



LAND USE PATTERN AND LAND USE EFFICIENCY OF THE KURNOOL DISTRICT, ANDHRA PRADESH

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ABSTRACT

The Present study aims to discuss the Land use pattern and Land use Efficiency of the Kurnool District. Land Resource are limited, it can be said that non- renewable Resources. The key task is in their rational use, which hangs from their effectiveness. Agricultural land use efficiency is the main factor that has a significant impact on the socio-economic situation both in individual regions and in the country as a whole. Land use data is important in analysis of environmental process and understanding its problems, if the living conditions and standards to be improved or maintained at current level and to avoid the adverse development. The Kurnool district has at typical geographical aspects and climatic variation comparatively from the other districts of Rayalaseema region. The district is rich in regur, ferruginous soils which constitute about 60 and 40 percentages respectively. The crops mainly raised are paddy, jower, Pulses, cotton, Ground nut. The annual average precipitation of the district is 653 mm. Its land use components are Net sown area, forest, current fallows, Land put to the non-agricultural use, Barren & Uncultivable land, other fallow lands, cultivable waste land, Permanent Pasture and other grazing lands, misc. tree crops and groves. The depth to water level ranges from 2.20 to 12.67 m bgl. The Increasing population puts enormous pressure on the land in the district. As a result, the land use pattern of the district keeps on changing. The agricultural lands are being acquired for human settlements and various Developmental activities. The forest land has been increased due enhancement of social forestry. The district is predominantly farmed via Rain fed agriculture. Low rainfall, labour scarcity and lack of irrigation facilities have had its impacts on the land; many areas formerly under cultivation have been transformed in to waste lands and uncultivable lands.

KEYWORDS : Land use, forest, Agricultural land, net sown area, Land use efficiency

INTRODUCTION:

Land is an important resource as it provides habitat to a wide variety of flora and fauna and it is a physical unit to carry out various human activities such as agriculture, social forestry, mining, building, roads, setting up of industries. Land use studies are great importance when the resource base of any region is under evaluation. Optimum use ,conservation and scientific management of Land resources play a critical role in developing the agricultural economy of any region.(Ramanaiah 1984, Veerannachari2013).Land use is one such aspect where Knowledge becomes increasingly important as the nation action plans to overcome the problems of haphazard, uncontrolled development, Deteriorating environmental quality and loss of prime agricultural lands etc. One of the prerequisite for better use of land is information on existing land use patterns and change in land use through time (Balaji etikala ,The land use pattern reflects the character of the interaction between people and environment , and influence of distance and resource base upon basic economic Activities (Rupesh kumarguptha ,2010).

The use of Land resources is "central to all discussions of problems and policies (Barlow, 1954 p.99). Therefore, land use planning is essential for the determination of optimum utilisation of every piece of land (Raju and vaidyanadan1978; Rao,2002). Land use study is also very important from the point of eco-development and eco planning. The planning of development land and readjustment is usually carried out in a number of successful phases namely land evaluation, socio-economic analysis, classification and programme effectuation. Land evaluation includes both qualitative and quantitative classification. In developing countries like India the agriculture is the main economic activity. The basic resources namely the land and water has to properly augment. For better planning; appraisal of resources and diagnosis of problem involved in management of resources availability is particularly important in the area of scarce resources. Y.V.Krishnaiah(2013),T.Ravi Raj Kumar(1996).

Land use studies assumed greater academic and Practical significance, especially after the brilliant contribution of Baker (1923), in United States, Stamp (1930), in Britain, and Buck (1937) in China. Some Pioneering works of land use studies in various parts of the Indian sub-continent have been carried out by some university Geography Department e.g Chatterjee (1941), Shafi(1951), Rao ,V.L.S.P (1957),Deshpande(1959), Roy (1961), Singh (1977), Mohammad(1978), and Gowtham and Narayana (1982).

Land use classification is generally made on the basis of different land use like Agricultural, non -agricultural and ecological. A few organisations National Atlas and Thematic Mapping Organisation

(NATMO) at Kolkata, the all-India Soil and Land use survey (AISLU) at new Delhi and Directorate of Economics and statistics (Department of Agriculture and cooperation -ministry of Agriculture, Govt of India). The technical committee on coordination of Agriculture statistics, Govt of India has recommended a standard land use classification and uniform definition of the same to be adopted all over India.

Land use efficiency is a typical concept adhering to the sustainable development model. (Jing Liu et al.,2019), and is also the result of dynamic processes driven by Natural and socio-economic impacts.

LOCATIONAL SETTING OF KURNOOL DISTRICT

Kurnool district is the south-western district of Andhra Pradesh and lies approximately between 14°54' to 16°18' North Latitudes and 76°58' 79°34' East Longitudes. The altitude of the district varies from 100 ft above the mean sea level. This district is bounded on the north by Tungabhadra and Krishna River as well as Mahbubnagar district, on the south by Kadapa and Anantapur district, on the west by Bellary district of Karnataka state and on the east by Prakasam District. The district ranks 10 in population with 40, 53,463 people accounting for 4.63 % of the total population of the state as per 2011 Population census. While in area it occupies the 3rd place 17658 sq.km. which account for 6.41% of the total area of the state. The Nallamala and Earramalla are two important mountain ranges in the district running in parallel from North to south. Earramalla divided the district into two well defined tracks from east to west in terms of soils. The Kurnool District is a combination of Red, Block and sandy soils. It has facility of Irrigation through canals (K.C.Canal, Tungabhadra project low level canal and hundrinevasujalasavanthi project), tanks, wells, and river sources. The district has typically geographical aspects and climatic variation comparatively from other districts of Rayalaseema region of Andhra Pradesh. The district is well connected with road and rail transportation with national highways to farmer capital city of Andhra Pradesh.



Data and Methodology

The Land use data for the year 2018-19 has been collected at mandal level from the chief Planning office (CPO) to study the land use concentration, net area sown, Total irrigated area, Intensity of Irrigation, Intensity of Cropping Pattern and land use efficiency of the district. The statistical Methods adopted by Bhatia (1965) have been used for the Analysis of Land use pattern.

1. Land concentration or Pattern (for example, for Adoni mandal forest area)

Forest area of Adoni mandal	Total Forest area of the District covering all the mandal
Total area of Adoni mandal	Total area of the district

2. Land Use efficiency has been worked out taking seven variables like

1).Net sown area, 2) Total irrigated area,3) Area irrigated more than once,4). Intensity of irrigation, 5). Intensity of cropping pattern, 6). Non cultivable land 7). Cultivable waste land. It may be reiterated that out of these seven variables, the first five are positive indicators while the last two are the negative ones. For these Seven variables mean standard coefficient are calculated for measuring land use efficiency.

Land use pattern

The Land use of the district has been classified into nine Categories, viz, Net area sown (48.10%), Forest (19.30%), Current fallow (10.10%), Land put to non-Agricultural use (8.20%), Barren & uncultivable land (7.20%), other fallow land (4.30%), Cultivable waste land (2.60%) Permanent pasture & other grazing land (0.20%), Misc. Trees, crops and groves (0.10%). (Fig.2).

1).Net area sown: It covers about 849243 ha of land and account for 48.10% of the district(fig. I & Table 1).The spatial pattern shows that very high concentration is found five mandals located in North West, south-west, Northern part of the district. High concentration is found in about seventeen mandals located in North western, central, southern part of the district. Moderate concentration is found fifteen mandal noticed western, centre and north eastern part of the district. Low and very low concentration is found in seventeen mandal located in east, north east, southern part of the district.

2). Forest: it covers 3, 40,669 ha of land and account for 19.30% of the district (fig. A & Table 1). The spatial pattern shows only one mandal srissailam mandal located in north eastern part of the district comes under very high concentration. High concentration is found in eight mandals located in eastern part of the district. Moderate concentration noticed in seven mandals located in south east, western part of the district. Low and very low concentration found in 38 mandals. Out of them some are located in north central part, some are south western and other are located in south eastern part of the district.

3). Current Fallows: It covers an area 1,79,100 ha of land and account for 10.10% of the total geographical area of the district(fig. H & Table 1).The spatial pattern shows that very high concentration is found only one Uyyalawada mandal located in south eastern part of the district. High concentration is found in twelve mandals located in western, south, north eastern part of the district. Moderate concentration is found in eleven mandals located in North West, southern part of the district. Low and very low concentration is found in 30 mandals located in central, north and north eastern part of the district.

4). Land put to non-Agricultural use: It covers an area of about 1, 43,951 ha of land that accounts for 8.20%of the total geographical area of the district (fig. C & Table 1). Its concentration is very high in only one Pagidayala mandal located in north eastern part of the district. Concentration is high in five mandal located in north and north eastern part of the district. Moderate concentration is found in ten mandals located in north central and north eastern part of the district. Low and very low concentration is found in thirty-eight mandal found in south central, south west, eastern part of the district.

5).Barren & Uncultivable land: it covers an area of about 1, 27,313 ha of land and account for 7.20% of the total geographical area of the district (fig. B & Table 1). Very high concentration is found in four mandals located in south, central part of the district. High concentration is found in eight mandals located in south, north eastern part of the district. Moderate concentration is found in nine mandals north central, western, north-eastern part of the district. Low and very low concentration is found in thirty-three mandals located in south eastern, east, western, south-western part of the district.

6).Other fallow land: it covers an area of about 75,562 ha of land and accounts for 4.30% of the total geographical area of the district (fig. G & Table 1). Its concentration is very high in only one mandal Kolimigundla located in southern part of the district. High concentration is found in four mandals north and north eastern part of the district. Moderate concentration is found in twenty mandals located in western, north eastern, central, south-central part of the district. Low and very low concentration is found in 29 mandals eastern, south eastern, north eastern, western part of the district.

7). Cultivable waste lands: It covers about 45,099 ha of the land that accounts for 2.60% of the total Geographical area of the district(fig. D & Table 1).The spatial pattern shows that only one krishnagiri mandal located in central part of the district comes under the category of very high concentration. High concentration is found in nine mandals located in north east and north central and south-central part of the district. Moderate concentration is found in seventeen mandals found in south and south central, eastern, north-western part of the district. Low and very low concentration is found in twenty-seven mandals located in western, south, south eastern, north eastern part of the district.

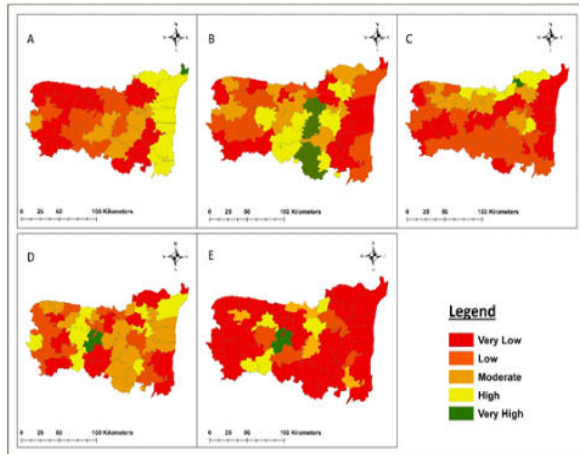
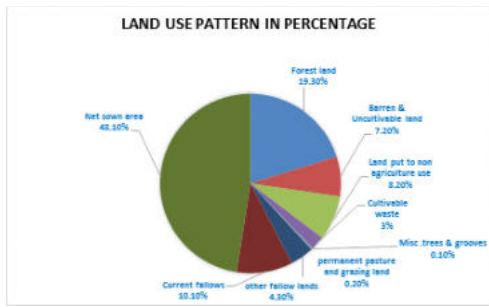
8). Permanent pasture and other Grazing lands: It cover an area of 3,178 ha of the land and accounts for 0.20% of the total geographical area (fig. E & Table 1).The spatial pattern shows that only Krishnagiri mandal located in central part of the district comes under the category of Very high concentration. High concentration is found in five mandals found in south and northern part of the district. Moderate concentration is found in four mandals found in North and western part of the district. Low and very low concentration is found in forty-five mandals.

9). Misc. Tree crops & groves: it covers an area of about 1,685 ha of land that amounts to 0.10% of total geographical area of the district (fig. F & Table 1). Its concentration is very high in one mandal sirvel located in south eastern part of the district. Concentration is high in only one krishnagiri mandal located in central part of the district. Moderate concentration is found in three mandals located in western, north and north central part of the district. Low and very low concentration is found in forty-nine mandals.

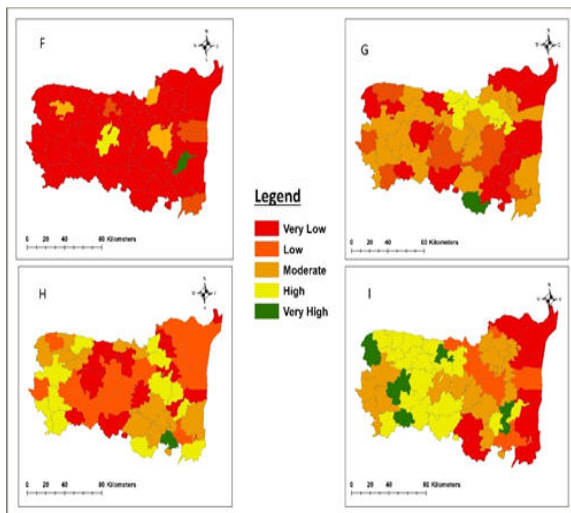
Table: 1 Land use Concentration of the Kurnool District (2018-19)

S.NO	Name of the Mandal	Forest	Barren uncultivable lands	Land put to Non-Agricultural uses	Cultivable waste	Permanent Pastures & other grazing lands	Misc. Tree crops & Groves not included in net area sown	Other Fallows	Current Fallows	Net Area Sown
1	ADONI	0.33	0.94	0.91	0.36	0.00	0.00	1.05	2.15	1.09
2	ALLAGADDA	2.51	0.27	0.87	0.44	1.60	0.00	0.61	0.51	0.69
3	ALLUR	0.10	0.81	0.51	0.50	0.05	0.00	1.20	2.31	1.21
4	ASPARI	0.09	0.63	0.59	0.05	0.00	0.32	1.00	0.97	1.55
5	ATMAKUR	2.47	0.52	0.56	2.43	0.00	0.00	0.41	0.87	0.57
6	BANAGANAPALLE	0.85	1.05	0.74	1.75	0.00	0.00	0.80	1.44	0.99
7	BANDI ATMAKUR	2.75	0.08	0.70	1.11	0.00	2.11	0.17	0.51	0.66
8	BETHAMCHERLA	0.42	3.05	0.88	1.02	1.90	0.00	1.50	1.08	1.07
9	C.BELAGAL	0.00	0.92	2.01	2.53	0.00	0.00	0.35	0.30	1.41
10	CHAGLANARI	1.82	0.62	0.92	0.06	0.00	0.60	1.76	1.82	0.56
11	CHIPPAGIRI	0.00	0.11	0.77	0.16	0.03	0.00	0.48	2.91	1.27
12	DEVANAKONDA	0.28	1.78	1.07	2.47	1.31	0.48	0.18	0.25	1.31
13	DHONE	0.52	1.66	0.90	0.00	0.71	0.00	0.63	0.71	1.26
14	DORNIPADU	0.00	0.00	0.66	0.72	0.00	0.00	0.09	1.28	1.65
15	GADIVEMULA	0.65	1.09	1.11	2.22	0.71	0.00	2.90	0.32	1.02
16	GONEGANDLA	0.00	0.72	1.48	1.91	5.38	0.30	1.74	1.13	1.41
17	GOSPADU	0.00	0.13	0.94	0.49	0.00	0.00	0.01	0.08	1.86
18	GUJUR	0.00	0.19	1.62	1.00	0.00	1.29	0.25	0.36	1.62
19	HALLAHARI	0.11	0.13	0.27	0.59	0.00	0.00	1.69	0.65	1.23
20	HOLAGUNDA	0.57	0.72	0.90	2.91	0.05	0.00	0.84	1.84	1.16
21	JUPADU BUNGALOW	0.00	1.64	1.76	2.74	0.00	0.00	1.59	0.03	1.24
22	KALLUR	0.30	1.32	1.41	0.09	0.08	0.00	2.26	0.28	1.26
23	KODU MUR	0.00	0.99	1.40	0.85	0.00	0.00	1.23	0.84	1.36
24	KOILKUNTLA	0.00	0.00	1.00	2.77	0.00	0.00	0.28	1.36	1.45
25	KOLIMIGUNDLA	0.00	3.43	0.57	1.13	0.00	0.18	5.75	2.02	0.47
26	KOSIGI	0.07	1.08	1.11	1.07	0.00	0.00	0.61	0.79	1.42
27	KOTHPALLE	2.09	1.12	2.62	0.14	0.00	0.00	0.18	0.50	0.60
28	KOWTHALAM	0.06	0.35	0.61	0.56	0.00	0.00	0.28	1.09	1.62
29	KRISHNAGIRI	0.37	1.90	0.28	5.21	12.86	14.82	0.59	0.67	1.39
30	KURINDOL	0.28	0.69	2.36	0.47	0.00	0.00	2.87	1.36	0.91
31	MADDIKERA (EAST)	0.00	0.31	0.72	0.00	3.83	0.00	0.42	0.05	1.85
32	MAHANANDI	3.24	0.07	0.51	1.02	0.00	0.00	0.22	0.03	0.60
33	MANTRALAYAM	0.10	0.40	1.73	0.96	0.00	0.00	0.85	1.19	1.31
34	MIDTHUR	0.14	1.18	0.48	0.00	0.77	0.00	3.59	1.95	1.18
35	NANDAVARAM	0.00	0.38	1.18	0.36	0.00	0.00	1.03	1.83	1.33
36	NANDIKOTKUR	0.10	0.25	1.99	1.13	4.02	7.99	1.11	1.78	1.10
37	NANDYAL	0.00	0.03	2.79	1.49	0.00	0.00	0.13	1.70	1.15
38	ORVAKAL	0.20	3.48	0.61	1.06	5.62	0.00	1.97	0.99	0.91
39	PAWK	0.83	5.07	0.82	1.02	0.00	0.00	1.37	1.98	0.44
40	PAGIDYALA	0.00	0.00	5.92	0.19	0.00	0.00	0.16	0.19	0.94
41	PAMULAPADU	0.15	1.81	1.75	1.63	0.00	0.00	1.37	0.91	1.05
42	PANYAM	0.70	2.00	1.40	0.47	0.08	3.88	0.45	1.81	0.81
43	PATTIKONDA	0.35	0.68	0.36	0.70	0.00	0.00	1.10	0.84	1.46
44	PEAPALLY	0.33	2.70	0.78	0.21	0.01	0.00	0.28	0.10	1.35
45	PEDDA KADUBUR	0.08	0.81	1.41	0.16	2.21	7.70	0.32	1.39	1.33
46	RUDRAVARAM	2.58	0.54	0.40	0.28	0.00	0.00	1.27	1.38	0.48
47	SANJAMALA	0.00	2.15	0.83	1.43	0.00	0.00	0.27	1.31	2.24
48	SRYEL	0.00	0.28	0.83	0.00	0.60	25.75	0.21	2.21	1.36
49	SRI SAILAM	1.96	0.00	0.52	0.00	0.00	0.00	0.00	0.00	0.00
50	TUGGALI	0.31	0.35	1.13	2.37	6.21	0.37	1.19	0.57	1.33
51	UYYALAWADA	0.00	0.06	0.84	0.74	0.00	0.47	0.30	4.52	0.91
52	VELDURTHI	0.76	1.80	0.50	1.36	0.00	0.00	1.46	0.51	1.11
53	VELGODE	2.94	0.19	0.51	0.93	0.03	0.00	1.25	0.88	0.44
54	YEMMIGANUR	0.17	0.52	1.40	1.07	0.00	0.00	1.02	1.10	1.31

Fig: 2 Land use pattern of the Kurnool District



Pattern of Land use concentration Kurnool District Fig- A. Forest land, Fig- B. Barren& uncultivable waste land, Fig- C. Land put to non-Agricultural use, Fig- D. Cultivable waste lands Fig- E Permanent pasture and other Grazing lands.



Pattern of Land use concentration Kurnool District Fig-F. Misc. Tree crops groves Fig-G. Other fallow land, Fig-H. Current fallow lands, Fig-I.Net area sown

Land Use Efficiency

The minimum Land use efficiency 0.65% is found in srisailam mandal of the district. The maximum land use efficiency value of 49.92% is found in Rudravaram mandal of the district. The average land use efficiency of the district is about 39.07 %. Its spatial pattern shows that the land use efficiency is very high in seven mandals located in south east, north east and central part of the district. High land use efficiency is found in eleven mandals located in western and eastern part of the district. Moderate land use efficiency is found in eleven mandals located in south, North and north eastern part of the district. Low and very low land use efficiency is found in 36 mandals located in western, south east and north eastern part of the district.

Table:2 Land use Efficiency of the Kurnool District (2018-19)

S.No.	Mandal	Land use efficiency(%)	S.No.	Mandal	Land use efficiency(%)
1	ADONI	35.95	28	KOWTHALAM	36.41
2	ALLAGADDA	36.99	29	KRISHNAGIRI	47.08
3	ALUR	34.10	30	KURNOOL	40.41
4	ASPARI	42.37	31	MADDIKERA (EAST)	43.33
5	ATMAKUR	38.62	32	MAHANANDI	47.03
6	BANAGANAPALLE	37.44	33	MANTRALAYAM	35.28
7	BANDI ATMAKUR	43.23	34	MIDTHUR	36.31
8	BETHAMCHERLA	36.39	35	NANDAVARAM	39.20
9	C.BELAGAL	43.70	36	NANDIKOTKUR	48.22
10	CHAGALAMARRI	38.55	37	NANDYAL	40.81
11	CHIPPAGIRI	34.21	38	ORVAKAL	45.76
12	DEVANAKONDA	44.90	39	OWK	39.13
13	DHONE	42.16	40	PAGIDIYALA	44.56
14	DORNIPADU	34.45	41	PAMULAPADU	45.76
15	GADIVEMULA	37.84	42	PANYAM	40.96
16	GONEGANDLA	45.51	43	PATTIKONDA	44.18
17	GOSPADU	37.20	44	PEAPALLY	39.97
18	GUDUR	36.48	45	PEDDA KADU BUR	37.32
19	HALAHARVI	34.68	46	RUDRAVARAM	49.92
20	HOLAGUNDA	36.58	47	SANJAMALA	36.07
21	JUPADU BUNGALOW	37.08	48	SIRVEL	36.62
22	KALLUR	40.53	49	SISAILAM	0.65
23	KODUMUR	42.10	50	TUGGALI	43.99
24	KOLKUNTLA	34.66	51	UYYALAWADA	35.10
25	KOLIMIGUNDLA	40.86	52	VELDURTHI	39.15
26	KOSIGI	35.97	53	VELGODE	35.86
27	KOTHAPALLE	35.55	54	YEMMIGANUR	42.45

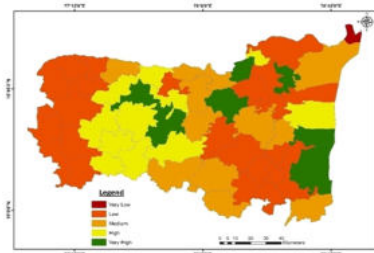


Fig: 5 pattern of Land use Efficiency of the Kurnool District

Conclusion:

The dominant land use and land cover category of the district is cultivation (48.10%) followed by the forest (19.30%), current fallows (10.10%) and others. The maximum land use efficiency 49.92% is found in Rudravaram mandal of the district. Very high land use efficiency is found in seven mandal, high land use efficiency is found in eleven mandals and moderate land use efficiency noticed in eleven mandals low land use efficiency is found in 35 mandals and very low land use efficiency is found in one mandal.

The district experiences loss of water due to low rain fall, frequent drought conditions, lack of irrigation facilities especially in the western part of the district.

Analysis of the secondary data in relation with Kurnool District land use efficiency given ways to suggested to be taken up to improve the land use efficiency and minimize the land use problems.

- 1) Major steps to taken to be improve the forest covered area by implementing social forestry schemes especially western and central part of the district.
- 2) Measures to be taken to minimise the fallow lands and to increase the cropped area by educating farmers to conserve the rain water and to implement micro irrigation techniques (like sprinklers, drip and trickle irrigation system) to utilise the water resources of optimum level.
- 3) Most of the farmers are illiterates and are not aware of recent developments in agricultural and irrigation sectors. They need to be educated about the advantages of the use of high yielding varieties of crops, optimum use of fertilisers, pesticides, bio-fertilizers and use of credit facilities in nationalised banks.
- 4) Govt authorities have to take measures to bring the more amount of cultivable waste land under cropped land by using machineries.
- 5) Due to increase of population, most of the agricultural land has been diverting non-agricultural use without nay proper plan and vision on non-agriculture use. This has to be taken care by adopting pilot

research projects in concerned local areas by adopting latest techniques like remote sensing and GIS.

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