

**A Remote Sensing-Based Evaluation of Land Surface Property**

**Changes Using LST, NDVI Analysis**

**Case Study: The Mara Ecosystem**

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## ABSTRACT

Land-use/ Land-cover change (LULCC) is fast taking place in the regions abounding the Maasai Mara National Reserve (MMNR) that constitute the Maasai Mara ecosystem. The modification, conversion and maintenance of Land cover are forms of human interference prevalent in the Mara ecosystem. Changes in the manner in which human beings interact with the environment alter land use and in effect alter land cover. As the dominant and natural land cover are altered, the land surface and its properties are altered, leading to changes in land-atmosphere interactions upon which many ecosystem services rely are also altered resulting in climate variability. Land Surface Temperature (LST or  $T_s$ ) is a land surface property, which varies over space and in time as a function of vegetation cover, surface moisture, soil types, topography and meteorological conditions. LULCC influence and affect LST, which is pertinent to climate variability studies. Normalized Difference Vegetation Index (NDVI) is a numerical indicator used in remote sensing to assess the concentration of green leaf vegetation and plant phenology and how plant phenology are affected by weather and climate variations. The variation of vegetation and hence NDVI therefore affects land surface processes, which influence energy exchanges between the land surface and atmosphere. The study area is the area constituting the Maasai Mara National Reserve and bounded by major urban centres including Narok, Kilgoris, Maji Moto and Lolgorian towns. The study found that there was substantial Land use/ Land cover change (LULCC) in the epochs of study accompanied by an increase in minimum LST

in all epochs apart from between 1995 and 2003. A comparative analysis of LST and LULC revealed that LST decrease was mostly in the regions where there was land cover change to sparse vegetation or grasslands, while increase took place where there was conversion to cultivated land, thus indicating that LULC has an effect on LST.

**Keywords-Land surface properties, Climate variability, LST, LULCC, NDVI**