

MODELING LAND USE-LAND COVER TRANSITION INDUCED MICROCLIMATE CHANGES: A CASE STUDY OF VIJAYAWADA CITY, ANDHRA PRADESH, INDIA

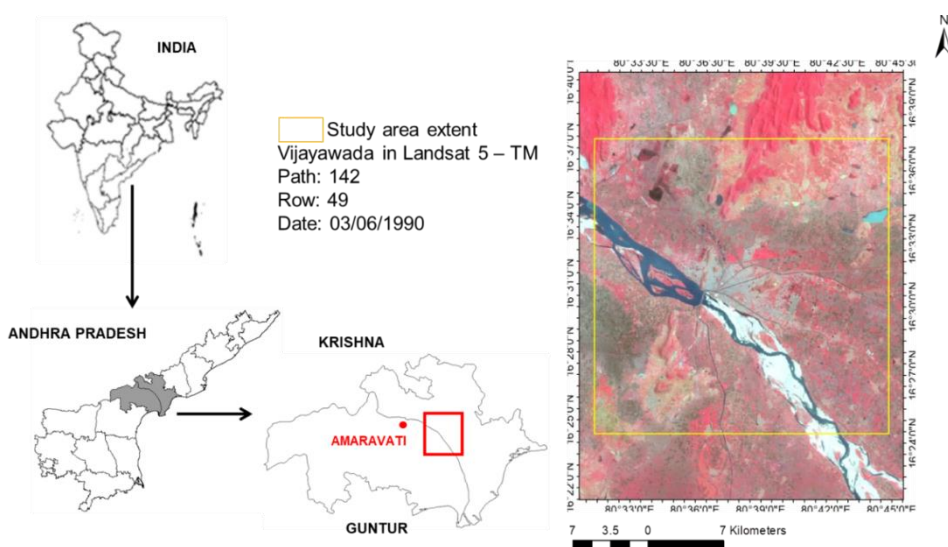
ABSTRACT

Urbanization induced unsustainable land use cover changes (LUCC) along with increasing population and associated lifestyle characteristics utilizing resources and emission of greenhouse gases cumulatively impact the land surface temperature (LST) of a region culminating into an urban heat island.

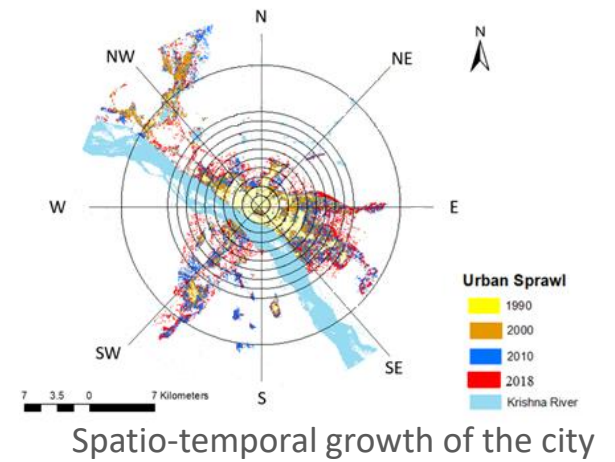
OBJECTIVE

With the knowledge of the thermal impacts as an effect of urbanization, proper urban planning strategies can be adopted to mitigate the adverse climate change phenomenon and ensure sustainability of the resources. The thesis thus aims towards following broad objectives:

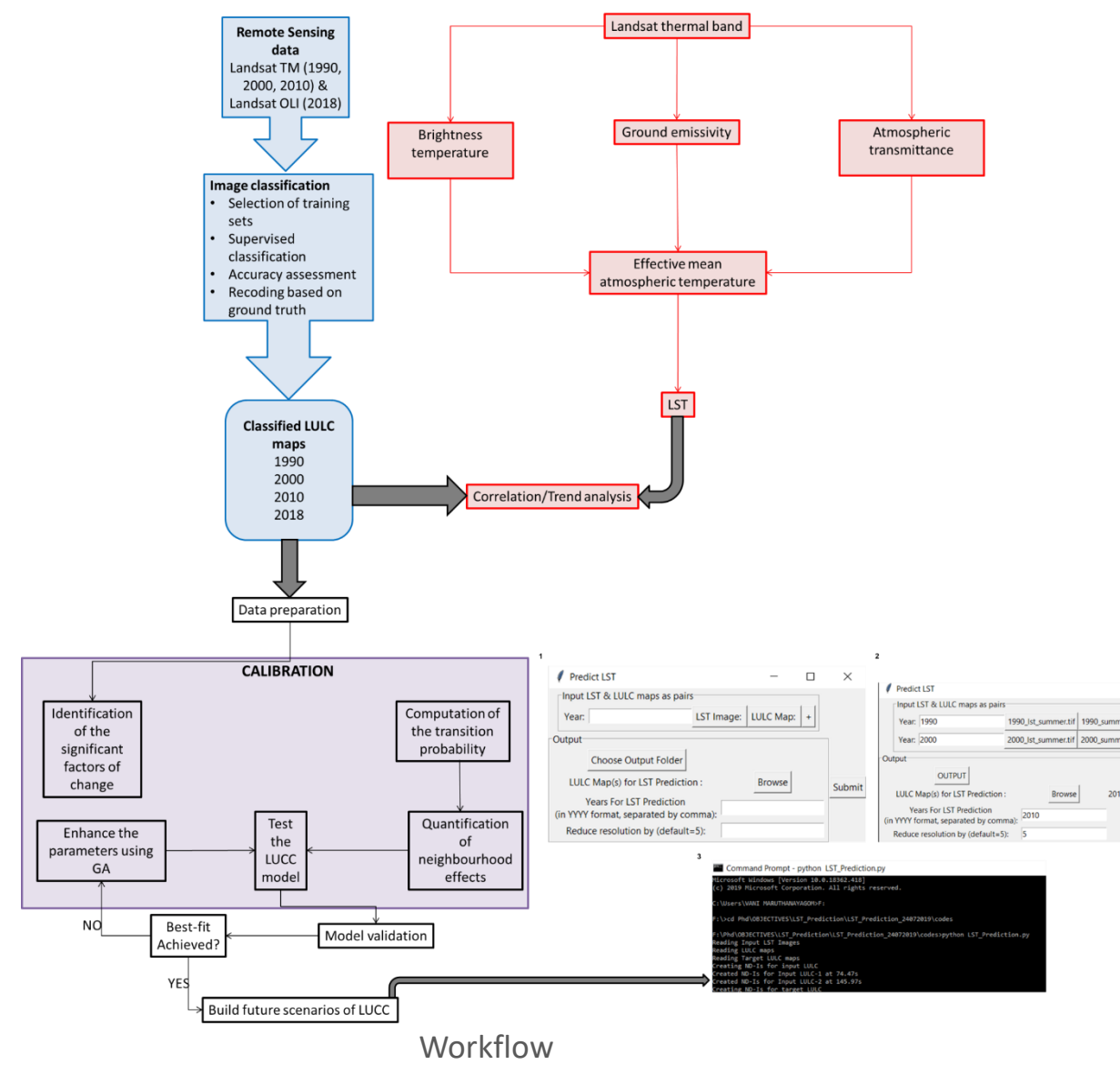
- Analyse the relationship between urban expansion and microclimate temperature fluctuations,
- Develop an algorithm to forecast land surface temperature (LST) based on the predicted LUCC



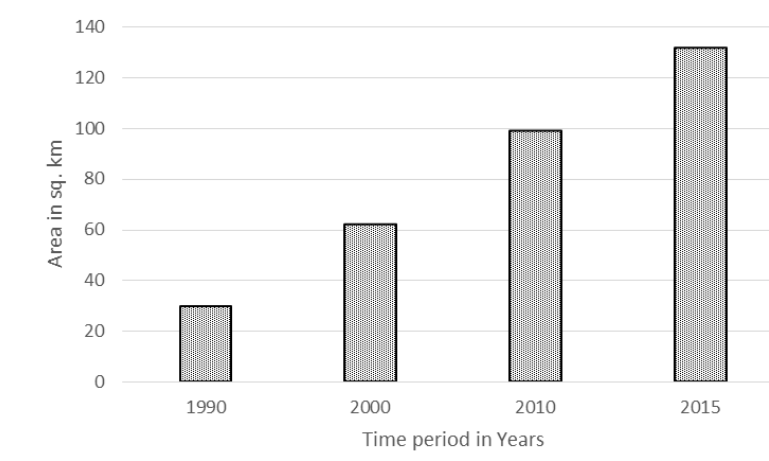
Geographical location of the study area



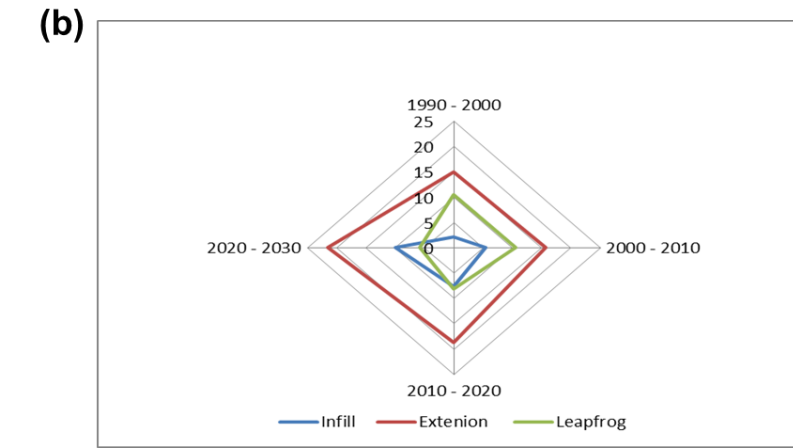
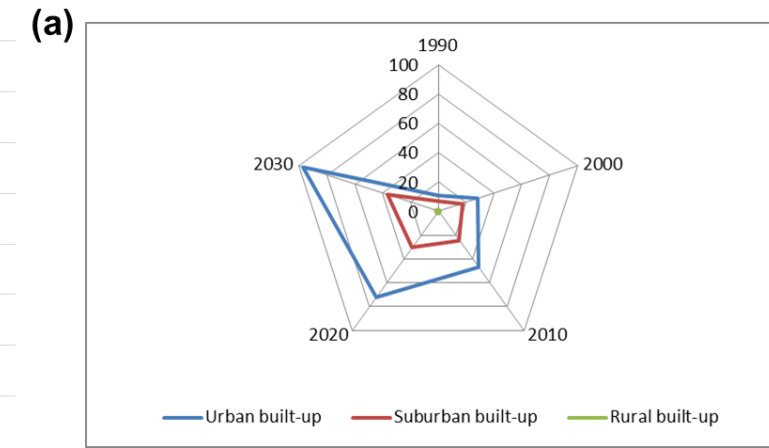
Spatio-temporal growth of the city



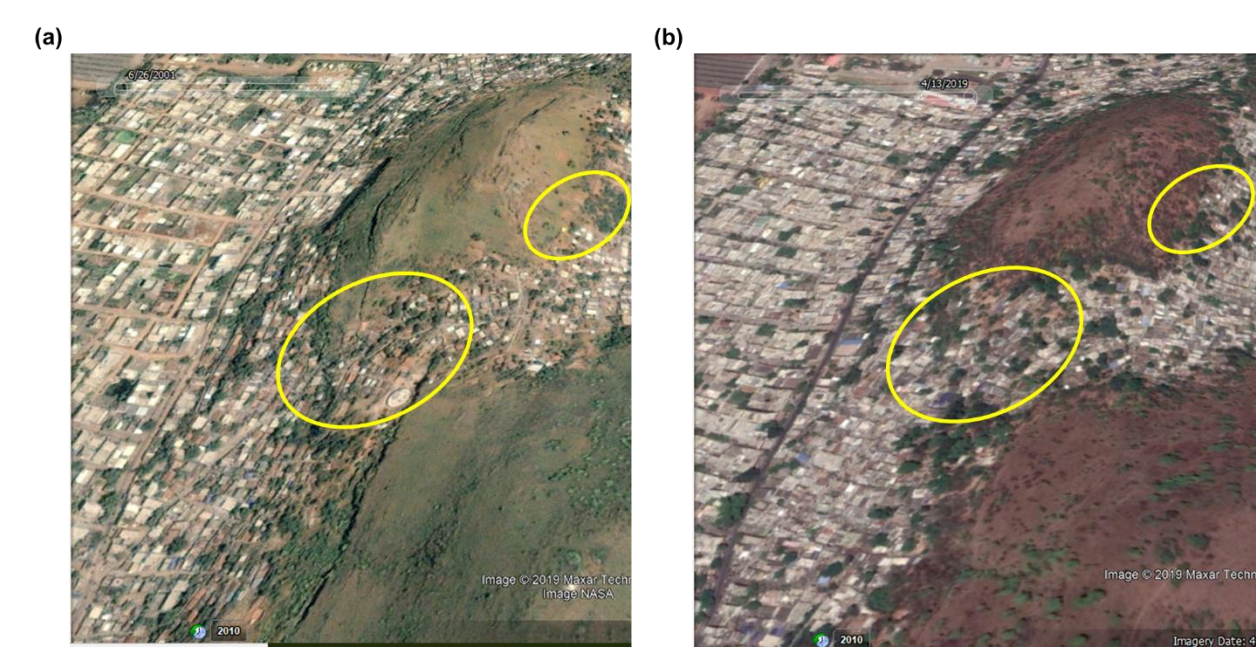
Workflow



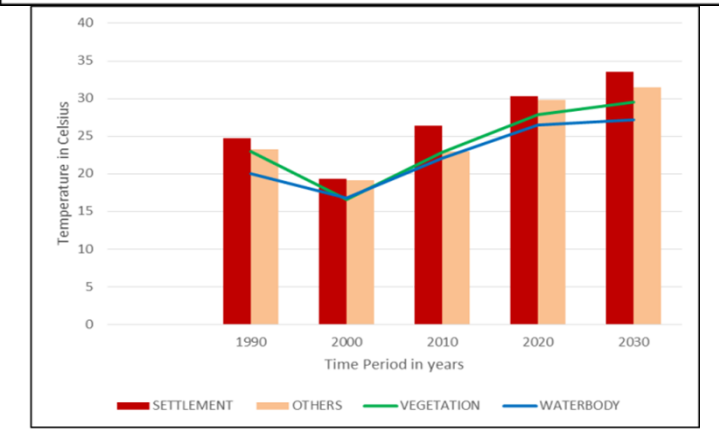
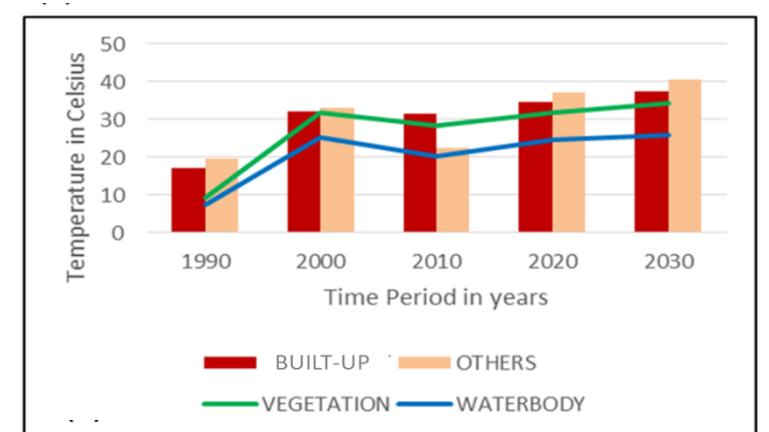
Built-up expansion over years



LUC dynamics captured in terms of (a) built-up changes (b) development pattern



Built-up expansion along the hill slopes witnessed through Google Earth in (a) 2001 and (b) 2019 (Courtesy: Google Earth)



Temperature trend observed during (a) Summer (b) Winter

METHOD

- Quantify the decadal land use-land cover (LULC) variations of Vijayawada from 1990 – 2018
- Identify the LUCC pattern
- Identify the drivers of change for the city
- Predict the expansion of the city and the pattern shift if any
- Quantify the temporal variations of LST during summer and winter
- Establish a relationship between the different LULC classes and their impact on the LST
- Forecast the LST associated with the predicted city changes