ORIGINAL RESEARCH PAPER

Geography

ROLE OF ICT IN GEOGRAPHICAL STUDIES

KEY WORDS: ICT, Geography, GIS, Remote Sensing.

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ABSTRACT

This study has find out the role of ICT in geographical studies. ICT is very useful for every subject. Geography has also a very vast subject matter. From the beginning of the subject find out the location of every place and also to create the maps and interpretation of maps by this ICT. We are using computer to create various types of maps. There are many types of software which are very useful for making maps like; ARC GIS, Q GIS, ERDAS. And these softwares has many techniques to create the maps. In this paper we use some examples of our other studies which are based on these softwares, these are: choropleth method, interpolation technique, supervised, unsupervised and NDVI.

INTRODUCTION

Information and communications technology (ICT) is an extensional term for information technology (IT) that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals) and computers, as well as necessary enterprise software, middleware, storage, and audiovisual systems, that enable users to access, store, transmit, and manipulate information.

ICTs stand for information and communication technologies and are defined, for the purpose of this primer, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information." These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephones.

Information and Communication Technology (ICTs) are often associated with the most sophisticated and expensive computer based technologies. ICT are basically information handling tools- a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information. Application of remote sensing (RS), global positioning system (GPS), geographic information system (GIS) and combination of three S techniques will become a very important part of the different application which in turn responsible development.

Applications of spatial technologies

Many successful applications of spatial technologies exist at the more aggregate levels of agricultural planning and research. Geographic information System also assists in planning rural infrastructure, such as prioritizing national investments in rural roads, electricity, health and education. Geographic targeting at the level of small communities reduces the change that the intended recipients in rural areas include emergency planning and response. The key to successful GIS applications is the availability of detailed spatial data. While remotely sensed information and GPS-based field surveys help plug some data gaps, much information is still difficult to obtain at a geographic scale that is relevant for operational impact. Strengthening of formal and informal capabilities for spatial-data collection at local levels is thus one of the priority needs.Now I am taking some examples of these technologies which can decide the role of ict in geographical studies.

In the present study, for all the five block namely, Rohtak, Lakhan Majra, Sampla, Kalanaur, Meham a four year wise depth to water table in June, 1980 to 2014 .It is evident from the table that depth to water table in June, 1980 ranged from less than 3.7 meter to more than 11.97 meter and from less than 3.03 meter to more than 4.07 meter in June, 2014. In this table average depth to water table in June 1980 is 6.17 meter and average depth to water table in June 2014 is 3.41 meter. Depth to water table is continuously rising up and becoming a cause of water logging problem.

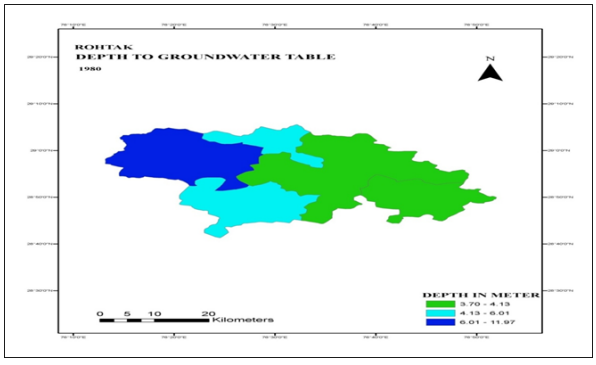


fig 1

Average Depth to water table lies from 3.7 m to 11.97 m in June 1980. In 1980 Rohtak and Sampla blocks stands with 3.7m-4.13 m depth of water table. This lies in potential water logged category. In village Pakasma depth to water table is 2.67m. This village comes under the category of water logged. In blocks Lakhan Majra and Kalanaur depth to water table lies between 4.13m to 6.01m which is also comes under the potential water logged category. Depth to water table of Nandal village from Lakhan Majra block is 2.58 m. This village is also comes in waterlogged category. In Meham block average depth to water table lies between 6.01 to 11.97m.

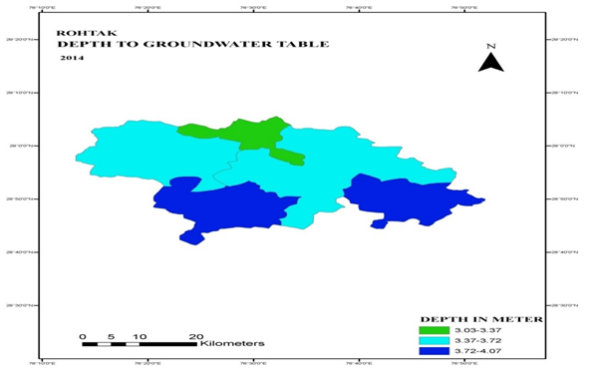


fig 2

In fig 2 range of average depth to water table is between 3.03 m to 4.07m. Two blocks of the district comes in the range of average depth to water table is 3.03 m to 3.37m namely Sampla and Kalanaur blocks. In blocks Rohtak and Meham depth to water table lies between 3.37 m to 3.72 m which is also comes under the potential water logged category. Rests block Lakhan Majra is also under the category of potential water logged with the range of 3.72 m to 4.07m.

The natural chemical composition of ground water is influenced predominantly by type & depth of soils and subsurface geological formations through which ground

water passes. Ground water quality is also influenced by contribution from the atmosphere and surface water bodies. Quality of ground water is also influenced by anthropogenic factors.

About 10 million years ago the area of Rohtak district was submerged under ocean hence originally the quality of ground water is saline. In general the ground water quality on the basis of electrical conductivity is classified into four categories as shown below:

Rohtak District: Ground water Quality

EC Value in micro mhos/ cm	Quality
<2000	Fresh
2000-4000	Marginal Fresh
4000-6000	Marginal
> 6000	Saline

Source: Agriculture Department; Ground Water cell, Rohtak

Rohtak District: Groundwater Quality in June 1988

Water Quality(EC)	Area In Sq. Kms.
Fresh(0-2000)	305.71
Marginal Fresh(2001-4000)	574.14
Marginal(4001-6000)	441.45
Saline(Above 6000)	343.24

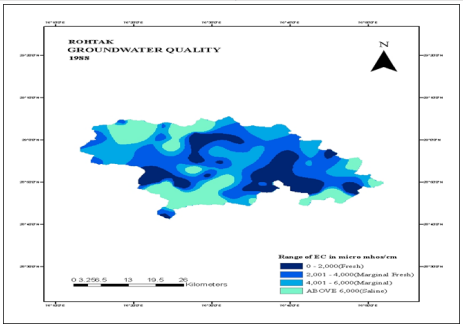


Fig. 3 Source: Groundwater cell, Rohtak.

In June 1988(Figure 3), out of total area only 307.71 sq. Kms. comes under fresh category and rest 574.14 sq Kms, 441.45 sq kms and 343.24 sq kms. Marginal fresh, marginal and saline quality respectively. The fresh water is available in pockets, mainly along the canals and drains and near the water bodies. In june 2014 area of fresh water increase from june 1988. 460.19 Sq. Kms. Area comes under fresh water category which is more than the result of june 1988 significant change has been observed in fresh water category. It was increased from 305.71 Sq. Kms. In june 1988 to 460.19 Sq. Kms. In June 2014.

Rohtak District: Groundwater Quality in June 2014

Water Quality(EC)	Area In Sq. Kms.
Fresh(0-2000)	460.19
Marginal Fresh(2001-4000)	637.3
Marginal(4001-6000)	452.99
Saline(Above 6000)	132.14

Source: Groundwater cell, Rohtak.

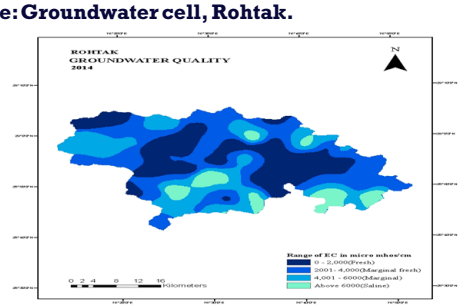


fig. 4 Source: Groundwater cell, Rohtak.

Marginal fresh and marginal category has been also increased from 574.14 Sq. Kms. and 441.45 Sq. Kms. In june 1988 to 673.3 Sq. Kms. and 452.99 Sq. Kms. In june 2014. Saline water have been decreased from 343.24 Sq. Kms. In june 1988 to 132.14 Sq. Kms. In June 2014.

Landuse and Land Cover of Siwani Using Supervised Classification

Supervised algorithms was used to derive land cover and land use map in the study area based on natural grouping and ground truthing of the enhanced image of LISS IV imagery. To prepare LULC maps, the following six broad categories were considered:

1) Vegetation
2) Built Up Area
3) Agricultural Land
4) Water Bodies
5) Fallow land
6) Sand dunesZ

According to supervised algorithm 48.56% is agricultural area out of total land area, fallow land, Vegetation, Sand dunes, Built Up Area and Water Bodies are measure 36.6 per cent, 6.48 per cent, 5.42per cent, 2.83 per cent and 11 per cent respectively by using supervised algorithm.

Table 1: Classification of Land Cover and Corresponding Predicted Area

CLASSES	AREA(HAC)	AREA (%)
AGRICULTURAL LAND	26521.9	48.56
FALLOW LAND	19989	36.6
VEGETATION	3540.82	6.48
SAND DUNES	2958.65	5.42
BUILD UP AREA	1547.24	2.83
WATER BODIES	59.1025	11
TOTAL	54616.7	100

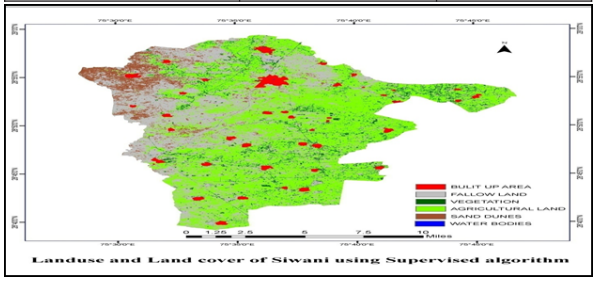


Fig 5

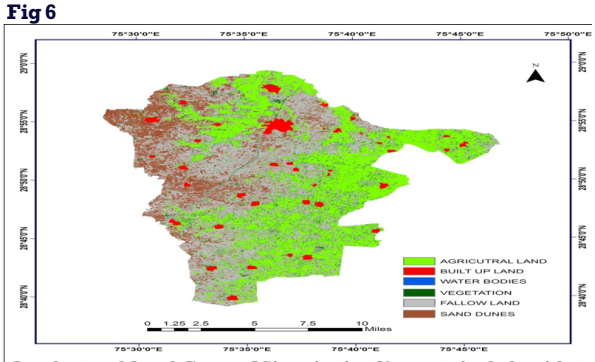
Unsupervised Classification

In unsupervised approach, a cluster analysis was used to examine the reflectance properties of the land surface and to aggregate related reflectance values into a number of classes. These classes were derived by cluster analysis and represent natural groupings of reflectance values (Eastman, 1992, Lillesand and Kiefer, 1994). The unsupervised classification is very popular among GIS agencies for data base maintenance because of the very fast programs now available and now it is easier to learn. Unsupervised classification is the definition, identification, labeling and mapping of these natural classes. Unsupervised classification can be determined as the identification of natural groups, or structures with in multispectral data. Unsupervised classification is a form of pixel based classification and is essentially computer automated classification. The user specifies the number of classes and the spectral classes are created solely based on the numerical information in the data (the pixel values for each of the bands or indices). Clustering algorithms are used to determine the natural, statistical grouping of the data. The pixels are grouped together into based on their spectral similarity. The computer uses feature space to analyze and group the data into classes.

Classification of Land Cover and Corresponding Predicted Area

CLASSES	AREA(HAC)	AREA (%)
AGRICULTURAL LAND	18275.8	33.46
FALLOW LAND	22907.2	41.94
VEGETATION	3849.78	7.04
SAND DUNES	8053.67	14.7
BUILD UP AREA	1451.97	2.78
WATER BODIES	122.28	0.08
TOTAL	54616.7	100

Fig 6



Landuse and Land Cover of Siwani using Unsupervised algorithm

According to unsupervised algorithm 33.46 per cent is agricultural area out of total land area, fallow land, Vegetation, Sand dunes, Built Up Area and Water Bodies are measure 41.94 per cent, 7.04 per cent, 14.7per cent, 2.78 per cent and 0.08 per cent respectively by using unsupervised algorithm.

CONCLUSION

ICT plays a very important role in every subject .But due to a practical subject in Geography this is very important and effective study tool. Nowadays geography practical is not just to draw maps on a piece of paper. But this is the time to look around the ICT. GIS, Remote Sensing and GPS are the most valuable techniques in the geographical study. There are many types of software which play precious role in the geographical study. In this study some examples have been taken which are showing choropleth method, interpolation technique, supervised and unsupervised technique that shows the role if ICT in geographical studies.

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