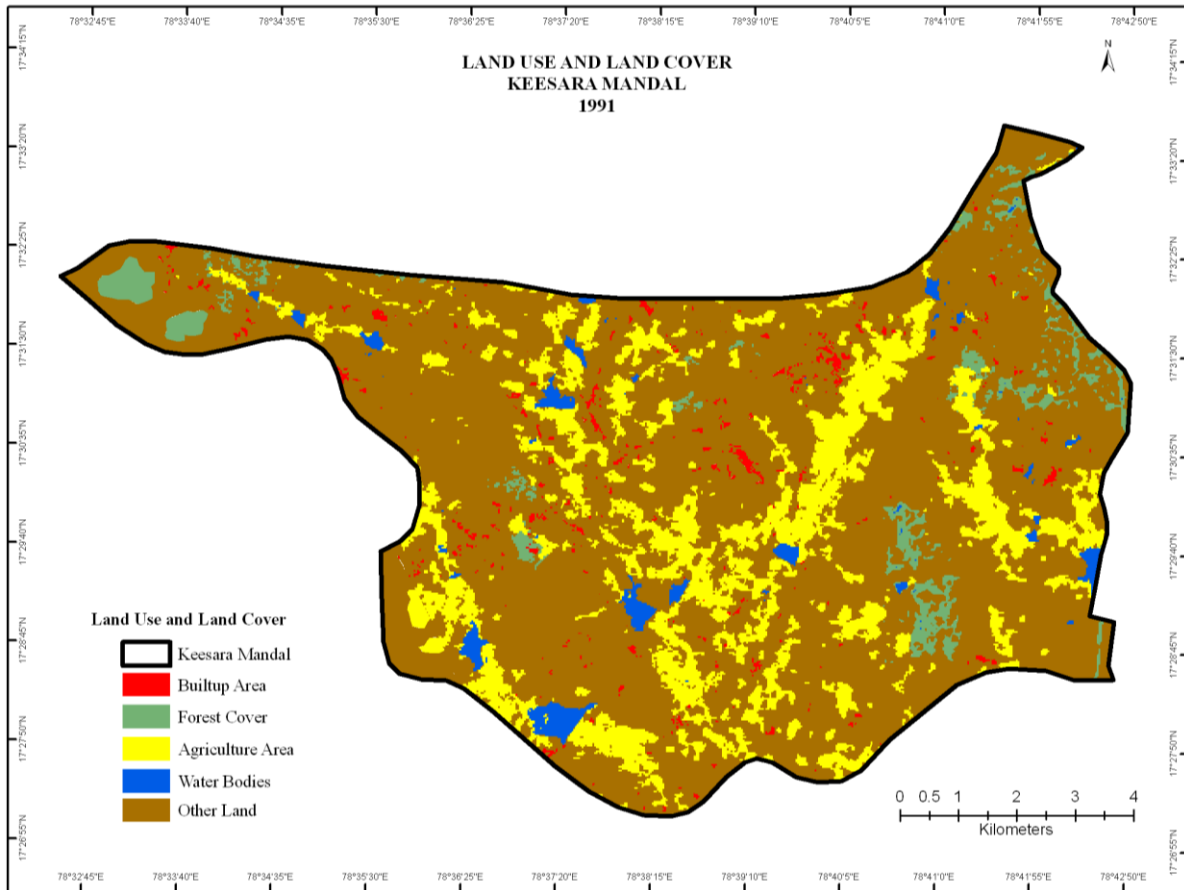
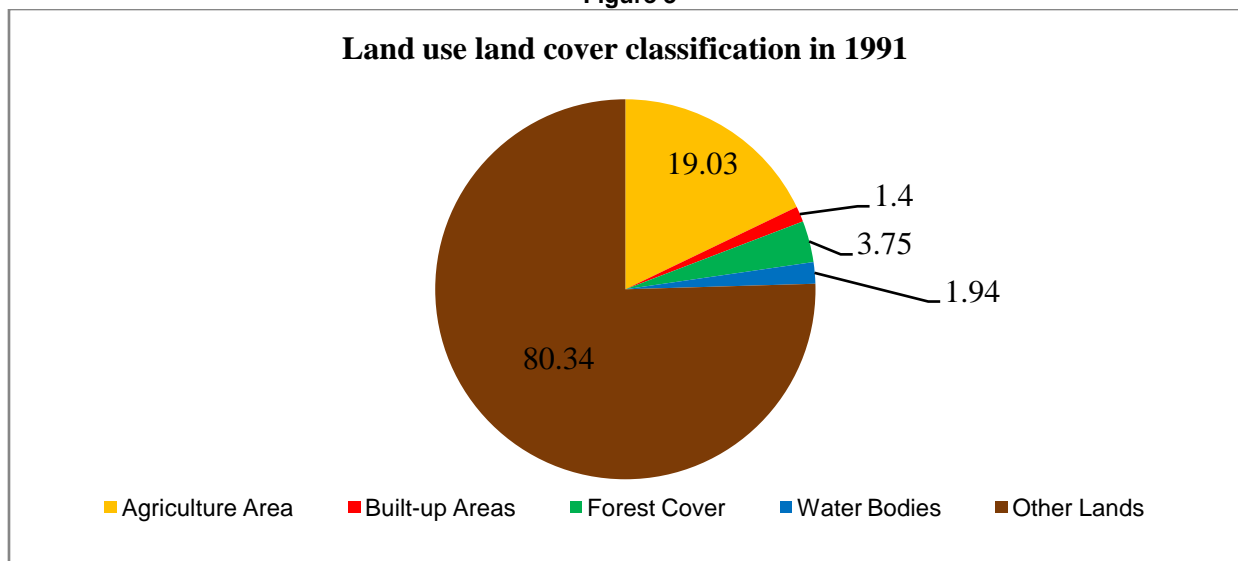


Figure 3



Remarking An Analisation

Agriculture Area

This is inclusive of all the cultivated areas covering. 17.88% of the study area, which covers 19.03 sq. Kms, was covered by Agriculture Area. The second highest percentage of area is agriculture land in the study area. Middle area of the study area is almost covered by agriculture area. Most of the Agriculture area is covered around the water bodies in the study area in 1991.

Built-Up Area

This is inclusive of all the built – up areas covering residential, industrial, govt. and all other constructed structures, roads etc. 1.32% of the study area, which covers 1.40 sq. Kms, was covered by built – up area. The fourth highest percentage of area is built-up area in the study area in 1991. Much of this 1.40 sq.kms concentration was in and around keesara village and Dammaiguda village.

Other Lands

This is inclusive of all the Scrub areas, uncultivated and unused land etc. 75.46% of the study area, which covers 80.34 sq. Kms, was covered by Other Lands. The highest percentage of area is other lands in the study area in 1991. Badshahpet, Kundanpally, Rampally, Mallegudem and Cheryal

surrounding villages etc. were occupied by open scrub.

Forest Cover

Other land uses like forest area occupied 3.52% of the study area, which covers 3.75 sq. Kms. The third highest percentage of area is forest cover in the study area in 1991. Forest area is covered in south east, west and east sides covered.

Water Bodies

Water bodies occupied 1.82% of the study area, which covers 1.94 sq. Kms. The agriculture area is very high around the water bodies in the study area in 1991.

Study area covering all the major tanks like Kundanpally cheruvu and cheryal tank.

Table – 2 Land use land cover classification in 2016

Land Use and Land Cover	Area in Sq. KM
Agriculture Area	3.04
Built-up Areas	19.27
Forest Cover	8.72
Water Bodies	1.44
Other Lands	74.00
Total	106.46

Figure 4

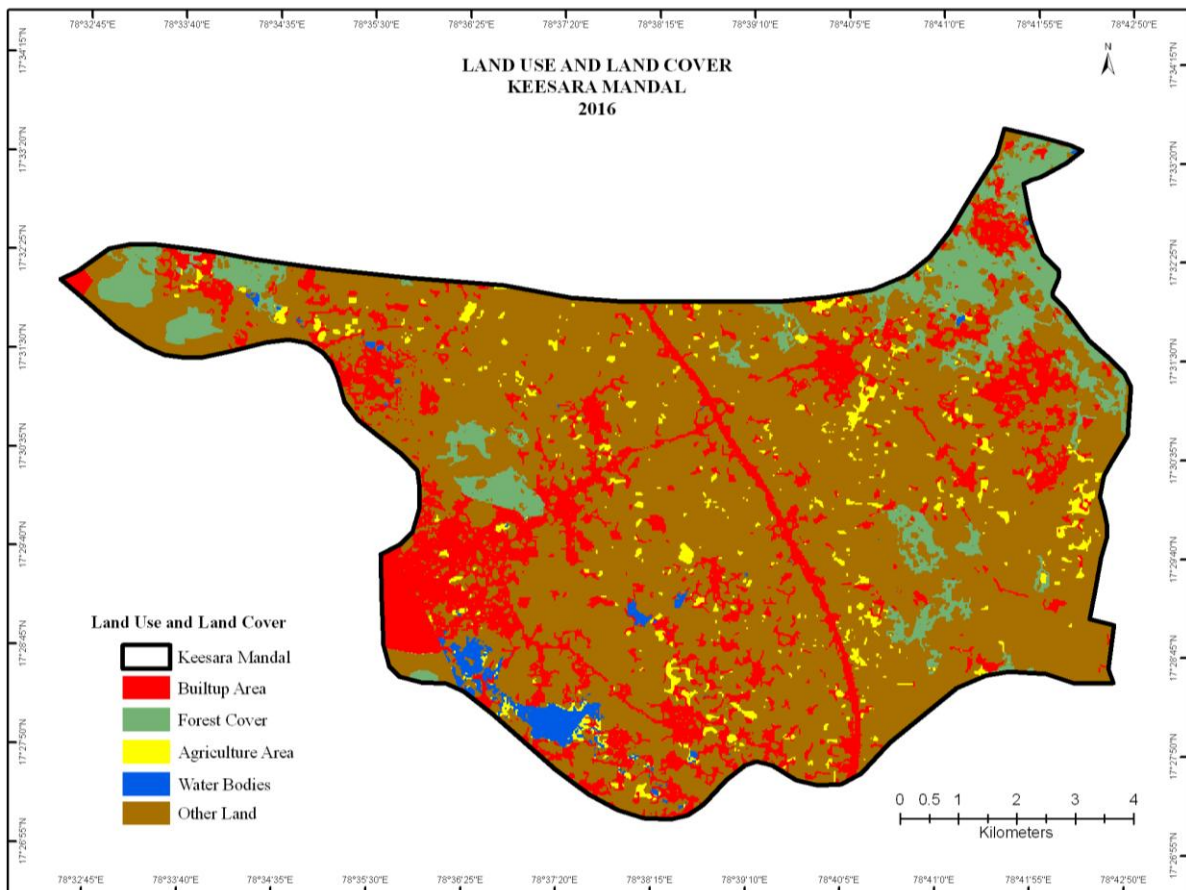
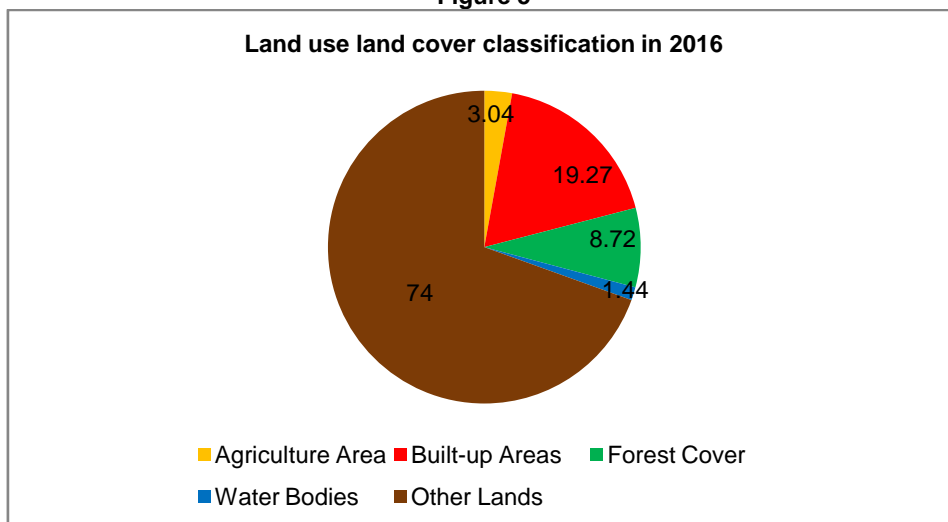


Figure 5



Agriculture Area

This is inclusive of all the cultivated areas covering. 2.85% of the study area, which covers 3.04 sq. Kms, was covered by Agriculture Area. Most of the Agriculture area is covered around the water bodies in the study area in 2016.

Built-Up Area

This is inclusive of all the built – up areas covering residential, industrial, govt. and all other constructed structures, roads etc. 18.10% of the study area, which covers 19.27 sq. Kms, was covered by built – up area. The second highest percentage of area is built – up area in the study area in 2016. Much of this 19.27 sq.kms concentration is in and around keesara, Dammaiguda, Cheryal, Rampally, Mallegudem and Kundanpally villages.

Other Lands

This is inclusive of all the Scrub areas, uncultivated and unused land etc. 69.51% of the study area, which covers 74.00 sq. Kms, was covered by Other Lands. The highest percentage of area is other lands in the study area in 2006. Badshahpet, Kundanpally, Rampally, Mallegudem Keesara gutta and Cheryal surrounding villages etc. were occupied by open scrub.

Forest Cover

Other land uses like forest area occupied 8.19% of the study area, which covers 8.72 sq. Kms. The third highest percentage of area is forest cover in the study area in 2016. The new urban forestry belts are covered in 2016.

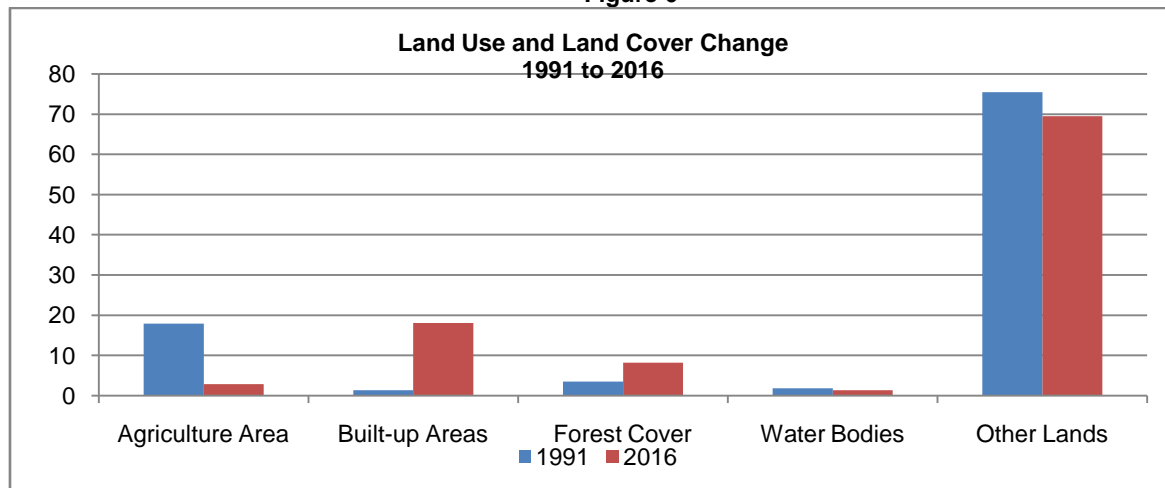
Water Bodies

Water bodies occupied 1.35% of the study area, which covers 1.44 sq. Kms. The agriculture area is very high around the water bodies in the study area in 2016. Study area covering all the major tanks like Kundanpally cheruvu and cheryal tank.

Table – 3 Land Use and Land Cover Change and Growth Rate 1991 to 2016

Land Use and Land Cover	Percentage of Land		Growth Rate
	1991	2016	
Agriculture Area	17.88	2.85	-84.06
Built-up Areas	1.32	18.10	1271.21
Forest Cover	3.52	8.19	132.67
Water Bodies	1.82	1.35	-25.82
Other Lands	75.46	69.51	-7.88

Figure 6



The agriculture area is decreased to 2.85% from 17.88%, the growth is negative of 84.06. The built up area is increased to 18.10% from 1.32%, the growth is 1271.21. Forest area is increased to 8.19% from 3.52%, the growth rate is 132.67 because of urban forest belts are established. The water bodies are decreased to 1.35% from 1.82% the growth rate is negative of 25.82.

Conclusion

The result of the research shows that the built-up areas have been on a constant positive and mostly uncontrolled expansion from 1.32% in 1991 of the study area in to 18.10% in 2016. The highest growth rate is 1271.21 of built up area. Because of outer ring road the built up area is increased rapidly. The rapid growth of built up area is burden to the local government for providing basic needs.

It is suggested that Government should encourage its personnel through funding so that changes in land use at regular interval will be detected. If such funds are made available, more research should be focus towards the use of modern application; such as, GIS and RS to obtain fast and accurate digital data or information.

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