



SESSION 38-9

REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEMS APPLICATIONS TO DETERMINE GRASSLAND TYPES AND GRAZING SYSTEMS IN HIGHLANDS OF THE EASTERN TURKEY

Y. BOZKURT¹ , L. BASAYIGIT¹ and I. KAYA²

¹ *Suleyman Demirel University, Faculty of Agriculture, Department of Animal Science, Isparta, TURKEY, ybozkurt@ziraat.sdu.edu.tr*

² *Kafkas University, Faculty of Veterinary Medicine, Department of Animal Science, Kars, TURKEY*

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 grassland types and grazing systems using LANDSAT satellite images and to evaluate grassland quality using GIS and RS techniques.

MATERIALS and METHODS

Study site

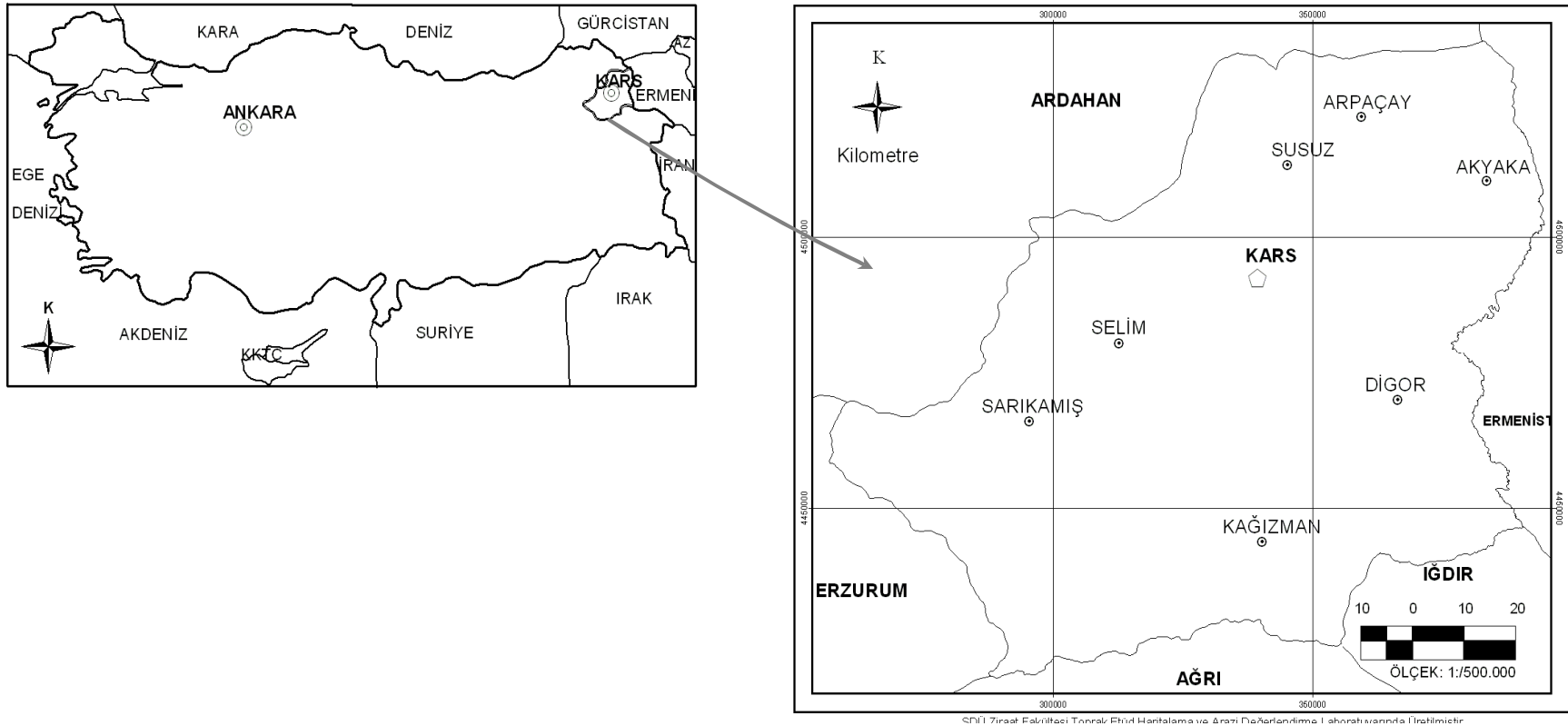
Study area covered provincial boundaries of Kars.

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..

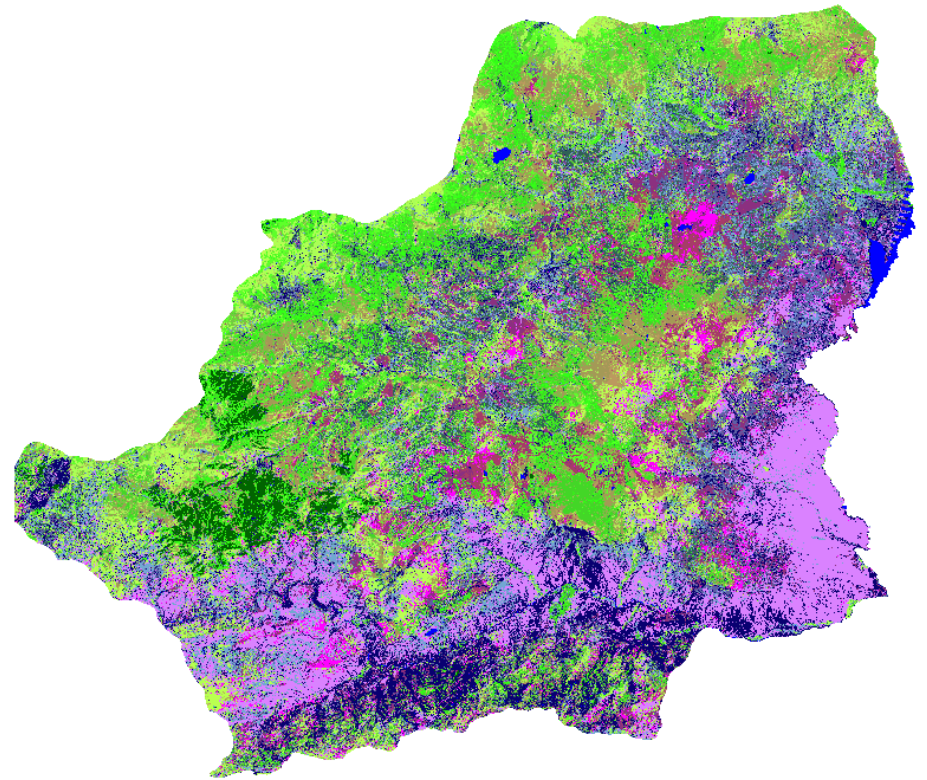
The grasslands account for 27.9% of all area of Turkey. This is equivalent of 21 million ha. In general, the animal husbandry is carried out under extensive conditions and based on grasslands in the Eastern part of Turkey where Kars Province is located and 41.4% of the whole grassland area of the country 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 map showing current status of grasslands from the LANDSAT 5 TM satellite data with 171 path and 32 row number taken on was produced.



Unprocessed satellite image of the study area.

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.

MATERIALS and METHODS...

Determination of Current status of Grassland

- In this image, the units showing different reflections were separated from each other by using histogram equalisation process. As a result of interpretation of histograms and histogram equalisation process, 11 basic plant cover types were determined and satellite data were classified into 11 classes according to unsupervised-isodata method.

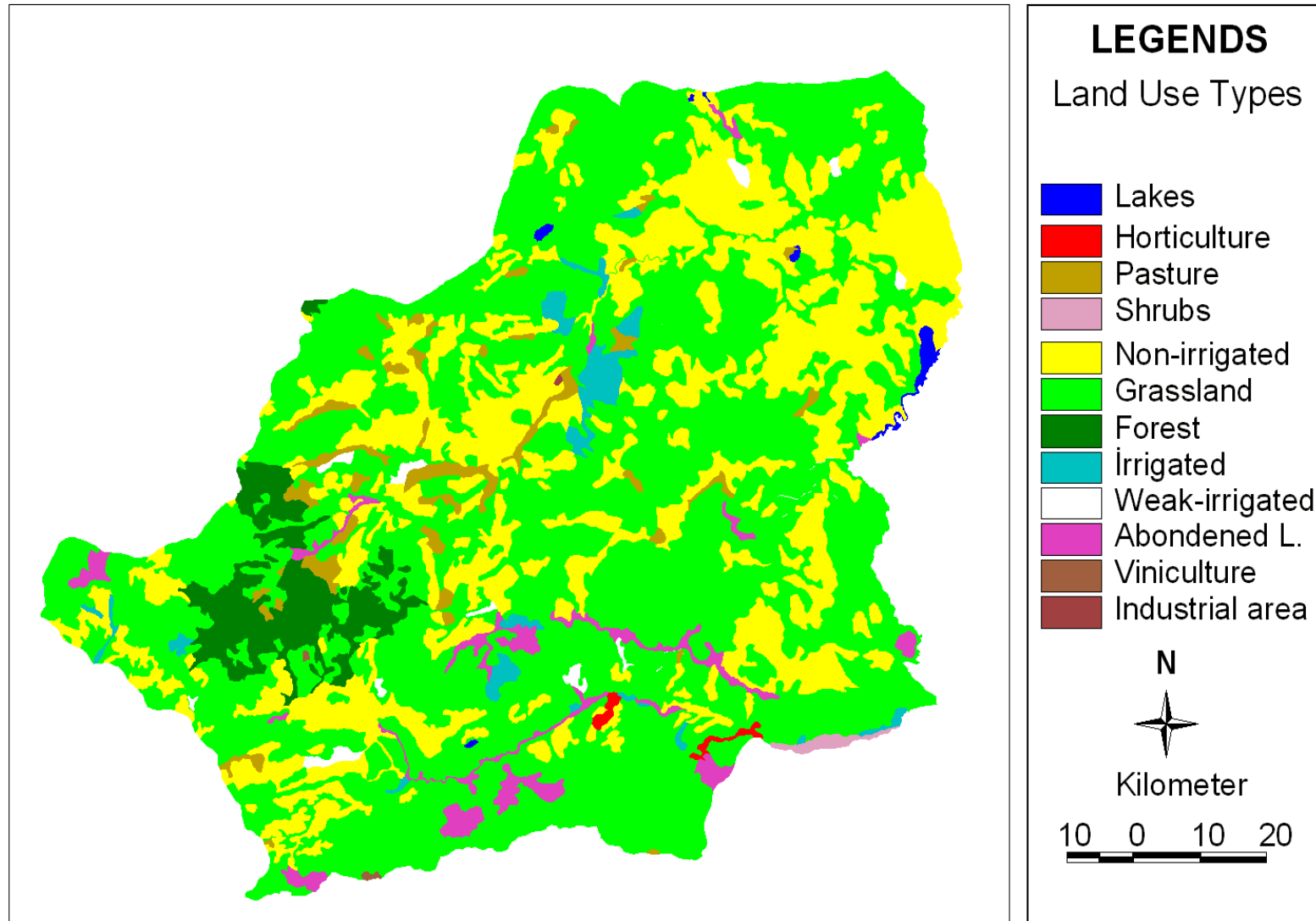
MATERIALS and METHODS...

Determination of Current status of Grassland

The each of these classes was checked out in the study area. Each class was confirmed at least at 5 locations at different physiographs. Finally, water surface, forest cover, agricultural land, urban and 8 different grassland types with different development were determined. The grassland distribution of the study area was created by merging 8 different grassland types.

RESULTS and DISCUSSION

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



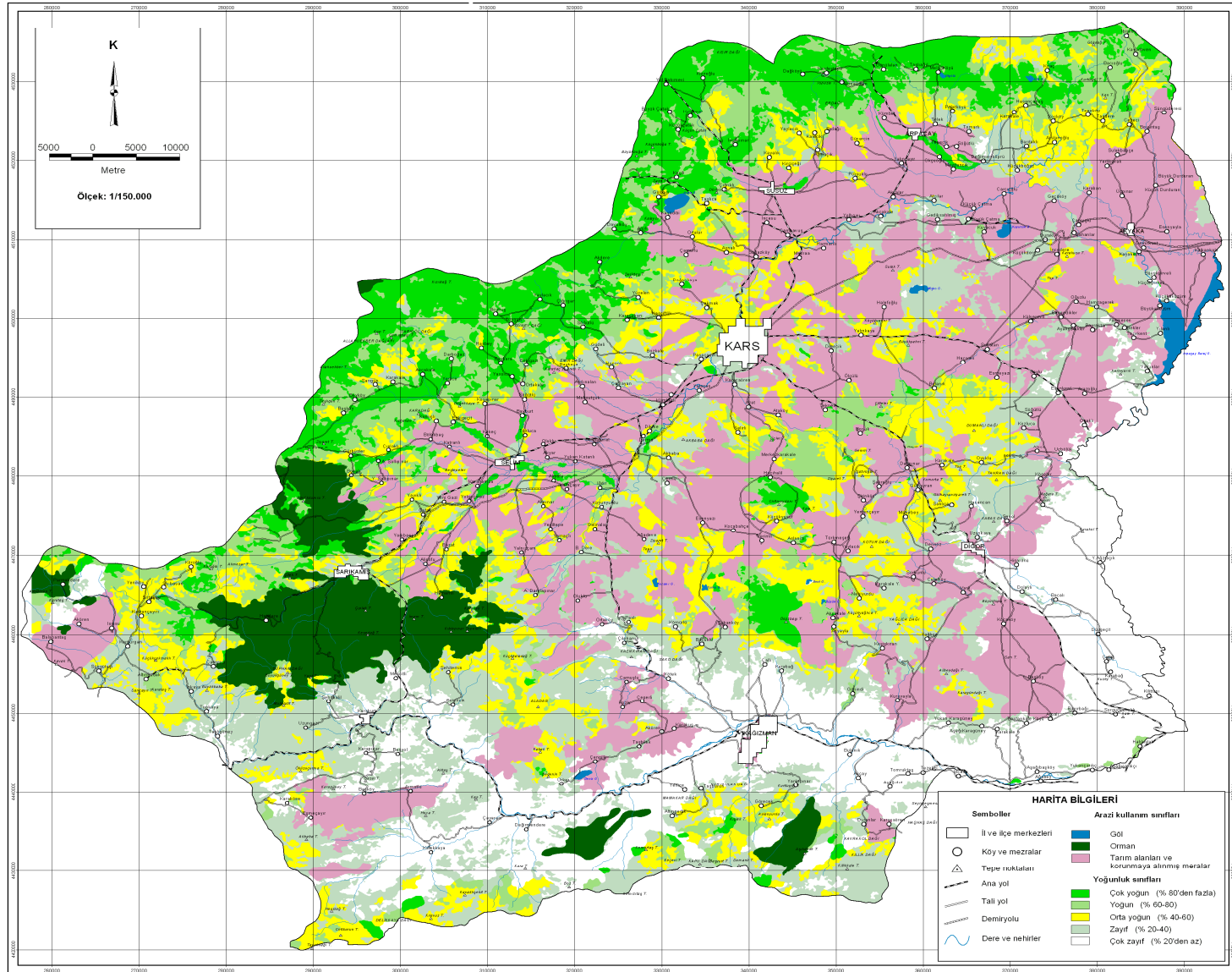
RESULTS and DISCUSSION...

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

The digitised land use and grassland classificatin map



SDÜ ZİRAAT FAKÜLTESİ TOPRAK BÖLÜMÜ TOPRAK ETÜD HARİTALAMA VE ARAZİ DEĞERLENDİRME LABORATUVARINDA ÜRETİLMİŞTİR.
TÜBİTAK-KARIYER TOVAG 104 V 124 NO'LU PROJE

RESULTS and DISCUSSION

- It was found that 2/3 rd of the total area of Kars province is grassland. However, in terms of plant cover density this accounts for only 1/3 rd of the total area. In other words, only 181 275.7 ha of the total of 638 393.5 ha of whole grassland area is in a better status in terms of plant cover to be utilised by cattle. It was also found that the best quality grasslands for beef cattle production lies in the North-west part of the province starting from the West of Sarikamis forests to the North-western range of Allahuekber mountains and to the foothills of Erdagi mountains.

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 grasslands allocated for agricultural use and degraded 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.

CONCLUSION

It was concluded that in this region where the economy is based on animal production, determination of grassland areas, stocking rates, estimation of biomass available for grazing, the length of vegetation period and monitoring the change in grassland must be included in Regional Development Plans and the results obtained from this study can be beneficial for the improved beef cattle production in the Region.

THANK YOU FOR YOUR PATIENCE

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