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DETERMINATION of GRAZING PRESSURE USING RS TECHNIQUES and MONITORING THE CHANGE in GRASSLAND STATUS by GIS

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INTRODUCTION

Remote sensing (RS) is the science of obtaining and interpreting information from a distance, using sensors that are not in physical contact with the object being observed.

In its broadest sense includes aerial, satellite, and spacecraft observations of the surfaces and atmospheres of the planets in our solar system.

INTRODUCTION...

A geographic information system (GIS) is a system for capturing, storing, analyzing and managing data and associated attributes which are spatially referenced to the earth.

It is a computer system capable of integrating, storing, editing, analyzing, sharing, and displaying geographically-referenced information.

INTRODUCTION...

Integration of these technologies has been reported to be used in many areas of agriculture as well, especially for land use and grassland management.

Excessive grazing of pastures and meadows and incorrect land utilisation are major causes of depletion of grazing land which is a critical resource for animal production.

For this reason determination of grazing pressure becomes very important issue for effective grazing management.

OBJECTIVE

Therefore, it was aimed to determine the grazing pressure using LANDSAT satellite images and to evaluate and compare the change in grasslands by years using GIS and RS techniques.

MATERIALS and METHODS

Study site

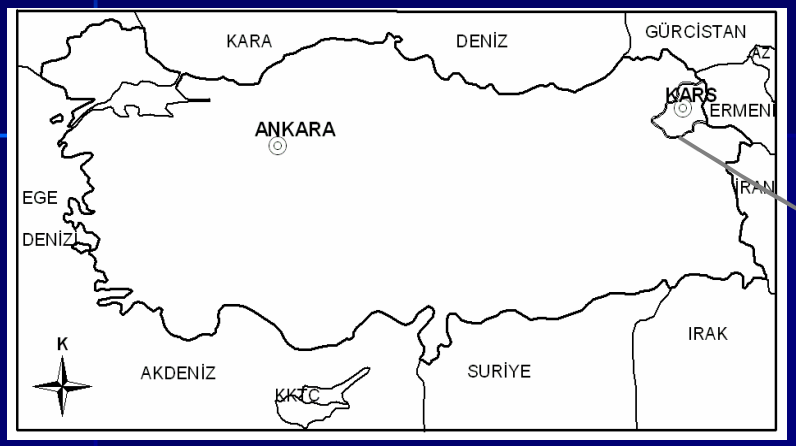
Study area covered provincial boundaries of Kars.

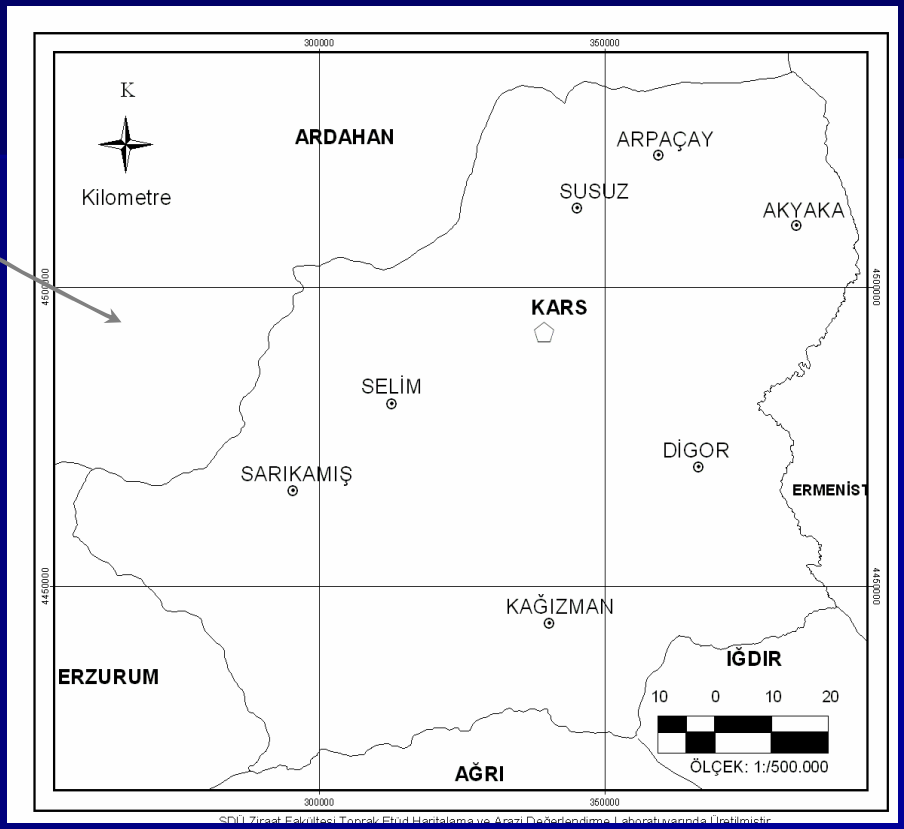
The area of Kars province is 918.117 ha.

It lies between 260 000-390 000 km East, 4 420 000 - 4 530 000 km North according to UTM Geographic Coordinate System.

Ardahan province is in the North; Agri in the South; Erzurum in the West and Armenia in the East.

MATERIALS and METHODS...





Geographical location of the study area

MATERIALS and METHODS...

Study site..

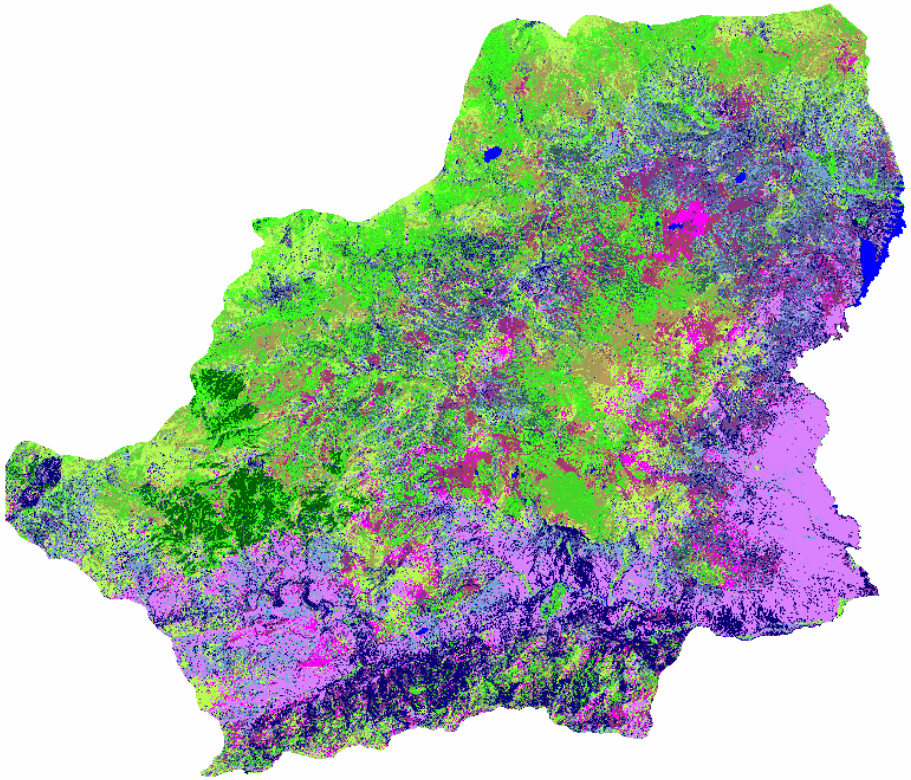
The grasslands account for 27.9% of all area of Turkey. This is equivalent of 21 million ha. In general, the animal husbandry is carried out under extensive conditions and based on grasslands in the Eastern part of Turkey where Kars Province is located and 41.4% of the whole grassland area of the country is present.

Kars province has a unique place in the region in terms of both the number of cattle and sheep and the larger area of grassland available.

MATERIALS and METHODS...

Data use

In this study, the maps showing currrent status of grasslands and those showing the distribution status of grasslands 21 years ago were produced for evaluation and comparison. The LANDSAT 5 TM satellite data with 171 path and 32 row number taken on 25.07.2005 and the report on land use in Kars province prepared in 1984 by the Turkish Ministry of Agriculture and the land use map with a scale of 1:100.000 were used.



MATERIALS and METHODS...

Determination of Past status of Grassland

Firstly, land use map with a scale of 1:100 000 was scanned with a A0 scanner and converted to the image format used by ERDAS software program and then Geometric correction was provided by topographic maps with 1:25000 scale. Geometric correction was done according to UTM WGS 84 north-projecting region 38. zone.

MATERIALS and METHODS...

Determination of Past status of Grassland..

Land use map of Kars province was digitised on the screen in line format by using ARC GIS software program, and then were converted into mapping units by setting up topology poligons and finally legend informations were entered. After this stage, the land use map of the study area was prepared and grasslands and grassland distribution were determined by using inquiry process of ARC GIS software.

MATERIALS and METHODS...

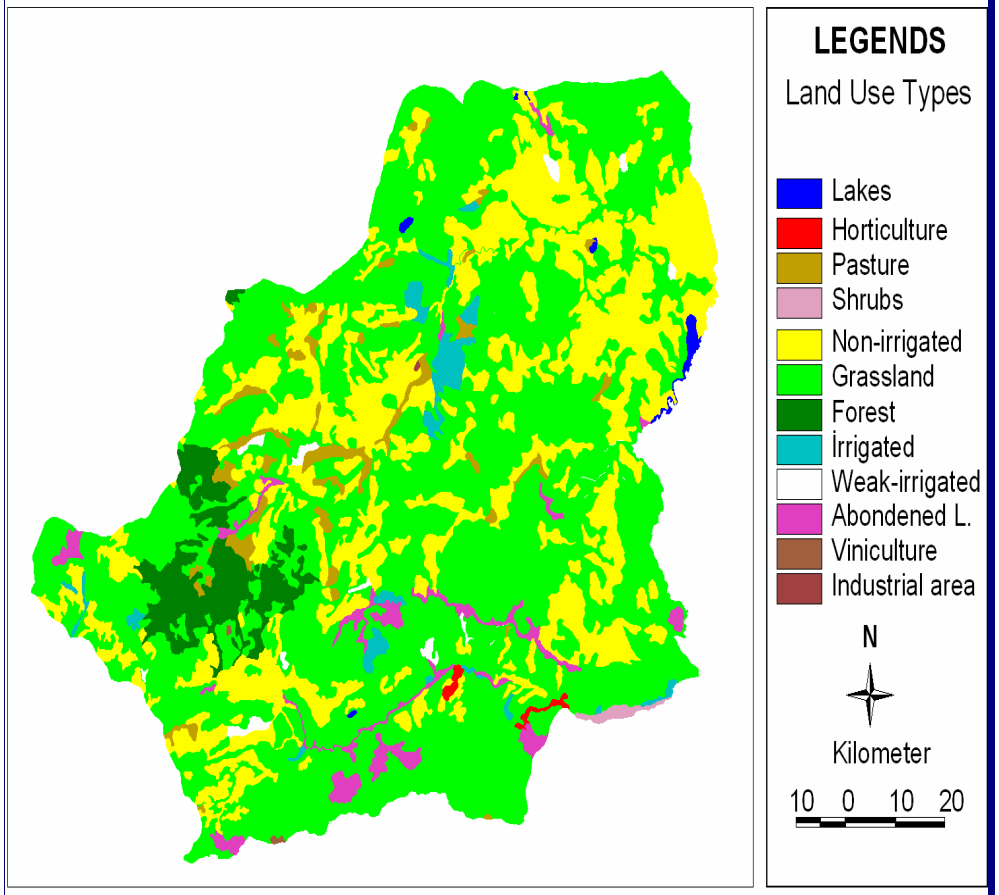
Determination of Current status of Grassland

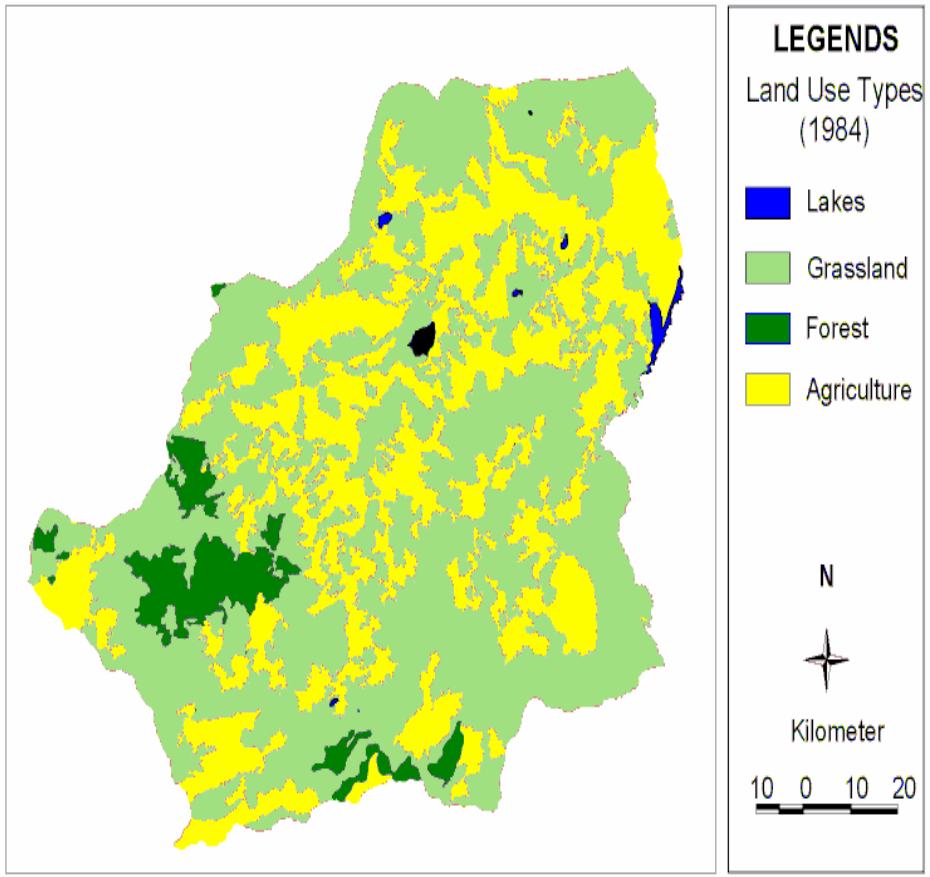
To determine the current status of grasslands, red (0.45-0.52 μm), near infrared (0.52-0.60 μm) and infrared (0.63-0.69 μm) bands of images were used and unsupervised classification was applied and the distribution map of grasslands showing the present status was produced.

Finally, the change in status of grassland between years 1984 and 2005 was determined by overlapping the map produced from LANDSAT data onto the digitized map.

RESULTS and DISCUSSION

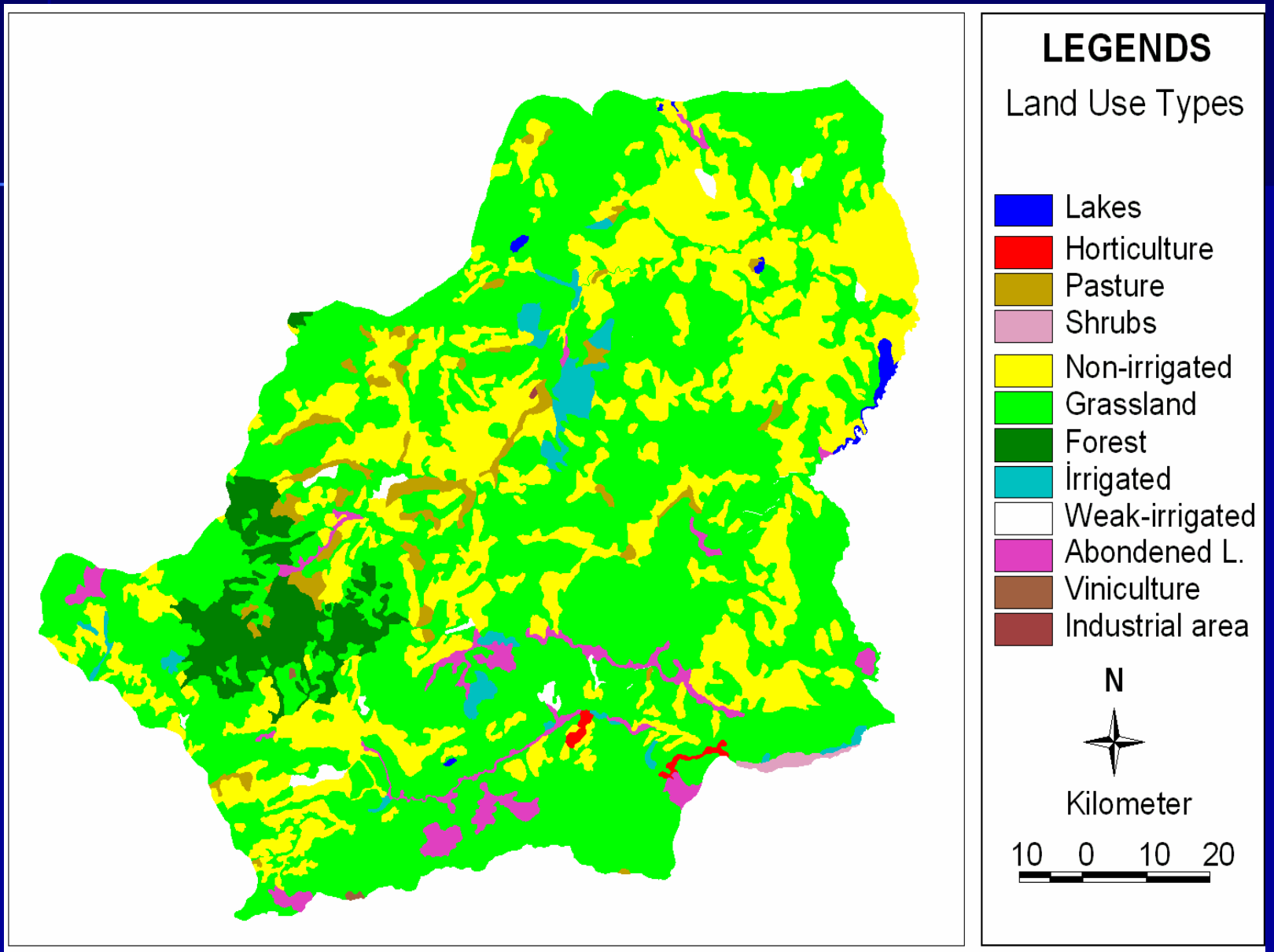
The current and past status of grasslands





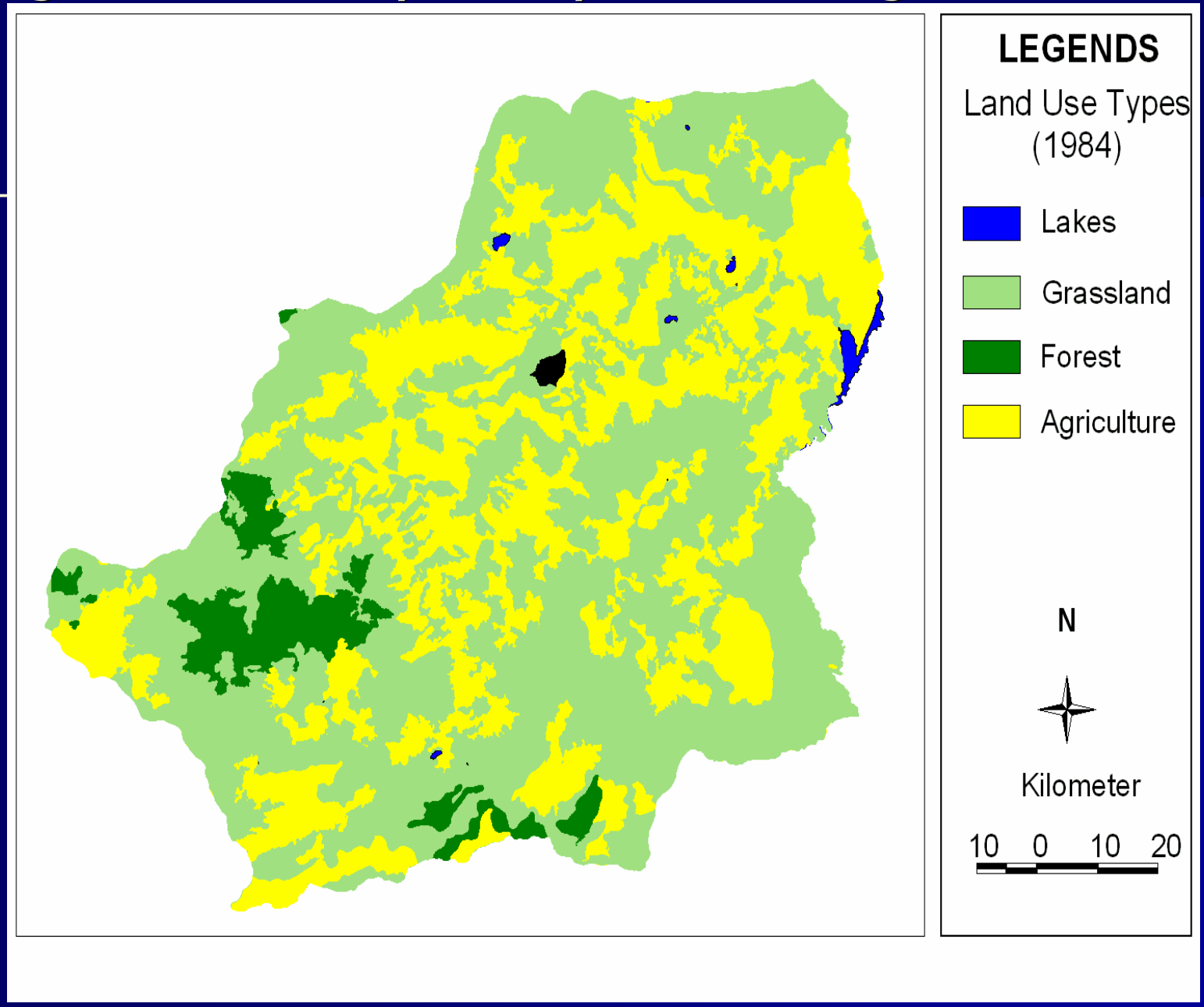
RESULTS and DISCUSSION

The land use map of Kars province showing the current status of grasslands



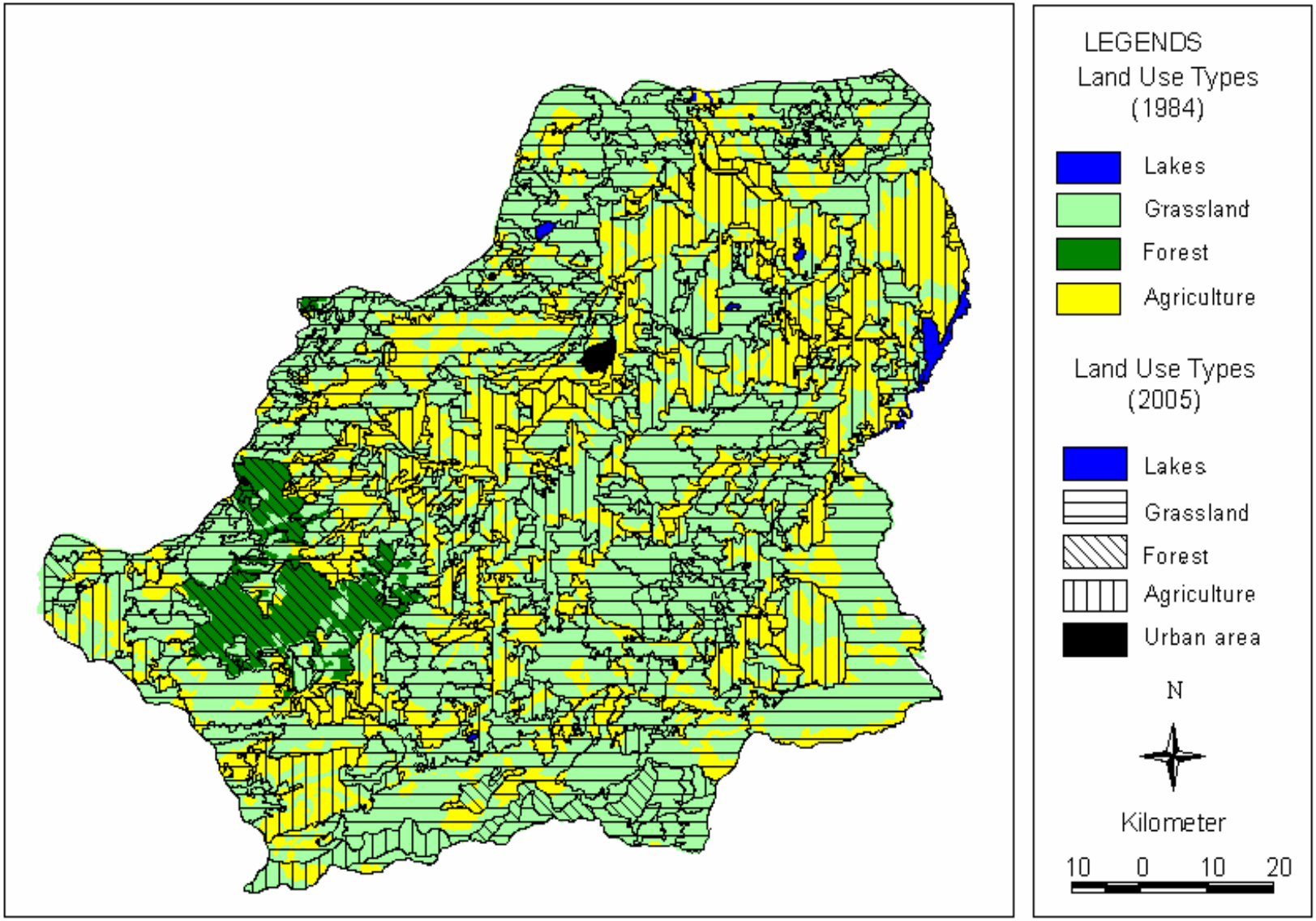
RESULTS and DISCUSSION

The digitised land use map of Kars province showing the status in 1984



RESULTS and DISCUSSION

The overlapped maps between years 1984 and 2005



RESULTS and DISCUSSION...

Land use type and comparision between the years 1984 and 2005

Years	Land use types											
	Lake		Forest		Grassland		Agriculture		Urban		TOTAL	
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
1984	2.682	0,28	41.486	4,33	636.477	66,44	277.374	28,95	95	0,01	958.117	100
2005	3.640	0,38	49.534	5,17	543.060	56,68	360.252	37,60	1.628	0,17	958.117	100
Change	958	+0,1	8048	+0,84	93417	-9,76	82.877	+8,65	1533	+0,16		

RESULTS and DISCUSSION...

According to these data, grassland area decreased in proportion of 9.76%, and agriculture lands increased 8.65%. In addition, forest and urban area were increased to 0.84% and 0.16% respectively

CONCLUSION

The grassland area was decreased at the rate of one in sixth (1/6) resulting from expansion of agricultural lands. If the allocation of grasslands for agricultural use continues at this rate there might be a risk of destruction of whole grassland area within the next decades.

The grasslands allocated for agricultural use and degradated grasslands due to mismanagement have a great potential in relation to biomass, high stocking rate, rich nutritive value and botanical composition. The tendency in reduction of grassland will certainly jeopardise national animal production sector and sustainable animal husbandry based on grassland in the region in respect for economic dynamics.

THANK YOU FOR YOUR PATIENCE

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