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**CORE HOTSPOT ANALYSIS IN KRISHNA DISTRICT USING ESTEEMED ISRO (BHUVAN) LULC MAPS**

**Introduction and Justification**: All regions of Krishna district have been experiencing rapid change in LULC on a continuous basis with the expansion of human activities like aquaculture, industrialization, urbanization. Detection of hotspots and dynamic change has a great significance to analyze the nature - human interaction. On the other hand, it is also useful for identification of natural hazards. For this reason, LUCC research of varying spatial scales has drawn wide attention. After Godavari districts, Krishana district has the major area contributing to agriculture. But urbanization and industrialization has brought drastic changes in this area. Aquaculture is another area contributing major changes in the land use. But there is no attention on change detection has been paid to the Krishana district.

**ISRO data used**: For the present study, LULC maps of 2005-06, 2011-12, 2015-16 and 2018-19 year maps, LISS-III and AWIFS satellite images from Bhuvan website along with ancillary ground truth data used in QGIS environment.

**Specific steps in GIS**: Hotspots analysis and spatial transfer pattern of land use studied from the perspective of spatial feature of land use dynamic change using the LULC time series maps in comprehensive and innovative manner.

* LULC maps (250k) for the Krishna has been downloaded from Bhuvan for 2005, 2011, 2015, 2018 in pdf format
* Georeferenced all the pdf maps using the admin boundary (India) and clipped to the Study area boundary (Krishana Dist) in QGIS via the 'Georeferencer GDAL' plugin.
* All the images were reclassified with reference to the legend color area using GRASS plugin by creating a reclassification rule file and calculated for each class.
* Change detection image generated using DT-Classifier plugin. Generated transformation matrix for years 2005-2011, 2011-2015, 2015-2018. LISS III, AWFIS and Ground truth data used for identifying change.
* Created Grid(fishnet) for study area. Grid (fishnet) cells with either high or low values of Landcover loss were clustered spatially, looking at each cell in the context of neighboring feature.
* Calculated the LULC change area for each cell using zonal statistic tool for 2005-2018 and integrated this data to the grid file.
* Using this file hotspot analysis was done (P-value of 0.05) the statistically significant hot-spot are tested.

**Complexities involved**:

* 4 layers of 250K LULC maps intensively used for this study.
* For accurate change detection, LISS III, AWFIS and Ground truth data also used.
* Calling WMS layer in QGIS is only useful as reference map. But not useful for analysis.
* Generated transformation matrix for years 2005-2011, 2011-2015, 2015-2018
* Creation of appropriate Grid(fishnet) size for spatial change detection
* Hotspots and cold-spots analysis with statistically significant p and Z values.

**Application and use of these maps:** The prepared maps can be useful

* Studying natural resource management
* To discover the active regions of regional development
* To highlight sensitive regions to land use change, which is critical for administrative authorities
* For better management of land resources efficiently in the long run.
* A clear cut indication of population migration and economic activities
* It is a major impact factor for environmental assessment. Climate change and effects can be studied
* A key tool urban planning
* Helpful for the process and driving factors of land use change in detail. To set up future land use strategy