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Landsat (MSS)

(MPS)

(NP)

(CA)

IRS/P6 (LISS III)

(AWMSI)

( )

( )

/ :

(2008) Azari Dehkordi Khazae .

Apan *et* )

/

.(*al.*, 2002

(2009) Talebi Amiri .

Matsushita *et al.*, )

.(2006

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.(Makhdoum, 2006)

Mokhtari .

(2009)

.

(2002) Herzog Lausch

Apan *et al.*, )

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.(2002

(2006) Matsushita

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-

.(McGarical & Marks, 1995)

(2006) Nakagosh Abdullah

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Weng

(2007)

$$\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2$$

(Lausch & Herzog, 2002)

$$\frac{(NP) \cdot (CA^2)}{(AWMSI^5) \cdot (MPS^4)}$$

(McGarical & Marks, 1995)

(Wang *et al.*, 2008)

IRS/P6 (LISS III) Landsat (MSS)

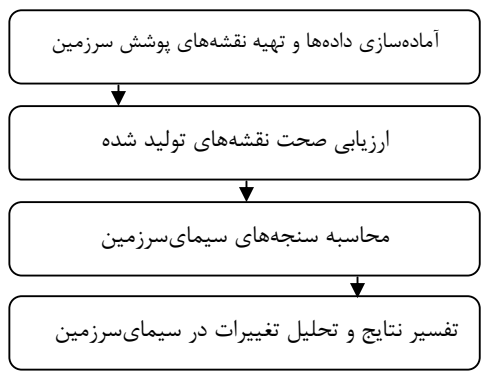
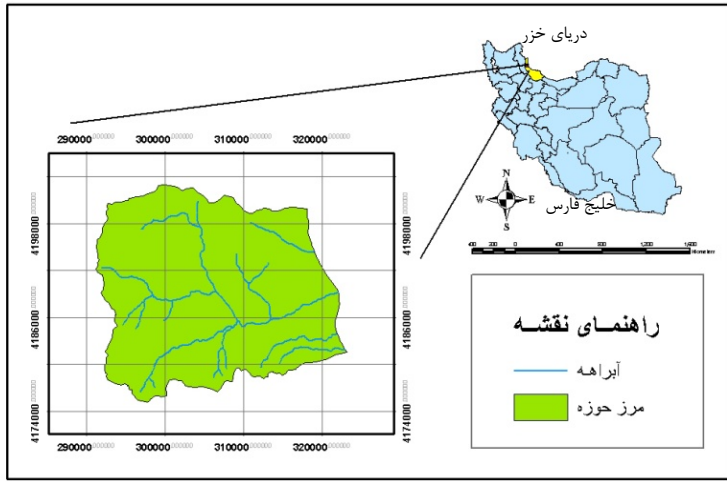
$$\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2$$

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<sup>2</sup> Class Area  
<sup>3</sup> Number of patch  
<sup>4</sup> Mean patch size  
<sup>5</sup> Area weighted mean shape index

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<sup>1</sup> Kappa



( × )  
/

(LISSIII

.(Wang et al., 2008)

- <sup>1</sup> Hybrid
- <sup>2</sup> Supervised
- <sup>3</sup> Unsupervised

(CA)

(NP)

(McGarical & Marks, 1995)

( / )  
( / )

(Gerger & Turner, 2002)

(% ) (% )  
(% ) (% ) (% )

$CA = \sum_{i=1}^n a_{ij} (10000)$		*	*	CA		
$n_i NP =$		*	*	NP		
$MPS = \frac{\sum_{i=1}^n (a_i)}{n}$		*	*	MPS		
$AWMSI = \sum_{i=1}^n \left[ \left( \frac{0.25 p_i}{\sqrt{a_i}} \right) \left( \frac{a_i}{A} \right) \right]$		*	*	AWMSI		

(McGarical & Marks, 1995)

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(AWMSI)

		/
/	/	
/	/	

(MPS)

(McGarical & Marks, 1995)

(McGarical & Marks, 1995)

%

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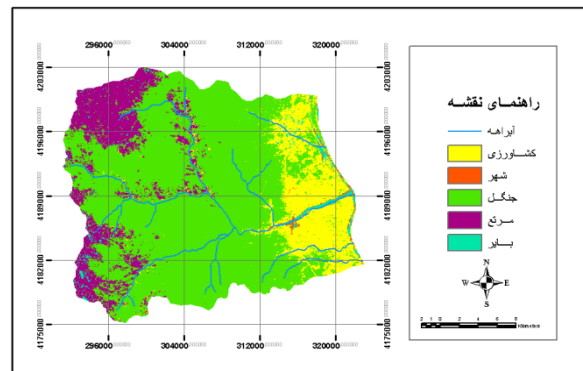
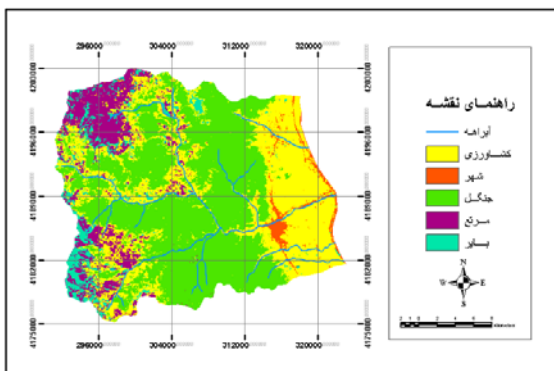
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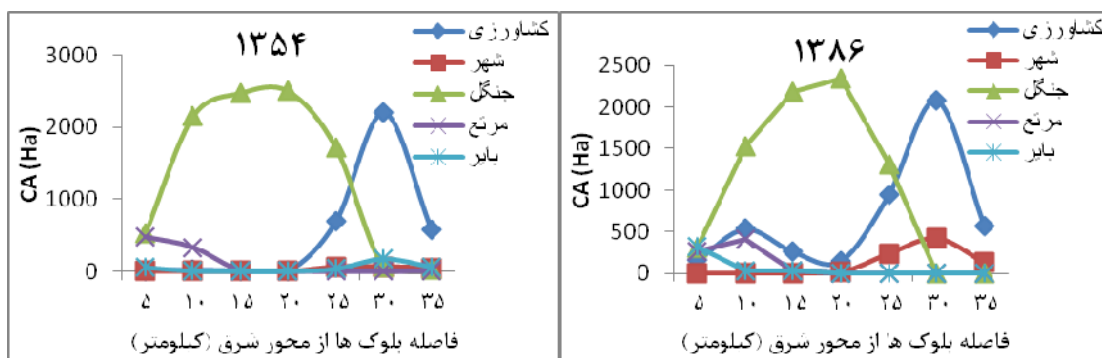
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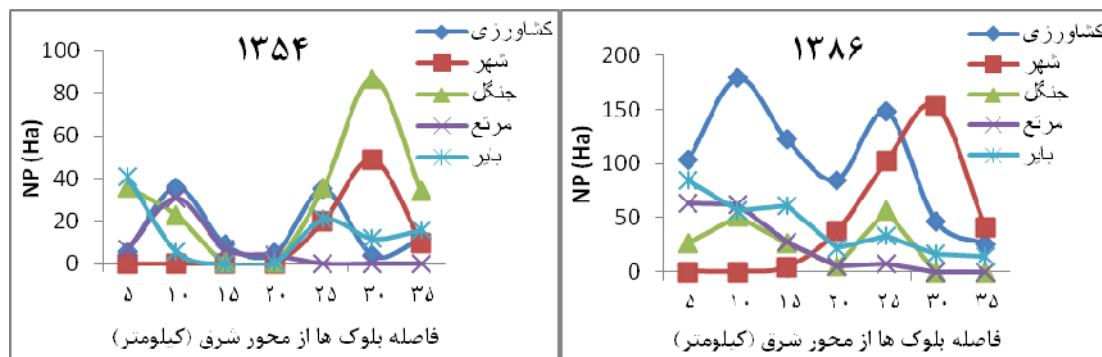
CA	NP	MPS	AWMSI	/
/		/	/	( )
/		/	/	( )
/		/	/	( )
/		/	/	( )
/		/	/	( )
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/		/	/	( )
/		/	/	( )



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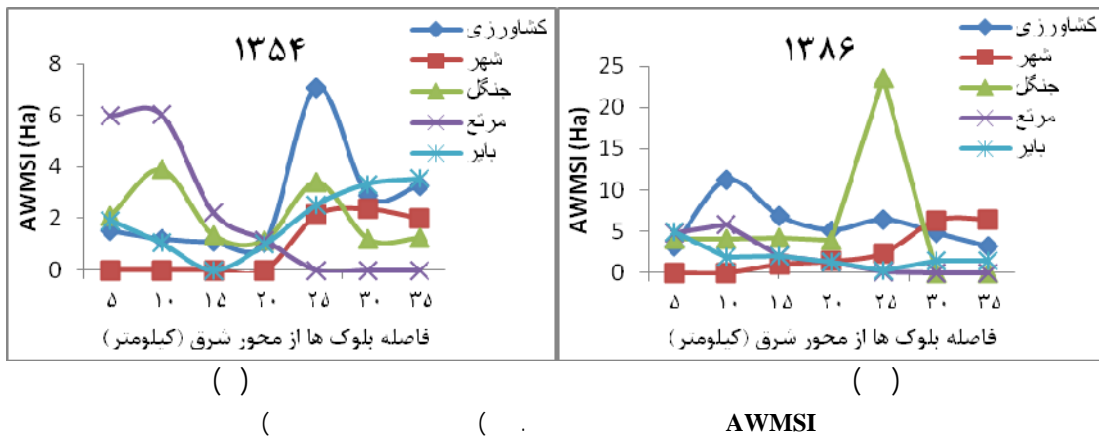
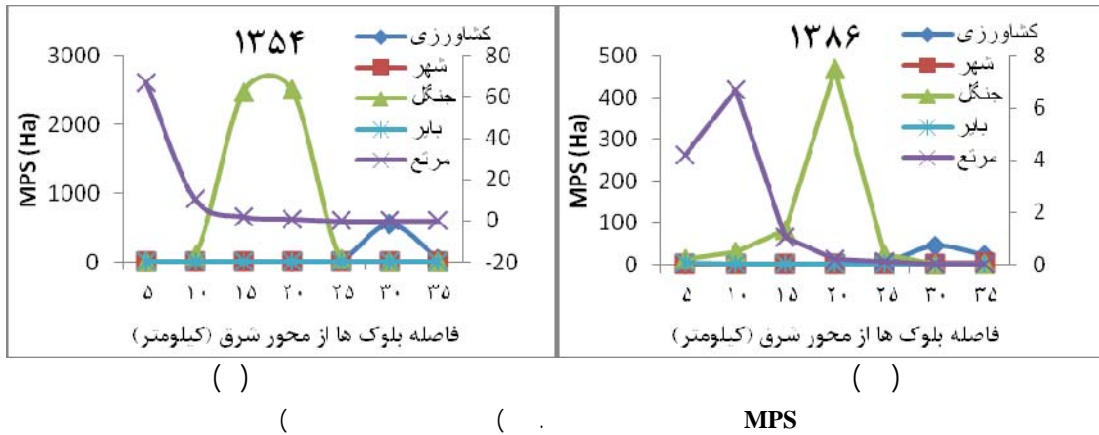
CA



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NP



McGarical & )

.(Marks, 1995; Gerger & Turner, 2002

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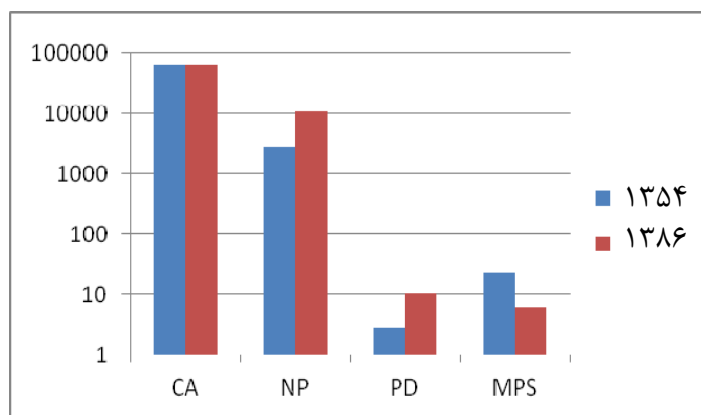
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Gerger & )

(Turner, 2002

Matsushita (2006) Nakagoshi Abdullah

Herzog Lausch (2007) Weng (2006)

(2009) Talebi Amiri (2002)

Nakagoshi Abdullah

Matsushita (2007) Weng (2006)

(2006)

Lausch

Talebi Amiri (2002) Herzog

(2009)

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## Landscape Ecological Metrics-based Investigation of Land Cover/Use Changes in Korganrud Watershed

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### Abstract

Human activities induced changes in land cover/use have extensive impacts on the landscape. In recent years, these changes had an increasingly growth due to irrational use of the natural resources in Iran. Hence, considering the negative effects of the inappropriate use of land and land-use change, understanding of the landscape changes over time is necessary to planning and implementation of sustainable management. This study has been carried out aiming to investigate trends in the landscape changes in Korganrud watershed during 1975-2007. In order to generate the land use/cover map and analysis of the changes, satellite images, including Landsat (MSS), IRS/P6 (LISS III) were applied and landscape metrics, including Class Area (CA), Patch Number (PN), Mean Patch Size (MPS) and Average Weighted of Mean Shape Index (AWMSI) were used to quantify the landscape patterns. Results of the present study revealed an extensive change in the landscape metrics in distribution and ratio of the land uses due to the increase in the area of disturbing patches (agriculture, urban and barren lands) in expense of decrease in the natural resources (forests and rangeland) during the study period. Degradation and reduction of integrity of the landscape have also been observed due to the increase in patch number of the land uses that were in association with the increase in shape complexity and decrease in the patch size in the study area. If such a trend continues, without any appropriate management plan and or land-use planning, it could result in adverse impacts on the structure of the ecosystems. Therefore, the results suggest the necessity of implementation of land use planning in order to determination of the suitability between land supply and demand, and decreasing degradation of the natural resources.

**Keywords:** Land Cover/Use Changes, Landscape Ecological Metrics, Satellite Images, Korganrud Watershed.