NATURAL RESOURCES CLASSIFICATION AND MAPPING

IN LARGE AREA USING, IMAGE ANALYSIS OF LANDSAT

(TM),DATA.

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ABSTRACT

Thematic Mapper (TM) data ,by using Landsat cct tape , covering 185 by 185km

with in Fars county area was analysed using Earth science Application.

Software (HP)101/A, and PCI, supervised classification techniques to identify

different classes of natural resources four of TM bands 3 4 5 7 were used in

a Maximum likelihood classification which produced 6 classes.

Aerial photography, farm record, soil surveys and topogarphy maps and on site

investigation of the area resulted in defining only 6 classes of land cover

varjation in the age and intermixing of similar vegetation type gave different

spectral classes which couldnot be separated on a rational basis.

The results of this investigation is indicated that TM bands 3 4 5 7 gave

excellent discrimination of varjation in natural resource, classification and

its increased resolution, as compared to the multispectral scanner   MSS

permitted the idenfication of small term infeatures and improved delination

of the boundaries for different classes of natural resources.

KEY WORDS: INTERPRETATION, IMAGE ANALYSIS, ENHANCEMENT, CLASSIFICATION,
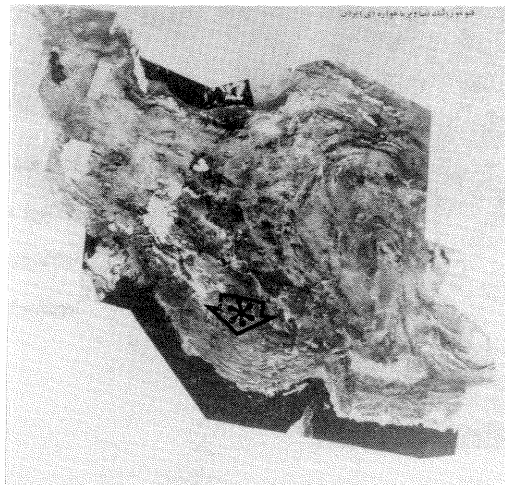
MAPPING.

Fig. 1 Location of area in photomap of IRAN .

INTRDUCTION

Islamic republic of Iran physically big in size and considered as one of the most important strategical country in the ASIA, (with total of 55 million population),the some part area of the country consist of fertil alluvial plane and piedmont plane ,most of the population depends on natural resource activities such as agriculture, forest, range land, the agiculture is of important of the nation , because it is not only providing food for the people but also providing employment to an over heming propertion of its people and suplies raw material to some industeries which constitutes the back bone of the country economy , sine the agriculture is playing vital role, for the country its undoubtedly important to pay much attention to its proper practice which may help to improve the economy of the country.

For the study of natural resources Landsat data for using land resources mapping , with in Fars county is part of the project investigation and mapping of natural resource,using remote sensing method, the main objective of the entire project is to evaluat multispectral digital data from landsat TM data to study natural resource, the objective of the this projectis a large area mapping which is cover large parts of Fars county, in a scale of 1:250,000 the study are meant to support conventional farms of large area inventory and are also to serve as a base for future natural resource mapping the classification by landsat TM data include the main classes of agriculture, forest , range land, water bodies, bare soil .
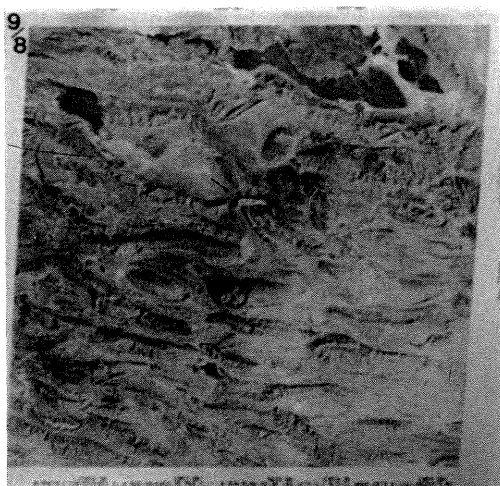

Fig. 2 Location of study area in Lansat data.

STUDY AREA

The study area is located to the south of the Iran,climatically the area lies on the boundary bettween the arid and semi- arid region of Fars county with average annual precipition around 120 -150mm the rainfall is sometimes seasonal with along dry period of 4.5 months bettween April and November and summer temperatures around 40 to 50 c,

The study area contains part of an east-west mountain chain which is part of the ZAKROS mountain, composed of folded and fauled lime stons and dolometes, the mountains are flanked either side by piedmont deposit, to the south unvegetated, alluvial fan with area of contemporaneus, erosion and deposition are found while to north vegetated alluvial fans now inactive, the increase is parentage vegetation cover to the north suggest that the mountains act as a climatic divide, the southers fans grade in to a sslty like area a fine grained saline depression.

MATERIALS USING

Satellite	Date	product type
Landsat (TM)	1986	TM ,TCC
Landsat MSS	1978	MSS

The digital image processing was executed in Ministry of Agriculture using a HP 3000 host computer system 101/A and PCI image processing host computer,

The Map were :

      Soil map of Fars county 1:250,000

      Geology map of area   1:250,000

      Hydrology map of area 1:250,000

      Topography map of area 1: 50,000

METHODOLOGY

When preparing the Map of large areas such as Fars Area

county,using Remote sensing (TM) data,for Mapping purposes

different items must be considered.

We can be roughly divided in to tow main group.

1- Those are related to general study formulatin such as,

a- aim of the mapping

b-scal of final mapping product,

c- material to be used,

2- Those are associated with purely interpretation and digital

analysis.

INTERPRETATION

Visual interpretation of TM data was down to delination   to 6

mainfeature classes like, agriculture , forest , rangeland ,

bare land ,water bodies .

Using landsat data with information present on the topographic

base Map at scale of 1:250,000 -1:50,000, this is an related

to be data collected during the digital image processing stage,

DIGITAL IMAGE PROCESSING

It can be divided in to three main group.

- preprocessing

-image enhancement

-classification

PREPROCESSING

Is concerned with the improvement of image quality in terms of

radiometric and gemetric correction resampling.

IMAGE ENHANCEMENT

Are manipulation of the data in order that the   information

content of the imagery may be improved and more   readily

available for visual analysis an example,being contrast stretch,

the first necessary items in digital image investegation is

content analysis, statistical analysis of the with in bands

correlation was performed in order to evaluate the amount of

total information contained in the TM data bands, because the

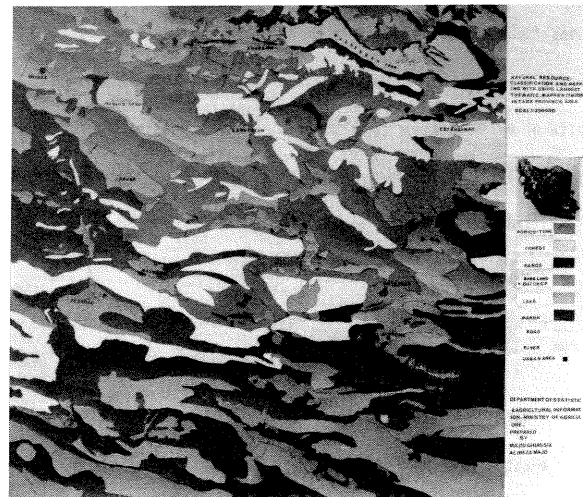histogram only specifies the total number of pixel at each grey

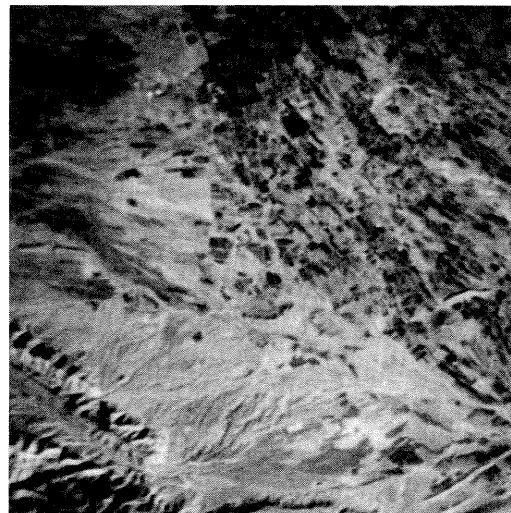Fig. 3 Natural resources Mapping using Landsat data

Fig. 4   study of test Area.

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CLASSIFCATION

can be described as the set of antions which leads to part of image being assigned to spcific group , in CCTS of landsat TM of atest area using by 3 4 5 7 bands was analysed in supervies classification to separate area of different area, but due to having the limatation of same spectral signatures the area of unite of mex vegetation couldnot be identified, according to computer analysis the cover types of the test area were classified as follow.

a-Agriculture

b-Forest

c-range land
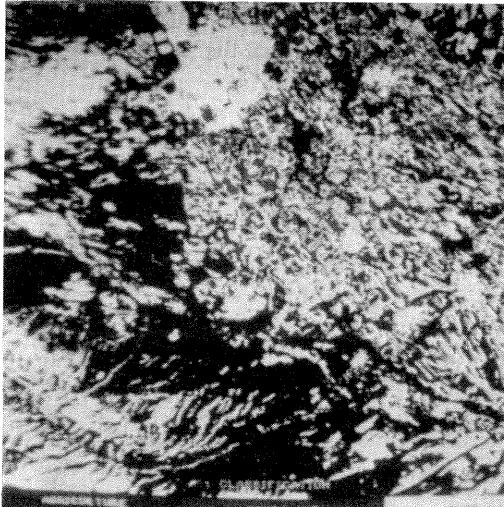
d-bare land ,urban built up

e-water bodies

Fig. 5 Classification result of test Area.

Fig. 6 Parentage of vegetation test Area.

AGRICULTURE :

Corresponds to the piedmont and river alluvial plain,it is charctrized by a hight agriculture with small and medium field size (1-50ha), the main crop are wheat, barly, Area =479750 ha.

FOREST AREA :

Corresponds of mountains area,it is cover mostly with forest, the main trees are wild Almond, wild Pistachio, Area =486626 ha.

RANGE LAND :

It is cover with alluvial plain,upper terraces,and lime materials,the main range are Legumenos, and Astragalas,in some place,Area=160,000ha.

Bare LAND :

Gravelly colluvial fans,with moderately slope or more and includes gravelly, sand stone, rock, can be available. Area=531812.5 ha.

WATER BODIES AND SWAMP :

Corresponds to the MAHLO LAKE and BAKHTAGAN LAKE,the water are salty, and can be product as a salt for using to some industeries also. Area =8483.5 +5693 /.5 ha.

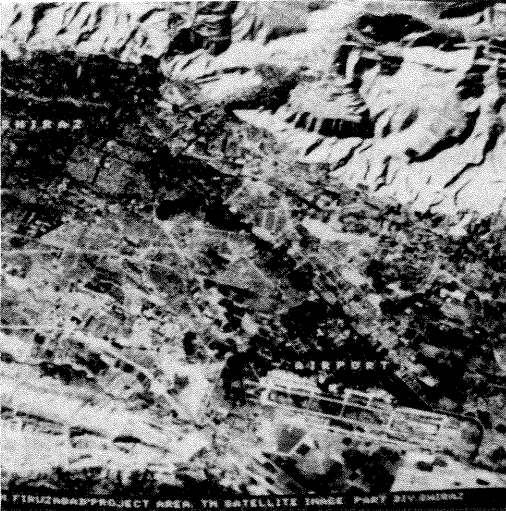| AREA	TOTAL,AREA	parcentage /.
Agriculture	479750	14 .81
forest	486626	15 .02
Range land	160,000	49 .38
Bare land	531812.5	16 .41
Water bodies	84835	2 .62
Swamp	5693 .5	1 .75
TOTAL	3240,000	100

Tab.1 Estimated of by measuring of classes.

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Fig. 7 Location of urban Area.
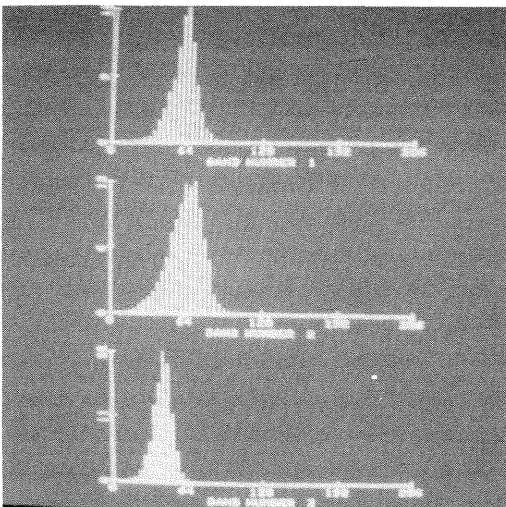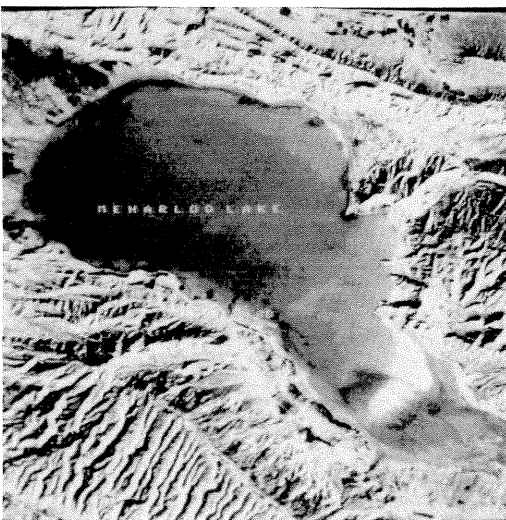

Fig. 8 Histogram of test Area.

Fig. 9 Location of water bodies in Mahlo Lake.

CLASSES	TOTAL POINT	PARCENTAGE/.
Agriculture	1339	15 .5
Forest	1244	14 .4
Range land	4182	48 .4
Bare land	1486	17 .2
Waterbodies	233	2 .7
Swamp	156	1 .8
TOTAL	8640	100

Tab.2 For sampling Area of each classes.

For digital accuracy analysis as follow to calculate the standard error, the formula was used.(Loetsch and Haller 1964).

$$SPJ = \sqrt{\frac{PJ(1-PJ)}{n}}$$

$$E = \sqrt{\frac{PJ(1-PJ)t^2}{n}}$$

Where :

SPJ=standard error of type j,

E= standard error or miss estimate

PJ =proportion of type in the whole area

for calculation of each classes are total

of point 8640, points number of 1339,as

follow in formula

IN Agriculture classes are as follow,

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1339

p =-------------= 0/ 155,=./.15 .5

1

8640

for Forest classes

1244

p =-----------=/.144, /.14.4

2   8640

for Range land classes

4182

p =---------=0. 4846 ,0.46.4 /.

3   8640

for Bare land classes

1486

p =---------=0. 172, 17.2 /.

4   8640

for Waterbodies classes

233

p =--------=0.027, 2.7 /.

5   8640

for Swamp classes

156

p =---------=0.018 ,1.8 /.

6   8640

CONCLUSION

Results reported in this paper are indicative of the level of

information obtained from satellite imagery for operational

purposes. Landsat imagery Tm data has proved to be particularly

useful for the production of Natural resource Map, at regional

scale,without the need for complex investigation techniques,in

addition Landsat imagery or cct provides an efficent base from

which an assessment of the natural resources,potential can be

accomplish in the near further increased benefits   and reduce

cost are anticipated with the availability of relative   high

resolution satellite data (ie Landsat TM data or spot).

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