

Urbanization and change detection of Kirkuk City, Iraq for Developmental planning through integrated geoinformatics Techniques

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INTRODUCTION

Land use is influenced by economic, cultural, political, and historical and land tenure factors at multiple scales. Land use refers to the type of utilization to which the man has put the land it also refers to the evaluation of the land with respect to various natural characteristics, but land cover describes the vegetative attribute of land. Land use and land cover data are essential for planner decision maker and those concerned to the land resource management (Ndukwe,1997) Since both land use/land cover are closely related and are not mutually exclusive they are interchangeable as the former is inferred based on the land cover and on their contextual evidence.

This study demonstrates the application of remotely sensed satellite data to dynamical monitoring of the process of urbanization and the loss of arable land. Integrated technologies of remote sensing and the geographic information system were used to analyze the urbanization process of Kirkuk City with its impact on regional environmental changes.

1:2 NEED OF STUDY

Agencies at the various governmental levels have been collecting data about land, but for many years they have worked independently and without coordination. Often this has meant duplication of effort, or it has been found that data collected for a specific purpose were of little or no value for a similar purpose only a short time later. Urban growth has been speeded up, and extreme stress to the environment has occurred. This is particularly true in the city where massive agricultural land is disappearing each year, converting to urban or related uses.

1.3 SCOPE OF STUDY

The user community, governmental decision making and environmental management needs detailed information in a GIS platform for better planning and development. This study demonstrates the application of remotely sensed satellite data to dynamical monitoring of the process of urbanization and the loss of arable land. Through the study of urban land use and land cover-changes and their consequences, conclusive statistical information and obtained regarding the processes, causes and impacts of the urbanization.

1.4 OBJECTIVES

The following specific objective is pursued in order to achieve the aim

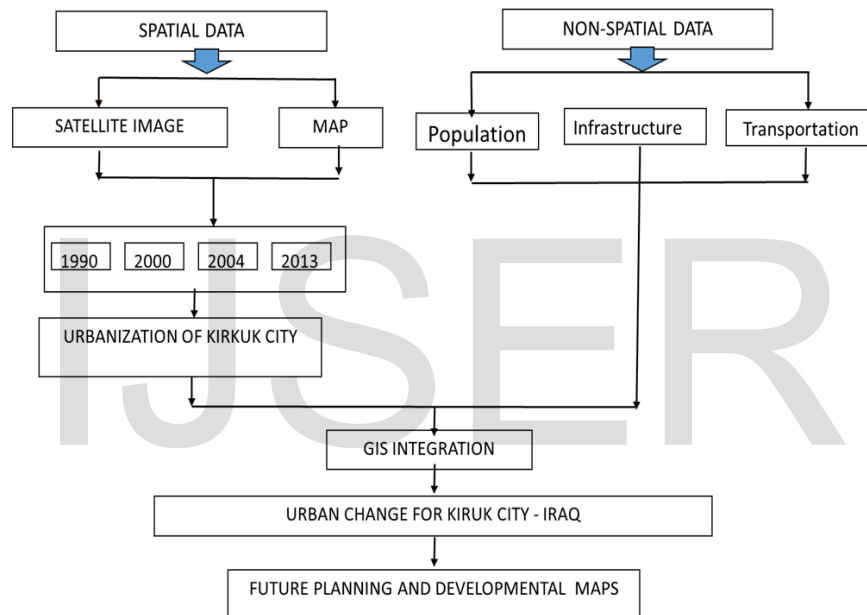
- To identify urbanization and urban land use/ land cover change for the period from 1980-2013 for Kirkuk city, IRAQ.
- To suggest appropriate recommendations to address the current rapid urban growth for better planning, implementation and monitoring of the urban area.

Data and Source

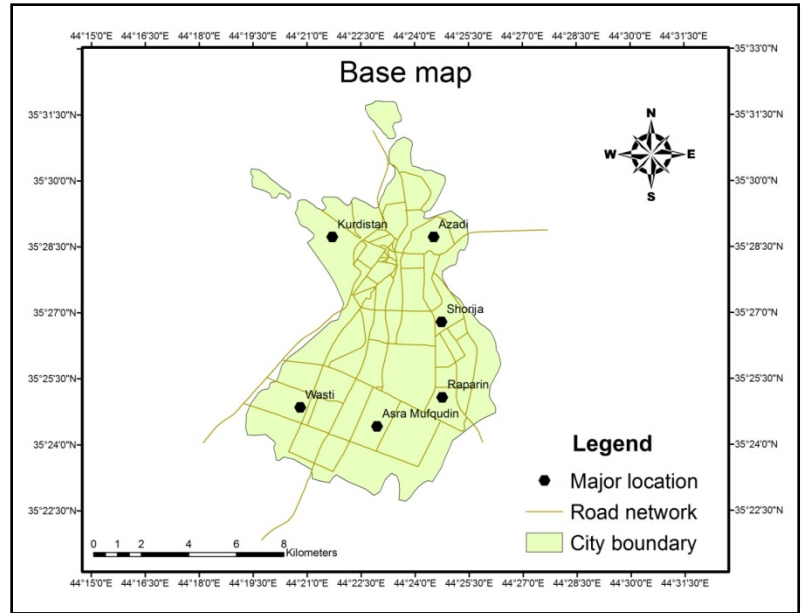
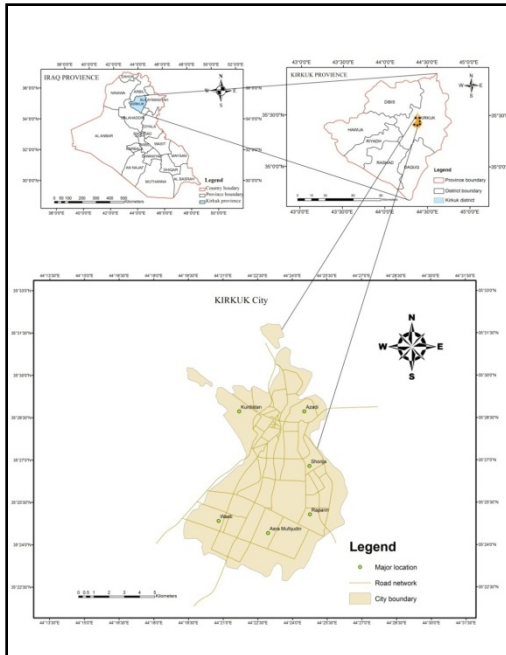
SL NO	DATA TYPE	DETAILS
1	Land sate 4 TM image	1990, 30m Spatial resolution
2	Land sat 7 ETM+ 9 image	2000, 30m Spatial resolution
3	Land sat 8 image	2013, 30m Spatial resolution
4	ORB view -3 panchromatic image	2004, 1m Spatial resolution

5	ORB view -3 multispectral image	2004, 4 m Spatial resolution
6	Topographic maps	National imagery and mapping agency

METHODOLOGY

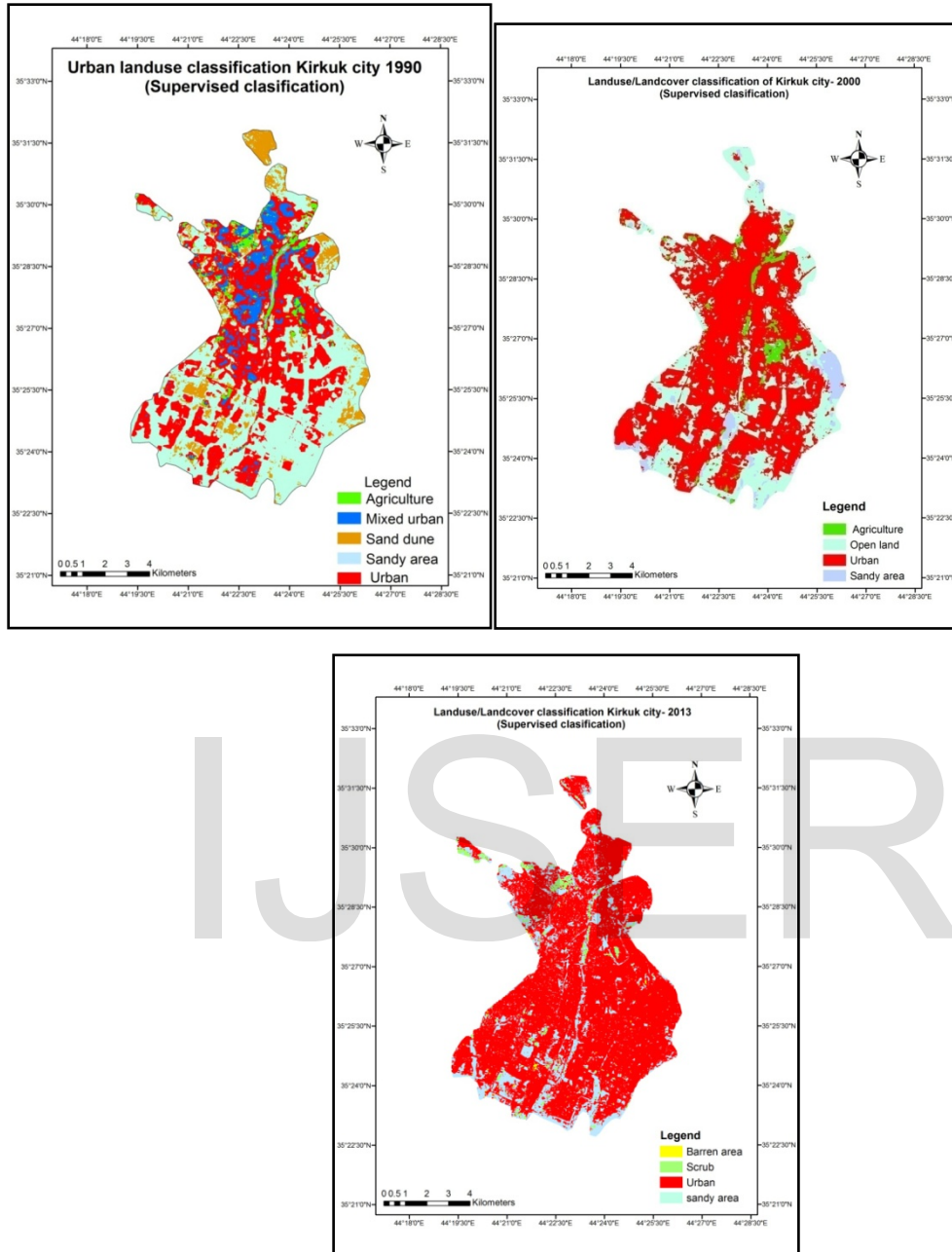


STUDY AREA



The supervised classification has adopted for

preparing land use/land cover map of Kirkuk city The important feature identified from Landsat images are urban areas, sandy area, Sand dune, mixed urban and agriculture lands, In the year 1990, 2000, and 2013 The map shows that the red part wick represent the urban built up area has increased. Major part part of the open area has been converted to urban landuse due to increasing the semand for residentail and commercial purpose, rural areas are being merged in to urban landuse.



Vector Overlay Analysis

Three layer of settlement boundary has been combine in to one map the analyzing shows that settlement area of Kirkuk city for 1990 is 68.22 sq km, and it

is 77.52 sq km for 2000. Huge expansion has happened pre 2003, the urban area of Kirkuk for 2013 has expanded to 91.42 sq km (Figure 4.2) (Table 4.2).

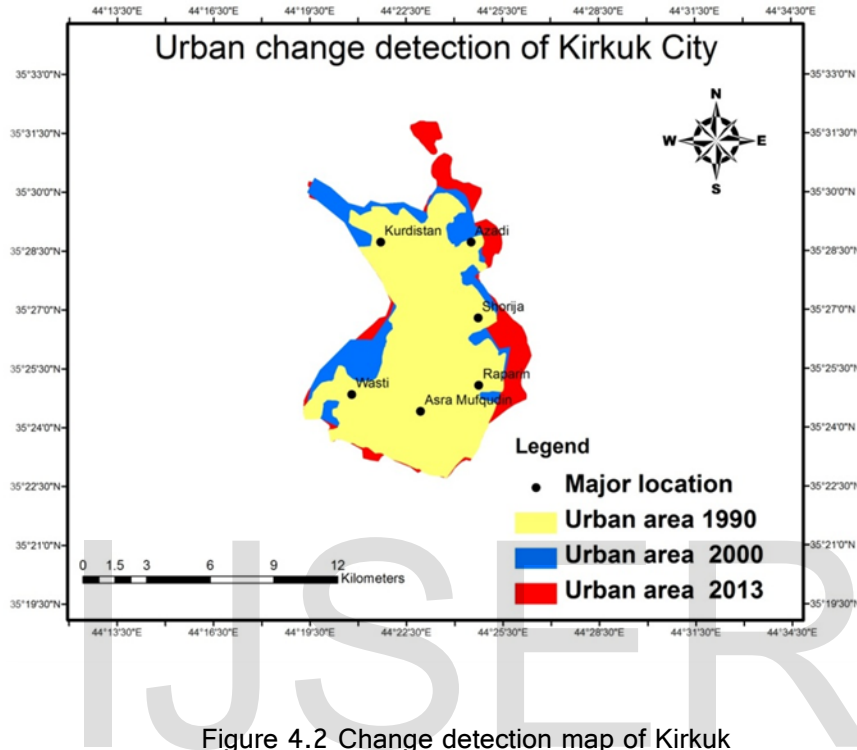
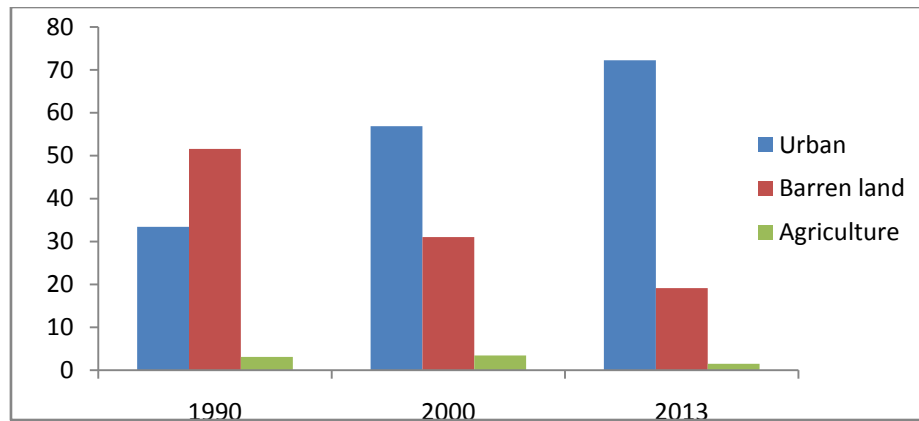


Figure 4.2 Change detection map of Kirkuk

Land-use type	Area (Sq.Km)		
	1990	2000	2013
Urban	33.41	56.89	72.25
Barren land	51.59	31.03	19.12
Agriculture	3.11	3.43	1.5

(Table 4.2



Bar Diagram of Landuse/Landcover Change

CONCLUSION

The geoinformatic based study on urbanization of Kirkuk, Study found that the landuse in Kirkuk city experienced rapid change due to fast urbanization process. Most of the agriculture land and open spaces change in to urban landuse. The main causes for Urban growth is economic plan which attract many private institutions and industries to settle there. The total urban area increased due to infrastructure growth in Kirkuk city the urban area increased from time to time and the growth is found mainly extended towards north and east of the original city having 68.22 sq.km in 1990, 77.52 sq. km in 2000 and 91.42 sq.km in 2013.

The study is able to analyze and identify the urban landuse change system correctly, accurately and provided valuable information by the help of availability of remote sensing satellite data and toposheets integrate in GIS from 1990 to 2013.

RECOMMENDATION

In view of dynamic nature of urban growth the utilization of resource should be done in scientific as well as planned manner with due consideration of prevailed ecological conditions.

There is likely going to be crowdedness brought by compactness within a few years. Therefore, it is suggested that encouragement should be given to people to build toward the outskirts and the forces of attraction that are available at the city centre should also be built up in these areas

Centralized urban markets need abundant farm production, which can bring considerable economic benefits, therefore it is recommended to drive the adjustment of development of some special farm production and agricultural structures.

After the reduction in farm land, natural vegetation and water bodies the city may undergo problem related to environment impact like soil erosion, higher pollution from industries, hence it can be suggested to further to make more awareness to protect these landcover classes.