



KENYA SPACE AGENCY

Possibilities beyond our skies

UN/GHANA/PSBAIP – 5TH INTERNATIONAL CONFERENCE SPACE TECHNOLOGIES FOR HEALTH

Malaria Susceptibility – *Homa Bay County*

CLAIRE MUNG'I – KENYA SPACE AGENCY

11 May 2022

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Introduction

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Kenya Space Agency

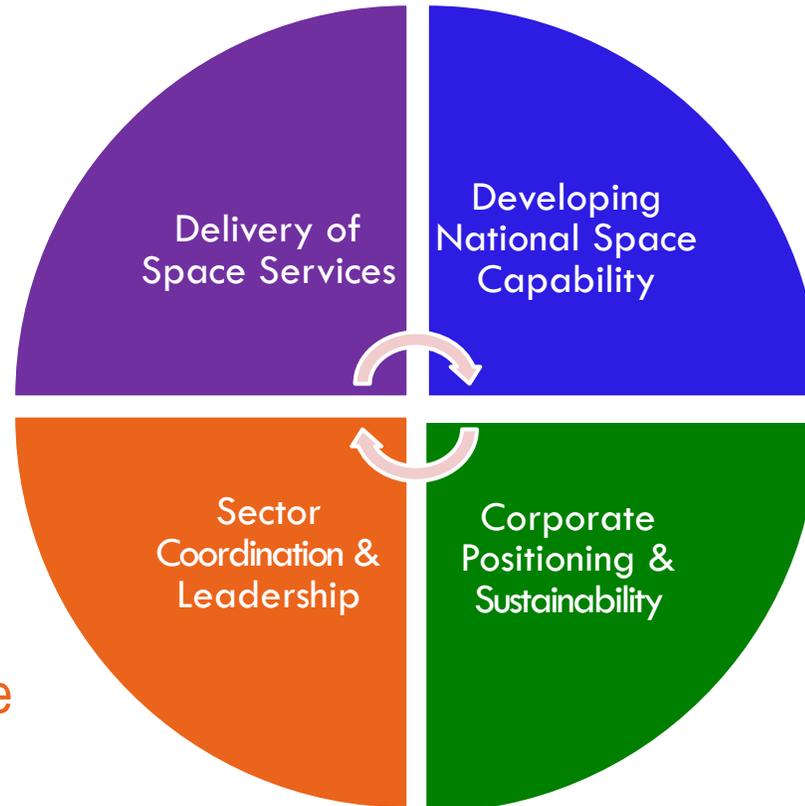
- Established in February 2017; became operational in 2018
- Mandate - **Promote**, **co-ordinate** and **regulate** space related activities in Kenya
- Key aspiration - to develop indigenous space capability in order to effectively utilize outer space for national development
- Transition Kenya from a passive user of space services and technologies into an active user and contributor to the development of space technologies
- KSA Strategic Plan 2020-2025 seeks to leverage space science, technology and applications for socioeconomic development and realizing SDGs

KSA Strategic Plan 2020-2025

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- Earth Observation
- Navigation & Positioning
- Satellite Communications
- Space Operations & System Engineering
- Space Science & Astronomy

- Sector Planning, Policy & Legal Environment
- Networks & Linkages
- Communications & Knowledge Management
- Sector Leadership



- Capacity Needs Assessment
- Human Capacity Development
- Systems Engineering
- Infrastructure & Facilities
- Research & Innovation
- Education and Outreach
- Space Economy and Commerce
- Space Situational Awareness

- Corporate Competence
- Resource Mobilization
- Institutional Sustainability

Background

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- Space technology and epidemiology
 - ▣ Geographical Information System (GIS)
 - 1854 Broad Street cholera outbreak
 - Dr. John Snow identified the contaminated water pump by using spatial analysis
 - ▣ Remote sensing
 - Environmental factors
 - Climatic factors
- Earth Observation data has continued to be used in disease mapping and epidemiology; to detect, respond, control, predict and show trends and the spread of disease.

Background

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□ Malaria

- A vector borne disease
- Transmitted to human beings by infected bite of anopheles female mosquitoes
 - The parasites thrives in the tropical climatic conditions - hence common in sub Saharan countries.

□ Factors

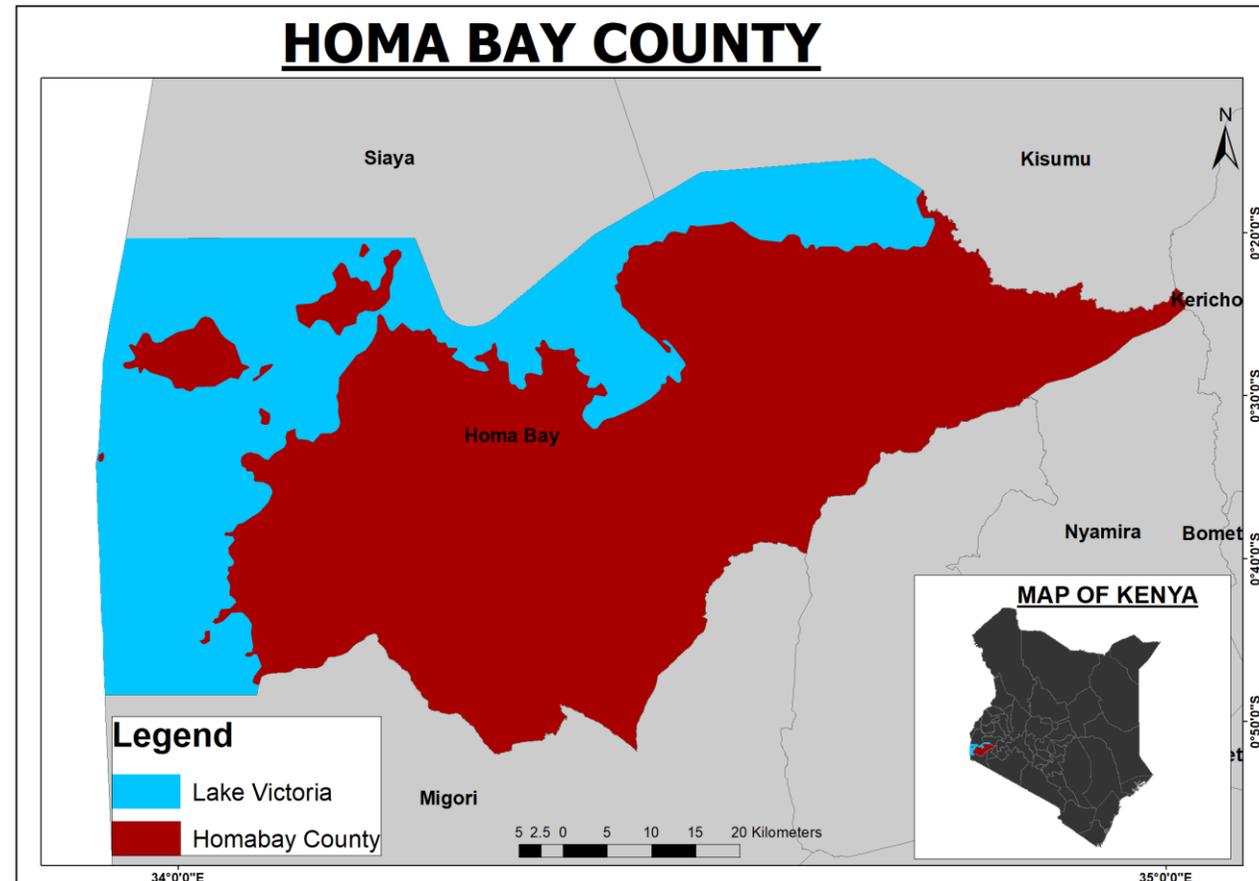
- Complex interaction
 - Vector, host, parasite, and environment
- Climatic influences:
 - rainfall, temperature, humidity etc.

- Efforts to combat the spread in malaria:
 - Use of insecticide treated nets
 - Administering of anti malaria drugs
 - Indoor residual spraying campaign
 - Malaria Vaccination- pilot program in Kenya, Ghana and Malawi

Area of Study

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- Homabay County
 - ▣ Located along the shores of lake Victoria in western Kenya.

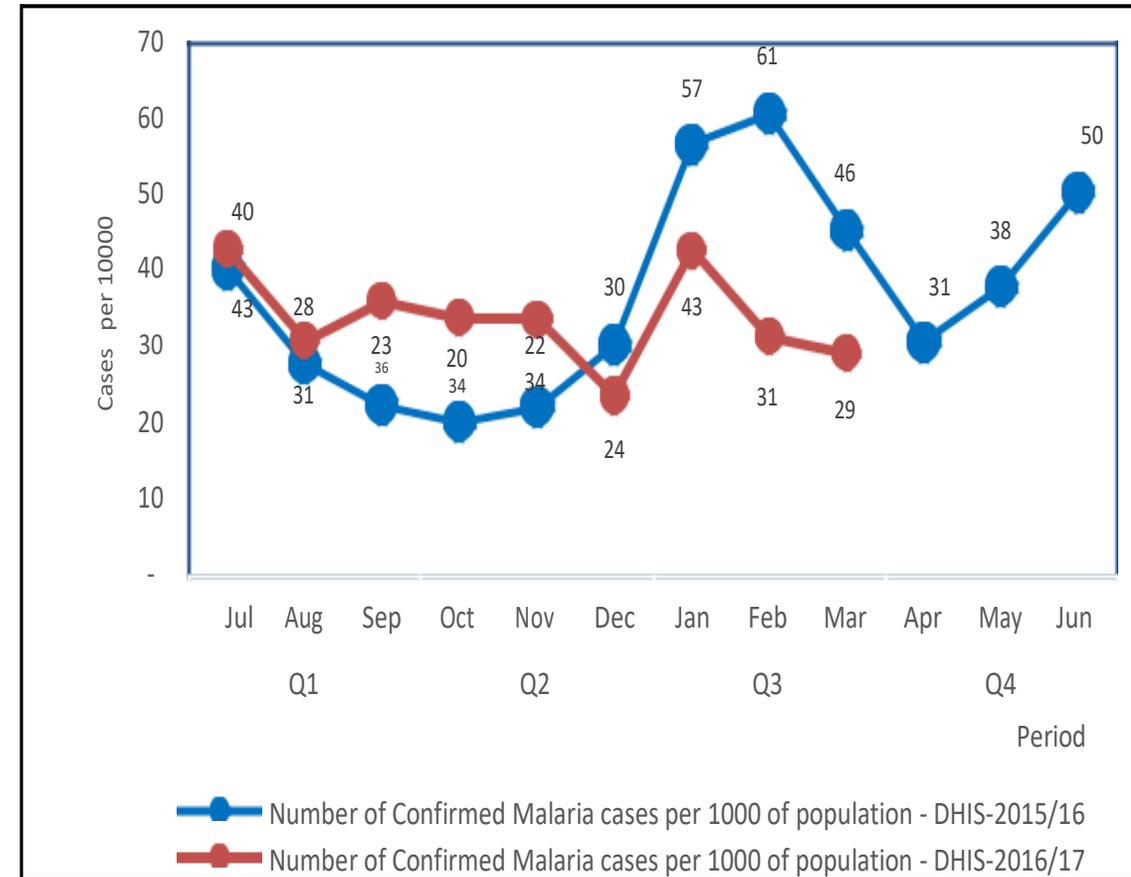


Area of study

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□ Homa Bay County

- Lie within malaria endemic zone where the transmission of malaria occurs throughout the year.



Malaria out patient cases, Homa Bay County
Maarifa.cog.go.ke

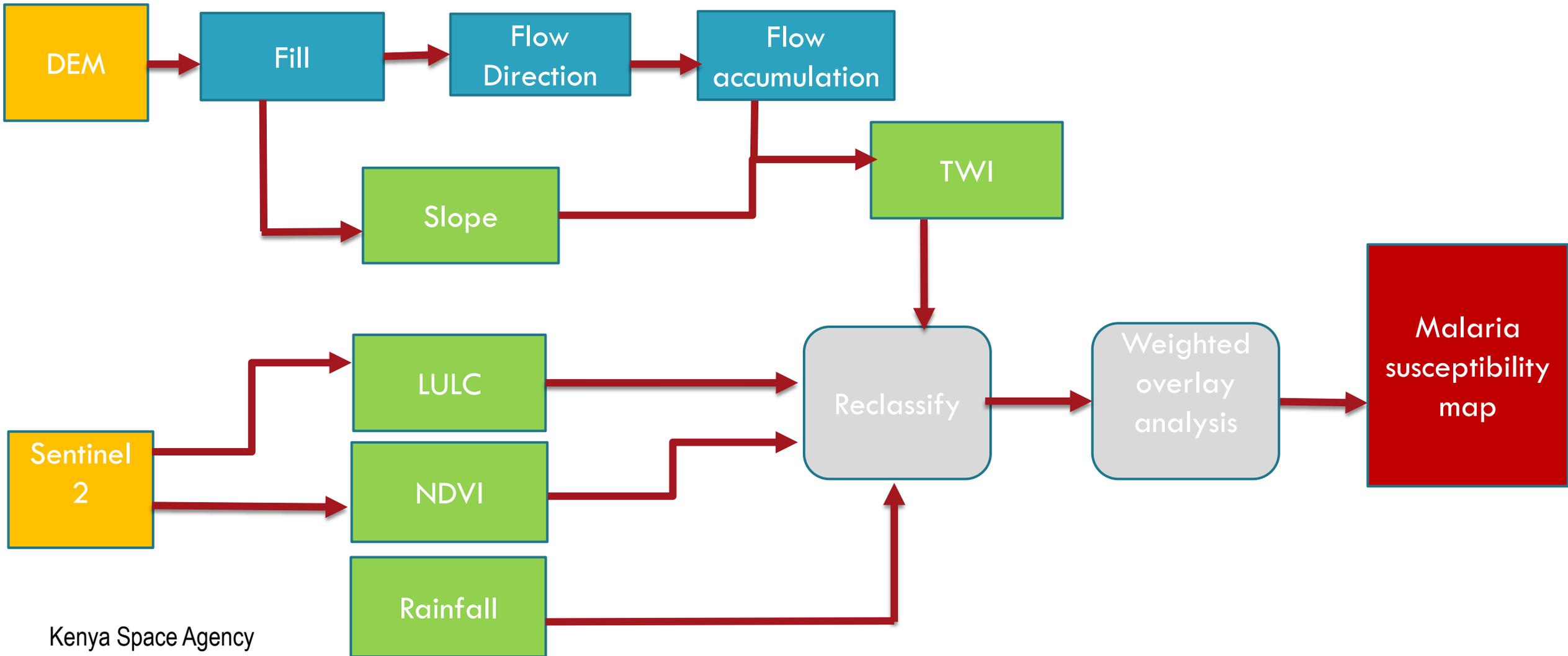
Methodology

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- Data
 - ▣ Satellite Imagery- Sentinel 2, 2021
 - ▣ Digital Elevation Model (DEM)
- Malaria Contributing factors
 1. Land use Land cover (LULC)
 2. Slope
 3. Rainfall
 4. Normalized Difference Vegetation Index (NDVI)
 5. Topographical Wetness Index (TWI)

Methodology

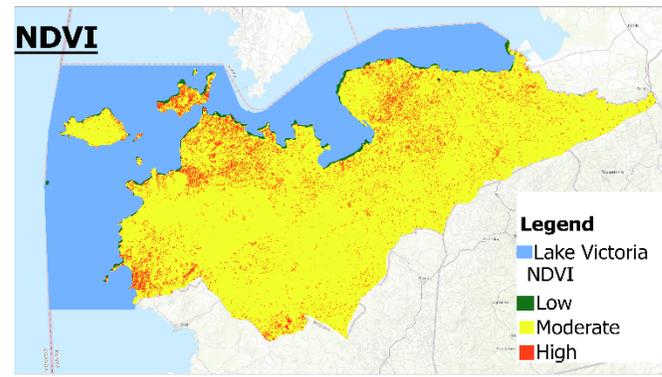
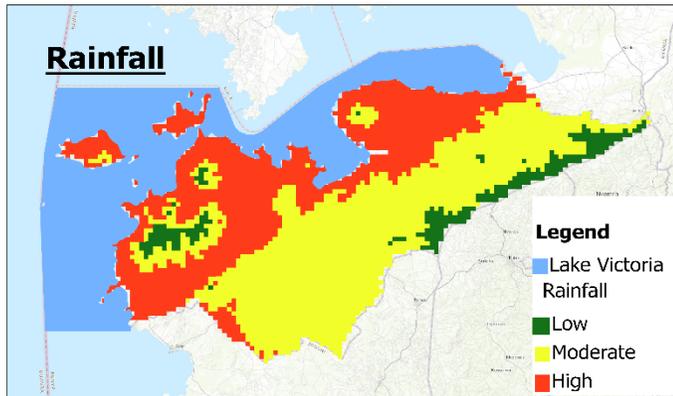
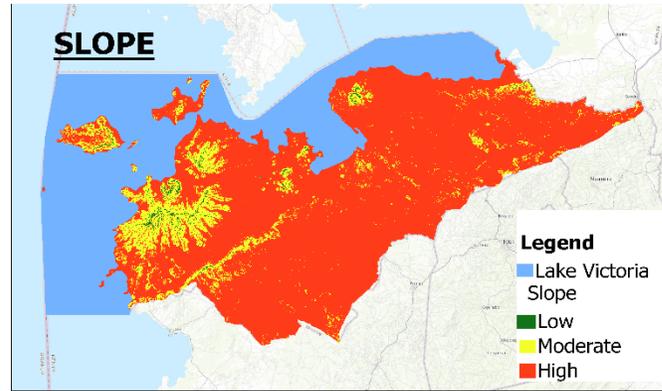
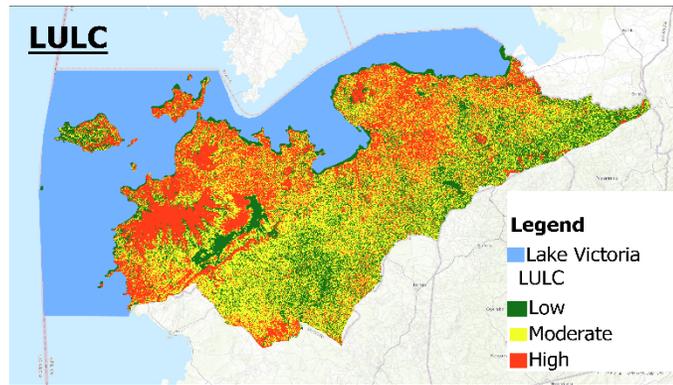
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Contributing Factors maps vs Malaria occurrences

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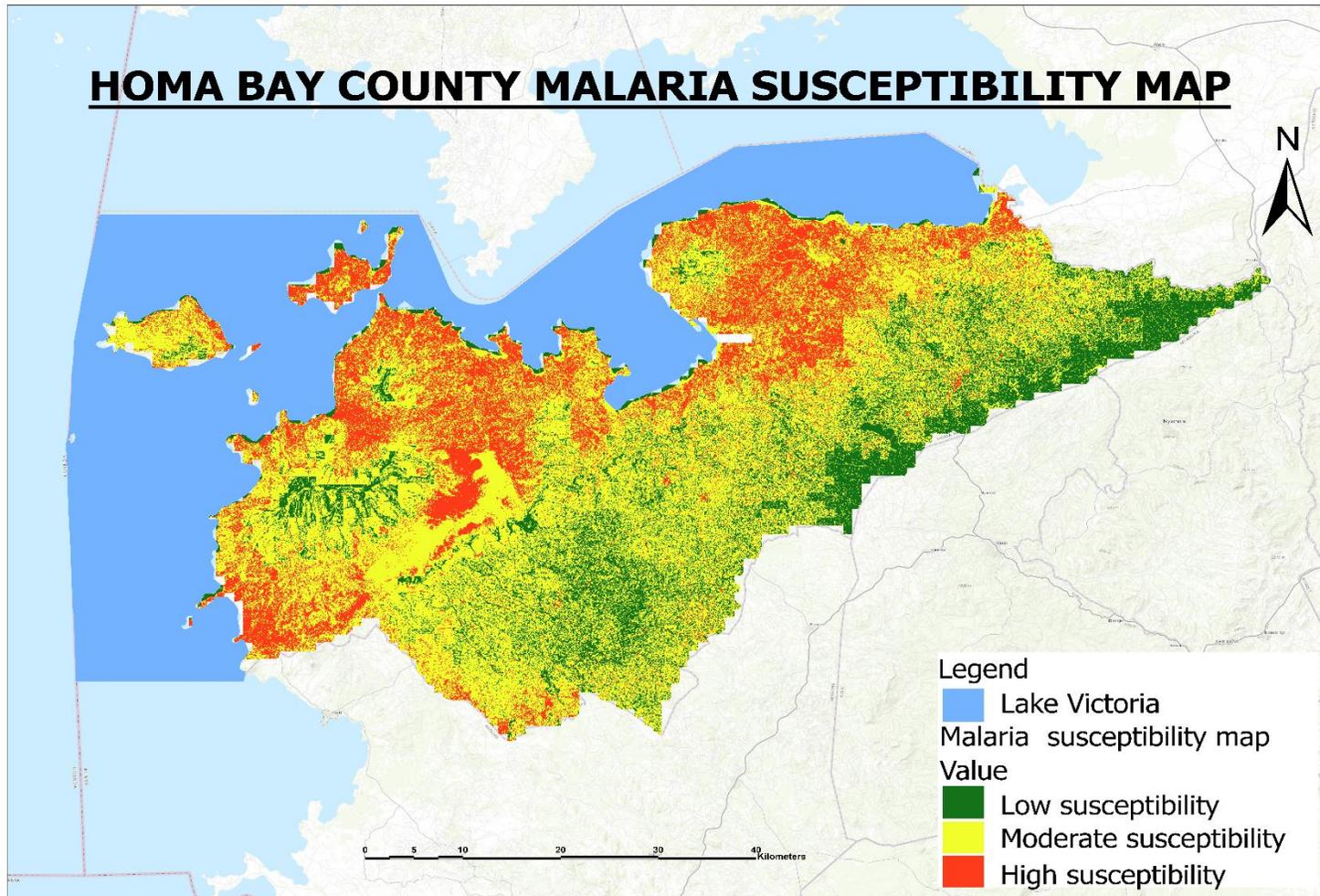
Malaria susceptibility contributing factors maps



0 15 30 60 Kilometers

Results

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- From the analysis, areas next to the lake are at high risk of malaria due to favorable environmental and climatic factors.

Conclusion

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- The malaria susceptibility map is a point of reference for administration and health practitioners in accessing areas prone to malaria.
- Hazard mapping based solely on natural conditions is not sufficient to assess malaria occurrences, but socio-economic factors, such as population density, distribution of health facilities, and road access, should also be considered in mapping malaria-prone areas.

Way forward

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- ❑ A high-resolution raster dataset is recommended to improve the quality of the product.
- ❑ Collaborating with the health ministry and the County Governments
 - ❑ In scaling up the project countrywide
 - ❑ Initiates efforts to combat malaria in malaria-prone areas
 - ❑ Develop GIS models for mapping other diseases in the country like cholera.



Thank you for your Attention