

Malaria Incidence in Nigeria

Course: i3 Project Interdisciplinary | Integrated | Interactive

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Introduction

Malaria remains a major public health challenge in Nigeria, accounting for significant illness and death, particularly in tropical regions. Effective malaria control requires understanding its spatial and temporal distribution. This project leverages Geographic Information Systems (GIS) to analyze malaria incidence across Nigeria's 36 states and the Federal Capital Territory. By integrating environmental, demographic, and national malaria data, the study identifies high-risk areas, reveals patterns of outbreaks, and provides actionable insights for public health interventions.

Material and Methods

Data Collection:

Malaria Cases: National-level malaria data, disaggregated to state levels.

Environmental Data: Rainfall and temperature data influencing mosquito habitats.

Land Use Land Cover (LULC): Data identifying high-risk areas based on settlement, agriculture, and forested regions.

Population Data: State-level population estimates derived from national census data.

Disaggregation Process:

Population data disaggregated to states based on census and weighted by LULC categories (urban > agricultural > forested > water bodies).

Temperature and rainfall data applied to assess environmental exposure to malaria transmission risks.

National malaria incidence distributed proportionally using state-level population and environmental risk factors.

GIS Techniques:

Hotspot Mapping: Visualization of malaria-prone areas using clustering and spatial autocorrelation.

Trend Analysis: Temporal mapping of malaria incidence from 2010–2020.

Interactive Tools: Dashboards and animated maps for intuitive data exploration.

Expected Results

Identification of environmental factors (e.g., temperatures of 20–32°C, consistent rainfall) contributing to high malaria incidence.

Visualization of high-risk areas through interactive maps and dashboards to guide targeted interventions.

Temporal patterns highlighting recurring malaria outbreaks and their drivers.

Insights to inform policies for effective malaria prevention and control, with a replicable methodology for analyzing other disease outbreaks.

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