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Temporal Change of Mancher Lake Through Landsat Satellite Imagery

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Abstract: This scientific study focuses on the change detection of Mancher Lake, due to depleting of natural resources, environmental crisis and unplanned changes of land used; these changes occurred without paying any attention and planning. The information about change is carried out updating land cover/ land use changes and maps of natural resources of Manchar Lake. The study based on the methods of change, to extract information from remote sensing (RS) sensed data. The remote sensing is an efficient tool to monitor change continuously. Present work reveals that decreasing of water bodies, vegetation and increasing dry land, these changes has adverse impact on eco-system of Mancher Lake.

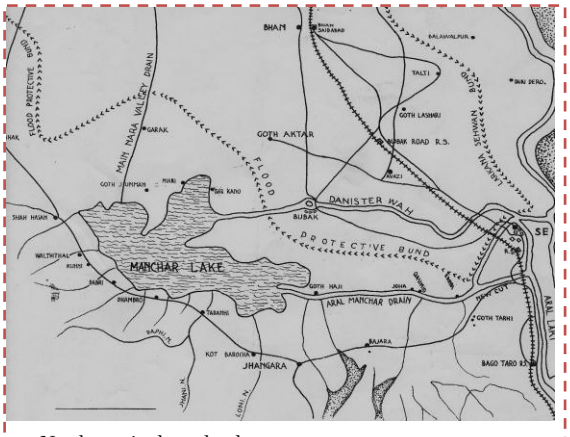
Keywords: Eco-system, Landsat Satellite, Classify, Remote sensing.

1. INTRODUCTION

Nowadays the change in environmental has turned into the hot topic all over the world. Soil degradation due to huge forest cutting, the urbanization and industrialization and other major cause is natural disaster such as flooding, drought and global warming (Lee. *et al.*, 1998). The satellite images are a controlling system for investigation, planning and observing earth surface property. This method has turn into essential and progressively more significant for the reason that of the synoptic coverage of satellites above great regions interpretation its price and time efficiency. in addition, in region which are complex to access, through this system is possibly the only way to acquire the essential information more efficiently and quickly *(Silva. 1996)*. This is significant variety of procedure and algorithm to execute for the distinguish changes be compatible by means of the uniqueness of the earth surface objects. Consequently, intended for successful change detection investigation, the selection of suitable change detection algorithm be too significant aspect. The selection is depending on the potential and capability of the algorithms (Mispan. *et al*., 1997). The objectives of this study are impact assessment of water scarcity, vegetation, human/ aquatic, life and environmental change detection in Mancher Lake and neighboring area by using remote sensing and "GIS" technology.

Study Area

The study area extends between 26.44181 ^{O}N 67.69933^{O}E Mancher Lake is a natural depression placed in Jamshoro region, Sindh, Pakistan. Total area of lake is 253sq kilometer. Mancher Lake have three water sources for fed, 1. River Indus 2. Hill torrents third source of water is Main Nara Valley Drain (MNVD) have contaminated water from agricultural, industrial and power plant. The environment of the Mancher region be intensively burning in summer and freezing in winter.



North: agriculture land (Dadu)
South: hills, dry land
East: agriculture land (Sehwan)
West: hills, dry land

Fig.: 1. Manchar Lake

3. METHODOLOGY

A number of change detection techniques have been introduced to observe changes in environment with remote sensing data *(Singh, A. 1989*). Frequently the processes for the change detection can be separated into

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two most important groups (i) pre -classification scheme and (ii) post-classification scheme. The first group focused typically on the changes in the risk region such as rough surface; the second group focused on wide-ranging land covers changes (Herold *et al*, 2002). Study region of Mancher Lake comes in one satellite image Landsat Multi-spectral scanner, Thematic Map-per digital image information cover Mancher Lake & Landsat information processed by "Environment for Visualizing Images (*ENVI* 4.7)" during image processing. Step number one improved the images, then raster images were stretching, step number two to reduce geometric mistake via survey chart and field, used Ground control points (GCP) to increase the image accuracy. Step number three resolve imagery was separation/ masked area of research. The investigation of images from 1992 and 2003 were hold evidence about the change detection, vegetation, water body and dry/ barren land are shown in (**Figs. 2 and 4)** accordingly.

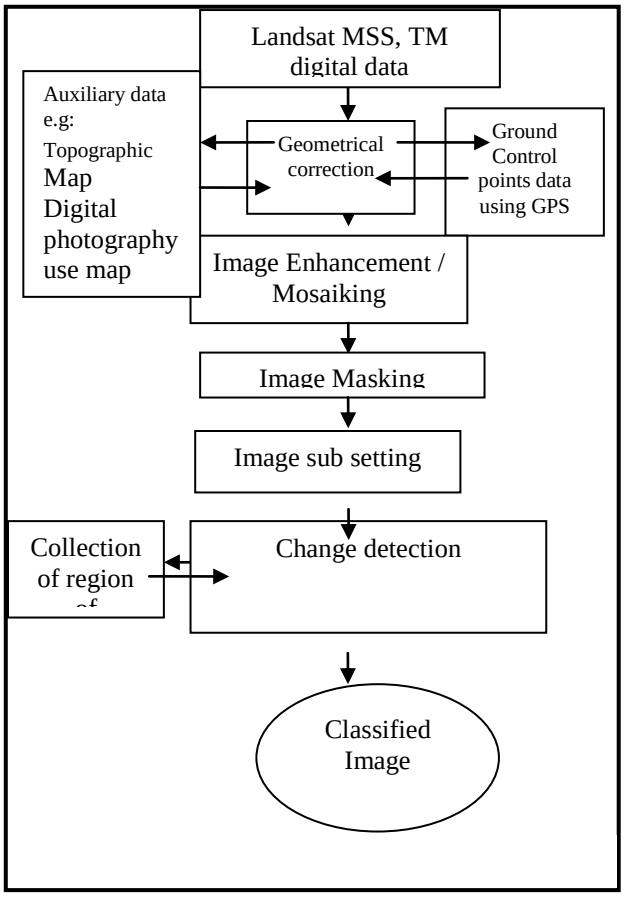


Fig. 2. Methodology for change detection

4. RESULTS

The satellite logical data used for change detection analysis were preferred and supervised classification of satellite Image in **(Fig. 3, (a, b)** shows that images are classified into the three categories, water, vegetation and dry land. Statistical Report shows that number of points (Npts) selected for the sample region on the image and percentage (Pct) show the area of water, vegetation and dry land, (GN) stands for Ground north which shows that image is geometrically corrected and star represents the true north on image. Consolidated record of vegetation cover, water body and other object are shown in **(Table: 1)**.

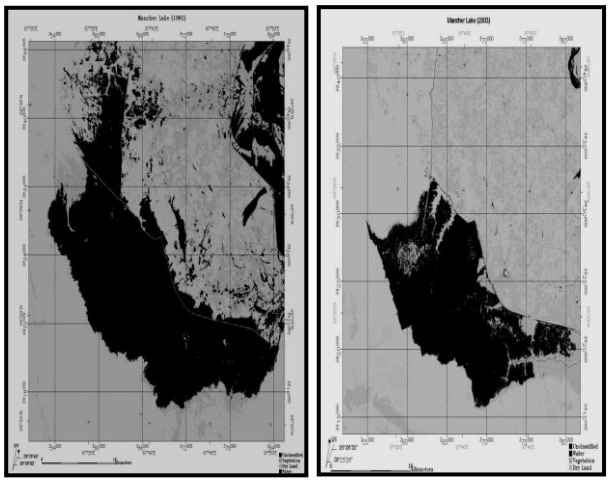


Fig. 3. supervised classification of satellite Image: 1992 and 2009

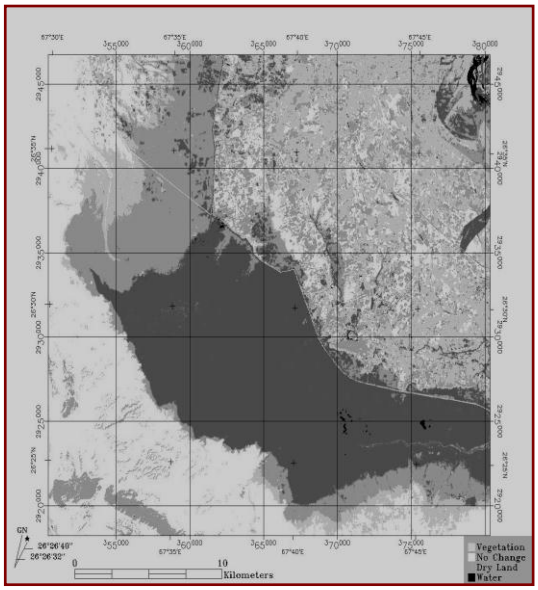


Fig.: 4. Results of Change detection 1992/2009

Table: 1 ***Statistically Analysis of Change Detection***

Year	Landsat TM data sat 1992	Landsat TM Data sat 2003
Unclassified	0.000%	0.000%
Vegetation cover	23.119%	20.971%
Water body	35.049%	19.299%
Dry Land	43.980%	57.582%

4. CONCLUSION

This research work has focused on impact of land use/cover using change detection method to Classify the location of an object and observe it at different times and to monitor environmental degradation changes on Mancher Lake. This research work based on multi-temporal analysis of TM Landsat satellite data. The area under assessment shows the significant change in the area is -32%. These uncontrolled changes in water and vegetation have been creating critical environmental issues threatening the ecosystem of the lake.

5. ACKNOWLEDGEMENT

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Appendix

Table 2: Ground control points (GCP)" of the Study Area using GPS and the digital camera.

Sr. No.	Name of location	Sea level	GPS L/L	Information
01	Baag yousuf	112 /ft	26.42104 ^{O}N 67.83395 ^{O}E	Land cover with the agriculture
02	Start manchar lake boundary	134 /ft	26.3980 ^{O}N 67.83093 ^{O}E	Land cover with water
03	Manchar lake village	137 /ft	26.41160 ^{O}N 67.9098 ^{O}E	Land cover with dry land
04	Manchar lake boundary	120 /ft	26.42387 ^{O}N 67.71812 ^{O}E	Land cover
05	Manchar lake market	111 /ft	26.44181 ^{O}N 67.69933 ^{O}E	Land use for urban area
06	Danstare wah	123 /ft	26.44216 ^{O}N 67.69896 ^{O}E	Land use
07	Chhandan	133 /ft	26.50957 ^{O}N 67.62467 ^{O}E	Land cover
08	Girkeno	130 /ft	26.47947 ^{O}N 67.67072 ^{O}E	Land cover
09	Aryal drain Lauky	122 /ft	26.39989 ^{O}N 67.66315 ^{O}E	Land cover with water
10	Tahre village	117 /ft	26.37554 ^{O}N 67.83066 ^{O}E	Land use for the agriculture
11	Bajara village	117 /ft	26.35593 ^{O}N 67.76722 ^{O}E	Land use for the agriculture
12	Jhangara village	137 /ft	26.34289 ^{O}N 67.22468 ^{O}E	Land use for urban area
13	Jhangara village	105 /ft	26.34008 ^{O}N 67.71943 ^{O}E	Land cover with the water
14	Dabhry	116 /ft	26.35687 ^{O}N 67.64785 ^{O}E	Land for the agriculture

15	Taranhi city	138 /ft	26.37869 ^{O}N 67.66175 ^{O}E	Land use for house
16	Taranhi village	134 /ft	26.38046 ^{O}N 67.66145 ^{O}E	Land use for school
17	Taranhi village	134 /ft	26.37999 ^{O}N 67.66030 ^{O}E	Land use for hospital
18	Dabri villge	130 /ft	26.40446 ^{O}N 67.58510 ^{O}E	Land use
19	Shah hassan village	130 /ft	26.44381 ^{O}N 67.56751 ^{O}E	Land cover with water
20	Shah hassan city	130 /ft	26.44518 ^{O}N 67.56747 ^{O}E	Land cover with water
21	Nie gage	130 /ft	26.44348 ^{O}N 67.56662 ^{O}E	Land use for houses
22	Dabhry	116 /ft	26.35687 ^{O}N 67.64785 ^{O}E	Land for the agriculture

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