

URBANIZATION AND URBAN HEAT ISLAND ANALYSIS OF LAGOS, NIGERIA: USING REMOTE SENSING AND GIS ANALYSIS TO DETERMINE URBAN HEAT

Final Result:

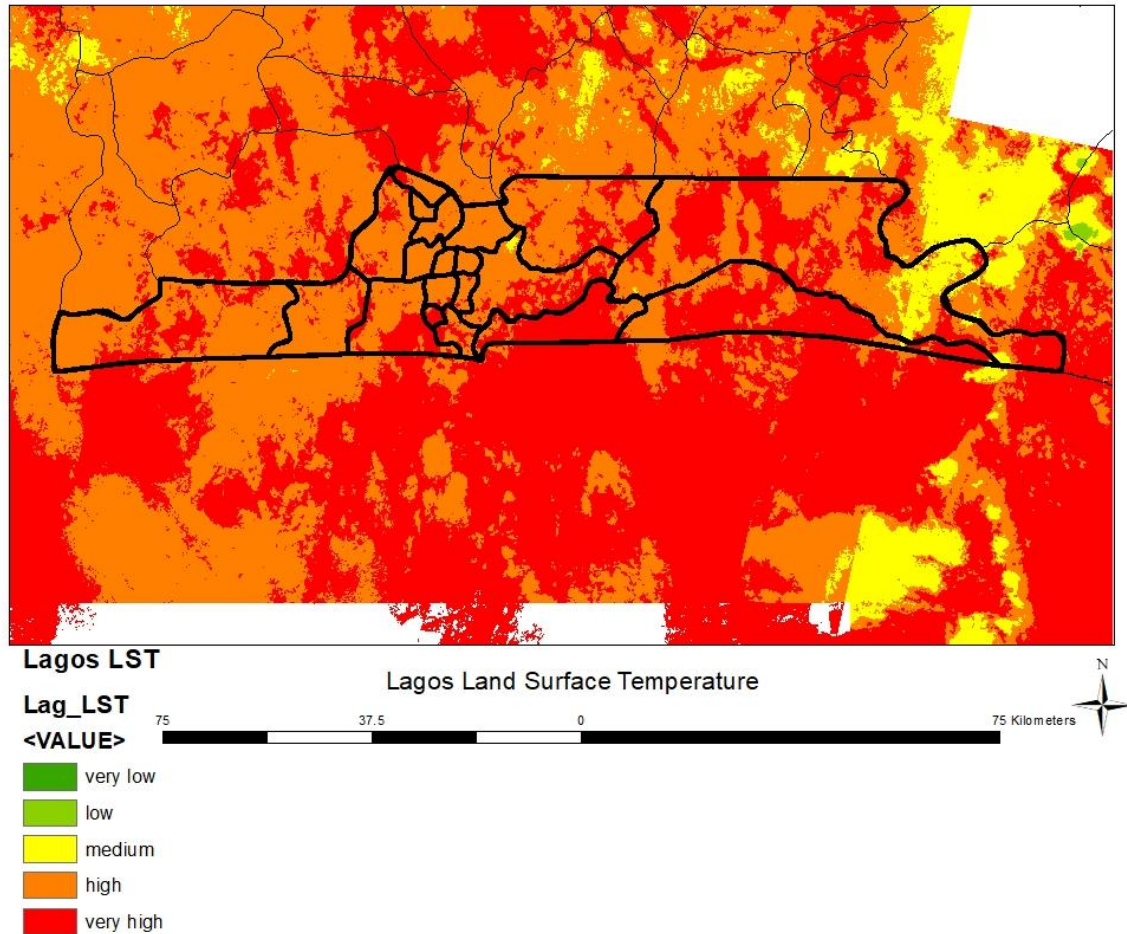


Figure 1: Showing land surface temperature of Lagos, Nigeria.

The figure above shows the urban heat line drawn by digitizing the area of Lagos using polyline on the land surface temperature layer, and the legend shows the varying temperature levels. The land surface temperature analysis was done by obtaining raster images (C2 L2 LandSat 8/9 OLI/TIRS band 10) from earth explorer, and I used the mosaic to new raster tools to merge the raster images together, and with the use of raster calculator the merged raster images was used to get the land surface temperature (LST) using the multiplicative factor (0.00341802) and additive factor (149) to get the LST in kelvin and the covert to degree Celsius, 273.15 was subtracted. Below are the raster images downloaded

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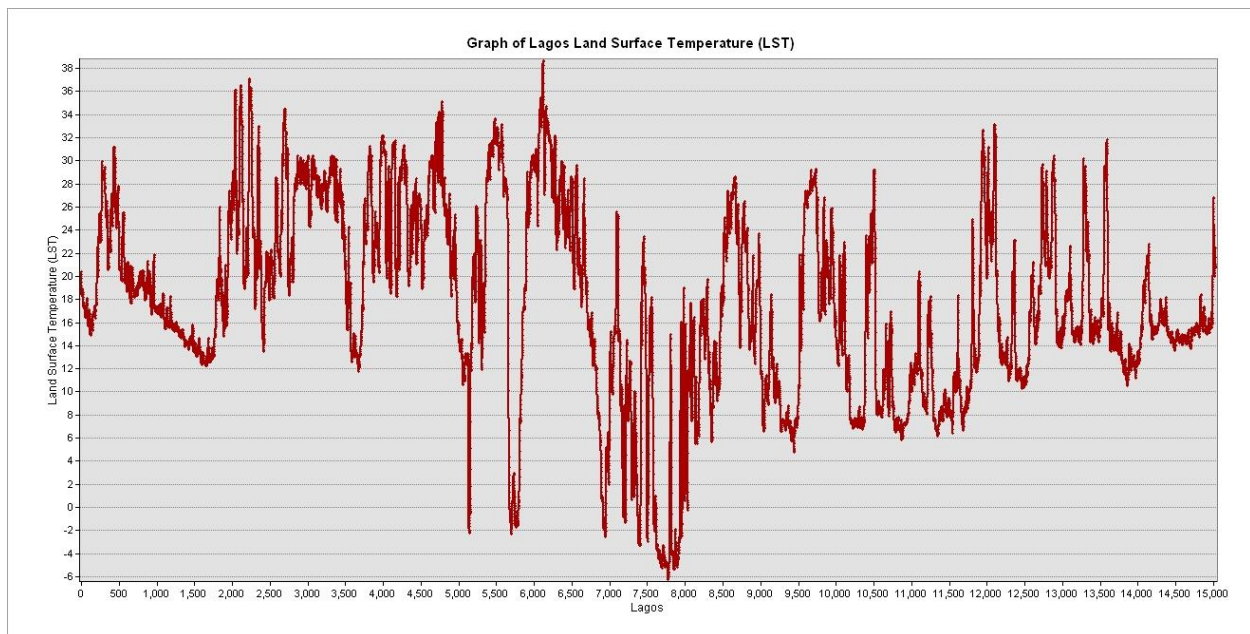


Figure 2: Showing the Lagos, Nigeria Urban Heat Island Analysis graph.

The figure above shows the urban heat island analysis graph of Lagos State, Nigeria, which was gotten by the stack profile tool, the digitized area of Lagos State, Nigeria, and the land surface temperature of gotten. The temperature in the graph was above 38⁰c as seen in the graph.

RELATIONSHIP BETWEEN DISEASE OUTBREAK AND HIGH URBAN HEAT IN LAGOS, NIGERIA.

To effectively tackle disease outbreaks, high case numbers in Lagos State, and the urban heat island effect, health authorities, urban planners, and the public must join forces. A holistic approach to these issues can certainly strengthen disease prevention and boost overall urban health. The interplay of disease outbreaks, high case numbers in Lagos State, Nigeria, and the urban heat island effect is intricate and influenced by numerous factors. Human activities and limited green spaces are the primary causes of the urban heat island effect, which can worsen disease transmission in densely populated urban areas such as Lagos. This, in turn, can contribute to the spread of diseases like dengue fever and malaria. For instance, in recent years, Lagos has faced challenges with mosquito-borne diseases such as malaria due to its tropical climate and favorable breeding conditions for mosquitoes. The urban heat island effect intensifies these conditions, allowing mosquitoes to breed more rapidly and expand their range. Similarly, dengue fever, though not as prevalent, poses a concern due to the proliferation of its *Aedes* mosquito vector in warmer urban environments.

According to a publication **“Mathematical modeling of climate change and malaria transmission dynamics: a historical review”** (<https://link.springer.com/article/10.1007/s00285-018-1229-7>) which establishes a clear link between temperature and the rising incidences of malaria. Another publication **“Modeling the effects of weather and climate change on malaria transmission”** (https://ehp.niehs.nih.gov/doi/full/10.1289/ehp.0901256?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%20%20pubmed) also establish a clear link between temperature and malaria incidence. To address this issue, a multi-faceted approach is required, including effective mosquito control measures, incorporation of green spaces into urban planning, and improved sanitation and waste management to reduce disease transmission. Public health campaigns focused on disease prevention, especially during high temperatures, are essential in mitigating the situation.