SPACE TECHNOLOGY FOR URBAN HEAT ISLAND

Dodoma, Tanzania

UN/Austria Symposium - Space for climate Action

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Contents

Introduction

Dodoma, Tanzania's capital, has seen rapid urban growth, with its population increasing from 410,956 in 2012 to 556,423 in 2020. This growth has led to significant changes in land use, notably the expansion of built-up areas.

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Urban Heat Island: Is a term that describe the phenomena of higher temperature in urban areas compared to the surrounding rural areas.

Objectives of this studies -SUHI

- To measure and quantify the intensity and extent of Urban Heat Island in different District of Dodoma Region
- To evaluate and compare the impacts of UHI on various aspects of urban life demand, thermal conform and health risk in different District of Dodoma Region
- To propose and implement solutions to reduce Urban Heat Island and enhance urban cooling

Satelite data used

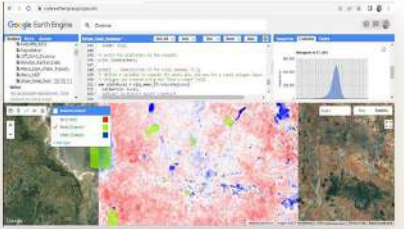
Landsat 8 and 9 LSRR Data product

	Landsat 9	Landsat 8
Sensor:	Thermatic Infrared Sensor 2 (TIRS-2)	Thermatic Infrared Sensor (TIRS)
Temperal Coverage:	11/2021 - present	02/2013 - present
Orbit and Swath:	185 Km	185 Km
Spectra Bands:	11.50 - 12.51	11.156 - 12.51
Spectral Resolution:	100m	100m
Temperal Resolution:	16 days	16 days

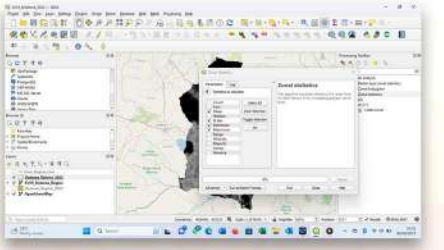
Software used: *Google earch engine* | *Qgis version 3.321*

Methodology

1. Machine Learning and data analytics

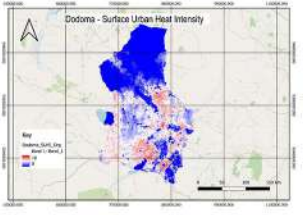


2. Heat Vulnerability Maps

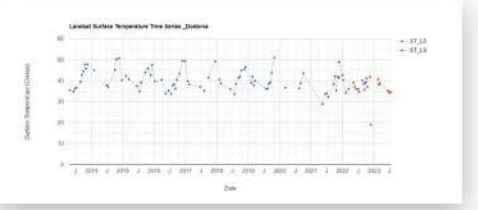


Results

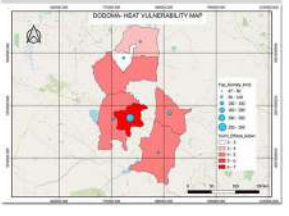
a.


Dodoma - Surface Urban Heat Intensity

b.


Landsat Surface Temperature Time Series _Dodoma
ST_LS
ST_LS
Date

c.


DODOMA- HEAT VULNERABILITY MAP

Benefits

- It aids urban planning by pinpointing heat islands, assessing green space and water cooling, and enhancing urban resilience.
- It offers high-resolution data on land surface temperature and land use/land cover, crucial for understanding urban heat island patterns and causes.
- It can help monitor the changes of urban heat island over time and access the impact of urbanisation climate change and mitigation strategies on urban heat island

Actions

- The government of Tanzania has planned to plant more than 14 million trees through students of primary schools, secondary schools and colleges, said the minister of the country, office of the vice president, union and environment Hon Seleman Jafo

- Implementing projects and programmes that aim to improve the resilience and livelihoods of Urban communities, such as the Resilient Natural Resources Management for Tourism and Growth (REGROW) Project, which supports Tanzania to enhance access to improved economic opportunities, reduce vulnerability to climate shocks.

Geospatial Frame work: Urban Heat

Unsuccessful Solution

- *Lack of Funds and Facilities to cover the whole Tanzania*
- *Skills and experience people to obtain the highly result*

Gap and Challenges

- *Lack of reliable, high-resolution spatial data on UHI vulnerability, exposure, sensitivity, and adaptive capacity .*
- *Lack of coordination and integration among different sectors and disciplines, such as urban design, energy, transport, health, and environment .*

Impact

- *Improved understanding of the spatial distribution and dynamics of UHI hotspots and vulnerable populations .*
- *Increased resilience and sustainability of urban systems and communities to cope with extreme heat events and climate change .*

Big Bets

- *Developing and implementing UHI vulnerability mapping using advanced GIS data and tools .*
- *Conducting a study on UHI using geospatial techniques to identify the causes and effects of UHI in different regions*

Thank you for your Attention!

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