Visualizing Landslide Risk Zones in Idukki Using QGIS

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Agenda

Topics Covered

1. Introduction
2. Data and Preprocessing
3. Slope Analysis in QGIS
4. Visual Output
5. Interpretation & Observation
6. Conclusion & Future work

INTRODUCTION

- Objective: Identify and visualize potential landslide-prone zones in Idukki district, Kerala using slope analysiS
- Tools Used:
  - QGIS (Open-source GIS software)
  - SRTM DEM (Digital Elevation Model)
- Why Idukki?
  - One of Kerala's most landslide-vulnerable regions due to steep terrain and high rainfall

DATA SOURCES & PREPROCESSING

Data Used

- SRTM DEM Tiles (Shuttle Radar Topography Mission)
  - Resolution: 30 meters
  - Source: USGS EarthExplorer
- Kerala & District Shapefiles
  - Source: Bhoonidhi
  -

Preprocessing Steps

- Merged multiple DEM tiles
- Clipped DEM to Idukki district boundary

SLOPE ANALYSIS IN QGIS

Methodology

- Used DEM → Slope tool via:
  - Raster → Terrain Analysis → Slope
- Classified slope values into 5 categories using Quantile mode:
  - Very Gentle
  - Gentle
  - Moderate
  - Steep
  - Very Steep (Landslide-Prone)

Styling

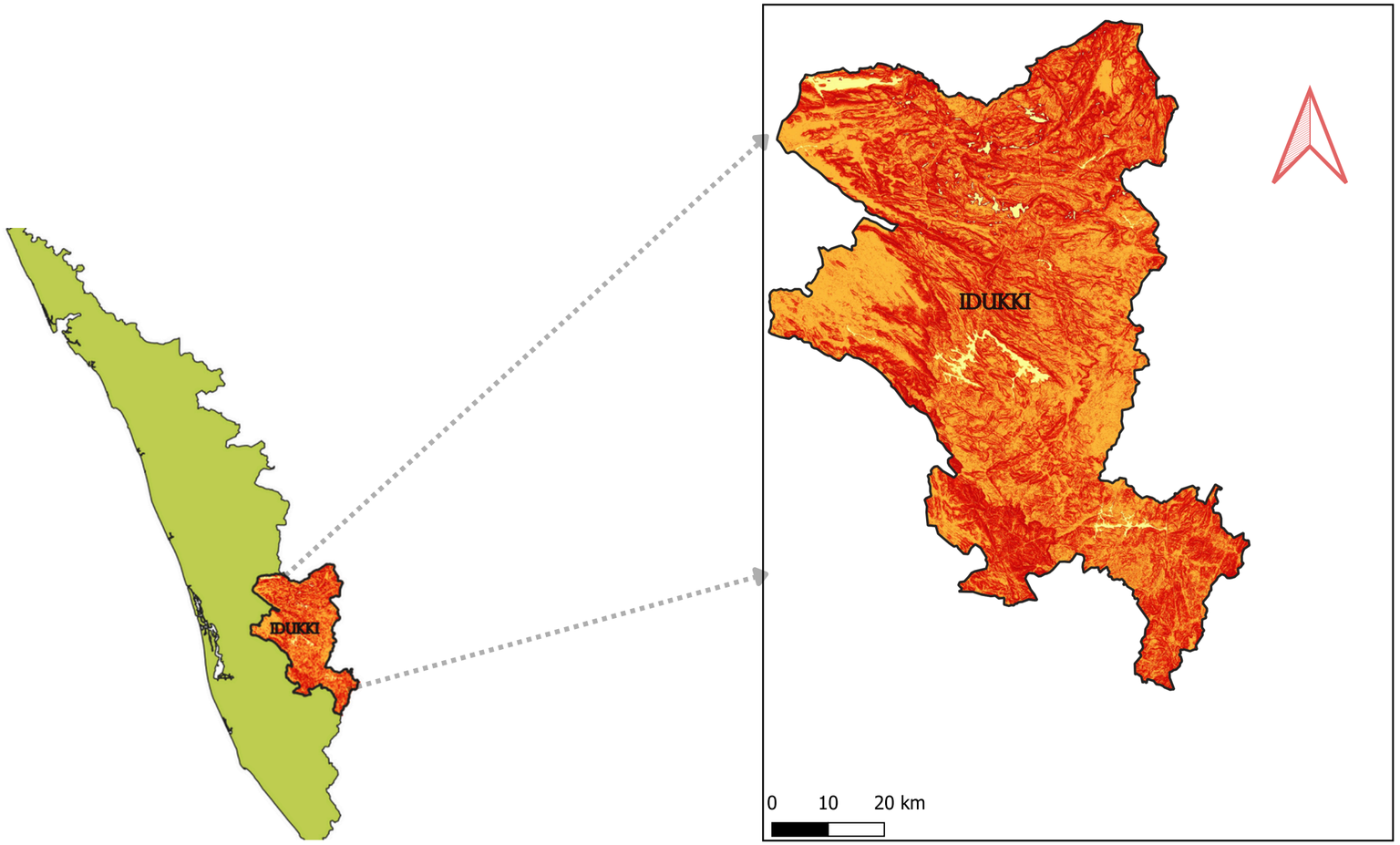
- Applied Singleband pseudocolor rendering
- Assigned colors from yellow to red (mild to steep)
- Custom labels created for each slope class

VISUAL OUTPUT

Final Map Includes:

- Slope categories color-coded from flat to steep
- District boundary for spatial context
- Legend, title, scale bar, and north arrow
- Map exported in print layout

Landslide-Prone Zones – Idukki
Based on Slope Analysis



Slope Classification

- Very Gentle Slope
- Gentle Slope
- Moderate Slope
- Steep Slope
- Very Steep (Landslide-Prone)

INTERPRETATIONS & OBSERVATIONS

Key Findings

- A large portion of Idukki falls under Steep to Very Steep classes
- High-risk areas are concentrated along elevated slopes and escarpments
- The visualization confirms Idukki’s vulnerability to landslides, especially during monsoon

Limitations

- Only slope data used — doesn’t consider:
  - Rainfall
  - Soil type
  - Vegetation
  - Human activity

CONCLUSION & FUTURE WORK

Conclusion

- QGIS-based slope analysis can effectively highlight landslide-prone zones
- DEM + terrain analysis is a powerful combo for preliminary risk mapping

Future Scope

- Integrate other factors like:
  - Rainfall intensity
  - Soil saturation
  - Land use data
- Model debris flow using 3D terrain visualization

THANK YOU