

### LISS\_III

\*

IRS

EC

SAR

Ca<sup>2+</sup> Mg<sup>2+</sup> Na<sup>+</sup> pH

NDVI)

(NDSI BI SI SAVI PVI SRVI

EC

BI SI

.GIS

IRS

:

(Mougenot et al., 1993)

, ( )

/ /

( )

( )

.(Farifteh et al., 2005)

(NaCl)

( ) Metternicht .

( )

/

NDVI

(Hunt and Salisbury,

.1972)

( ) Moreau

.(Wang et al., 2002)

)

(

( ) Wang et al. .(AL-khaier, 2005)

( ) Ghassemi et al. .

NIR

(Seal)

VIS

SRVI

( ) Metternicht

( ) Masoud and kike

( nm)

PCA1 OIF

PCA1

...

:

IRS

( ) Khan et al.

o / o / / o / o /

LISS-II

.( )

SI

(BI)

NDSI

)

(

Weak Aridic

(Thermic)

NDVI NDSI

LISS\_III

( ) Dwivedi et al.

PCA

PC2 PC1 .

PC4

PC3

PC1

PC3

PC4

Khan et al., )

)

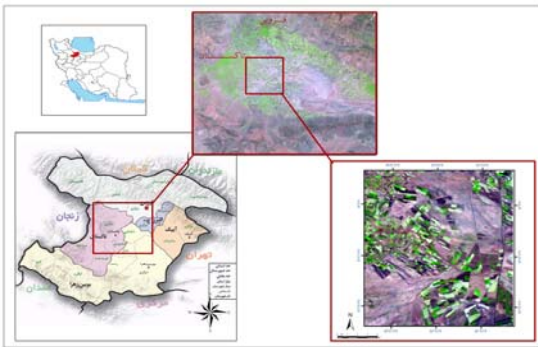
.(2001

( :

Metternicht .

/

( ) and Zinck



%

GIS

(Stratified random sampling)

(DEM)

DEM ( ) Liu et al. .

( )

B3 B2

(

LISS\_III

×

/

/ × /

F3 F10 F9 ( )

S2 S1

(S3 S4,S5)

F8 F6 F5 F4

F1

Ca<sup>2+</sup> Mg<sup>2+</sup> Na<sup>+</sup> pH

F12 F11 F2

dS/m >

>

SAR

( )

( )

( )

(Mask)

(Fatahi, 2006)

( )

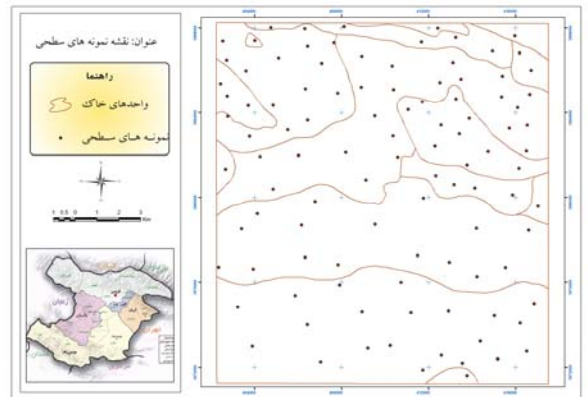
( )

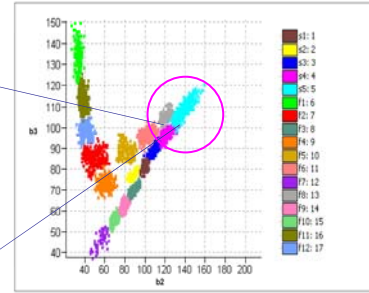
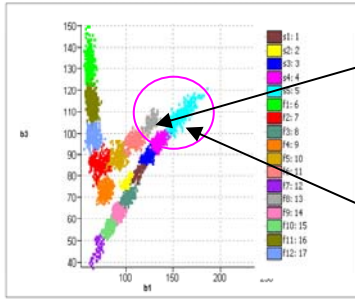
( )

)

(

F7

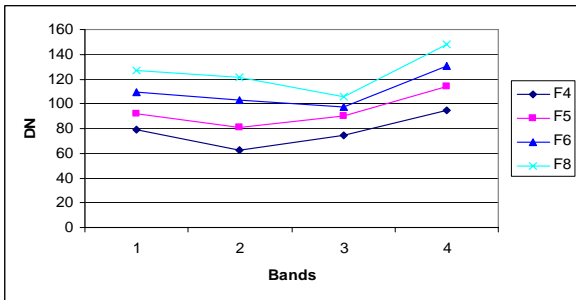




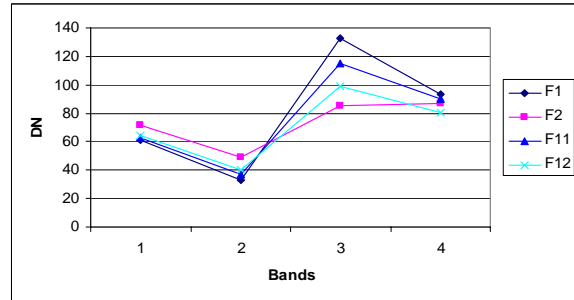
ج  
B3 B1  
(S2 S1)

الف  
B3 B2  
( )

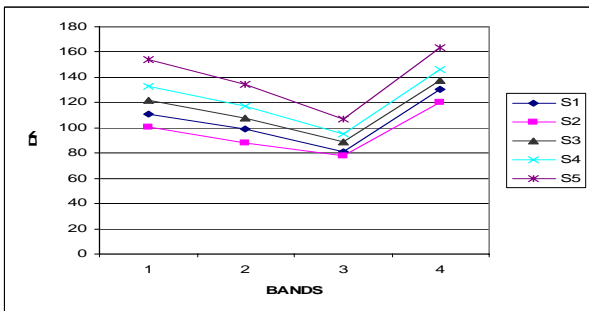
(S5 S4 S3)



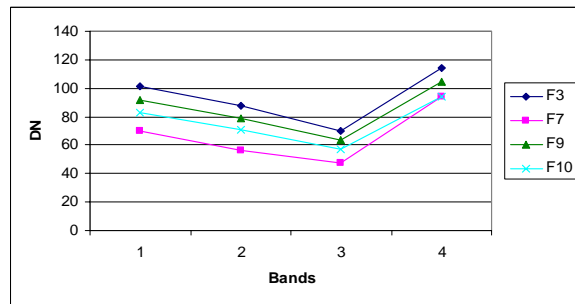
(ب)



(الف)



( )



( )

( )

( )

( )

(Optimum Index Factor)

DEM

DEM

(Liu et al., 2005)

( )

Minimum distance to

Parallelepiped or Box )

(Maximum likelihood)

(mean

(classifier

SI SAVI PVI SRVI NDVI

( )

BI NDSI

( )

Eliminate (Majority)

Box Classifier

( )

DEM

(NDSI BI SI SAVI PVI SRVI NDVI)

EC<sub>e</sub>

SI <sub>1</sub>	$\sqrt{G \times R}$	.695**
SI <sub>2</sub>	$\sqrt{G^2 + R^2 + NIR^2}$	.694**
SI <sub>3</sub>	$\sqrt{G^2 + R^2}$	.690**
BI	$\sqrt{R^2 + NIR^2}$	.614**
NDVI	$\frac{NIR - R}{NIR + R}$	-.357**
SAVI	$\frac{NIR - R}{NIR + R + L} (L+1)$ (a=0.9,	-.310**
PVI	$\frac{NIR - aR - b}{\sqrt{1 + a^2}}$ b=0.1)	-.287**
NDSI	$\frac{R - NIR}{R + NIR}$	.222*
SRVI	$\frac{NIR}{R}$	-.358**

S5

( )

soil4

( )

(% ) S4

(% )

%

f3

S4

/ /

S2 S1 S0

%

)

f3 (

( )

(Cross)

LISS

% /

(Box Classifier)

%

Undefined

% /

( )

( )

DEM

(Kappa coefficient)

/ (Overall accuracy)

Producer )

/ (User accuracy)

/

/ (accuracy

DEM

( )

...

:

(PCA)

. EC

LISS

	EC	s0%	s1%	s2%	s3%	s4%	s5%	EC
soil1	s3							s3
soil2	s4				/	/		s3
soil3	s3				/	/		s4
soil4	s4					/	/	s4
soil5	s5							s5
f1	s0							s0
f2	s1							s0
f3	s0							
	s2		/	/				s2,s1
	s1							
f4	s0							
	s2		/	/				s2
	s1							
f5	s0	/	/	/				s0,s1
	s1							
	s2							
f6	s2	/	/	/				s1,s0
	s1							
	s0							
f7	s0							s0
f8	s2							s1
	s1							
f9	s1	/	/					s0
	s0							
f10	s0	/	/					s0,s1
	s1							
f11	s0							s0
f12	s1							s0
	s0							

EC

( PCA)

S1

EC			
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

( )

S5

S0

S2 S0

( )

S5

S5

LISS

( ) McGowen and Mallyon

S5

S4

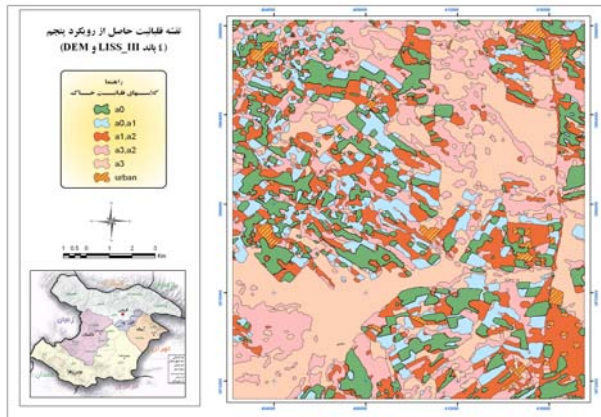
(% )

S3 S4

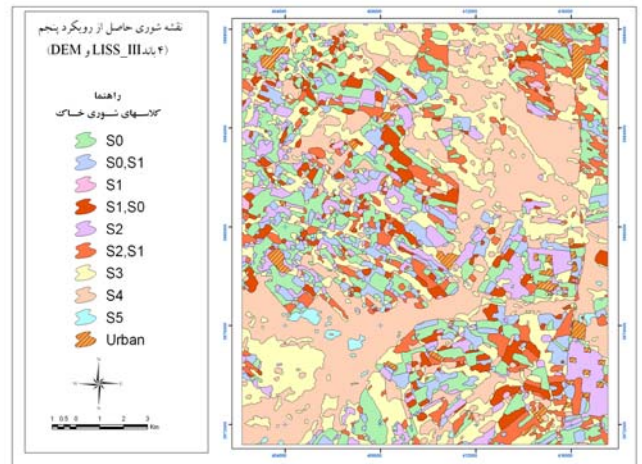
S1

LISS\_III

	s0	s1	s2	s3	s4	s5		
s0							/	/
s1							/	/
s2							/	/
s3							/	/
s4							/	/
s5							/	/
	/	/	/	/	/			
	/	/	/	/	/			



LISS



LISS\_III

/ / /

a2

a1 a3

( )

a2

a3



...

:

LISS . a1

a0 . S3 S4 S5

. SAR LISS

—	EC	a0%	a1%	a2%	a3%	SAR
s1	a3 a2	18 18				a2,a3
s2	a3 a2			/	/	a3,a2
s3	a2 a3			/	/	a3
s4	a3					a3
s5	a3					a3
f1	a0					a0
f2	a0					a0
f3	a1 a0 a2	/	/	/		a1,a2
f4	a0 a1 a2	/	/			a1,a2
f5	a2 a1 a0	/	/	/		a0,a1
f6	a0 a1	/	/			a0,a1
f7	a0					a0
f8	a1 a0					a0,a1
f9	a0 a1	/	/			a0
f10	a1 a0	/	/			a0
f11	a0					a0
f12	a0					a0

	a0	a1	a2	a3
a0				/ /
a1				/ /
a2				/ /
a3				/ /
	/	/	/	/
	/	/	/	/

( ) Farifteh et al.

DEM

)

S5 ( )  
( )

S1

(Alavipanah and Pouafar, 1998)

Masoud and kike

- ( ) Matinfar ( ) Liu et al. ( )

Dwivedi et al. ( ) Masoud and kike

BI SI ( )  
EC

Rao et al., ; Moreau, 1996)

(1995

SRVI PVI NDVI SAVI

EC

EC

BI SI NDSI

( )

.(Metternicht and Zinck, 1997)

BI: Brightness Index

DEM: Digital Elevation Model

EC: Electrical Conductivity

GIS: Geographic Information System

NDSI: Normalized Differential Salinity Index

NDVI: Normalize Differential Vegetation Index

OIF: Optimum Index Factor

PCA: Principal Component Analysis

PVI: Perpendicular Vegetation Index

SAR: Sodium Absorption Ratio

SAVI: Soil Adjusted Vegetation Index

SI: Salinity Index

SRVI: Simple Ratio Vegetation Index

( ) Matinfar ( ) Masoud and kike

( )

**REFERENCES**

- Alavipanah, S.K. and Pouafar, A. (1998). Potentials and constraints of soil salinity studies in two different conditions of Iran using Landsat TM data. In: *International Congress Washington, D.C. USA*.
- AL-khaier, F. (2003). Soil Salinity Detection Using Satellite Remote Sensing. MS dissertation, ITC.
- Dwivedi, R. S. and Sreenivas, K. (1998). Image transforms as a tool for the study of soil salinity and alkalinity dynamics. *International Journal of Remote Sensing*, 19, 605–619.
- Dwivedi, R. S. (1996). Monitoring of salt-affected soils of the Indo-Gangetic alluvial plains using principal component analysis. *International Journal of*

*Remote Sensing*, 17, 1907– 1914.

- Farifteh, J., Farshad, A. and George, R.J. (2005). Assessing salt-affected soils using remote sensing, solute modeling and geophysics. *Geoderma*, 130, 191-206.
- Fatahi, M. (2006). Compersion of four methodes for mapping landuse/landcover of Qom area, Agricultural research center of Iran. (In Farsi)
- Ghassemi, F., Jakeman, A. J., and Nix, H. A. (1995). *Salinisation of land and water resources: human causes, extent, management and case studies Canberra*. PhD dissertation, The Australian National University.

- Hunt, G., Salisbury, J., and Lenhoff, C. (1972). Visible and near infrared spectra of minerals and rocks: V. Halides, phosphates, arsenates, vanadates and borates. *Journal of Modern Geology*, 3, 121– 132.
- Khan, M. N., Rastoskuev, V.V., Shalina, E.V. and Sato, Y. (2001). Mapping salt affected soils using remote sensing Indicators- a simple approach with the use of GIS IDRISI. In: Proceedings of *The twenty second Asian Conference on remote sensing*.
- Liu, X., Peterson, J., Zhang, Z. and Chandra S. (2005). Improving soil salinity prediction with high resolution DEM derived from LIDAR data. In: Proceedings of *The ninth International symposium on physical measurements and Signature in Remote sensing*, China.
- Margate, D. E., and Shrestha, D.P. (2001). The use of hyperspectral data in identifying “desert-like” soil surface features in Tabernas area, southeast Spain. *The twenty second Asian conference on remote sensing*.
- Masoud, A.A., and kike, K. (2006). Arid land salinization detected by remotely-sensed landcover changes, A case study in the Siwa region, NW Egypt. *Journal of Arid Environments*, 66, 151-167.
- Matinfar, H. R. (2006). Evaluation of ASTER, LISS\_III, ETM, TM, and MSS data for characterizing and mapping soil base upon filed observation and Geographic information system(GIS). PhD dissertation, university of Tehran. (In Farsi)
- McGowen, I., and Mallyon, S. (1996). Detection of Dryland salinity using single and multi-temporal Landsat imagery. In: Proceedings of *the 8th Australasian Remote Sensing Conference*, Canberra (pp. 26–34).
- Moreau, S. S. (1996). Application of remote sensing and GIS to the mapping of saline\sodic soils and evaluation of sodification risks in the Province of Villarroel, Central Altiplano, Bolivia. In: Proceedings of *the 4th International Symposium on High Mountain Remote Sensing Cartography*.
- Metternicht, G. (1999). Current status and future prospectives of radar remote sensing for cartographic applications. *Journal of Cartography*, 28, 1– 16.
- Metternicht, G. and Zinck, J. A. (1997). Spatial discrimination of salt and sodium affected soil surfaces. *International Journal of remote sensing*, 18, 2571-2586.
- Metternicht, G. I. and Zinck, J. A. (1996). Modelling salinity – alkalinity classes for mapping salt-affected topsoils in the semi-arid valleys of Cochabamba (Bolivia). *ITC Journal*, 2, 125– 135.
- Mougenot, B., Pouget, M., and Epema, G. (1993). Remote sensing of salt affected soils. *Remote Sensing Reviews*, 7, 241–259.
- Rao, B., Sankar, T., Dwivedi, R., Thammappa, S., Venkataratnam, L., Sharma, R., and Das, S. (1995). Spectral behaviour of salt-affected soils. *International Journal of Remote Sensing*, 16, 2125– 2136.
- Wang, D., Wilson, C. and Shannon, C. (2002). Interpretation of salinity and irrigation effects on soybean canopy reflectance in visible and near-infrared spectrum domain. *International Journal of remote sensing*, 23(5), 485-492.