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GEOSPATIAL EXCELLENCE

SATELLITE-BASED VEGETATION HEALTH & STRESS MONITORING FOR IDUKKI DISTRICT, KERALA

S**atellite-Based Vegetation Health & Stress Monitoring** provides a reliable way to assess crop and forest conditions over large and inaccessible areas using high-resolution remote sensing imagery. By capturing changes in canopy color, structure, and moisture levels, satellites help **identify early signs of stress** caused by drought, pests, disease, or poor soil conditions. This approach offers consistent, repeatable, and unbiased observations that are not limited by ground access or weather constraints. The insights gained enable timely decision-making, allowing farmers, foresters, and land managers to apply targeted interventions, improve productivity, and reduce potential losses.

Parameter	**Description**
Satellite	Sentinel-2 (A/B)
Spatial Resolution	10 meters
Time Period	1 Oct 2024 – 28 Feb 2025
Area of Interest	Idukki, Kerala
Parameters Used	**NDVI (Normalized Difference Vegetation Index)** – Vegetation vigor, greenness, biomas **NDRE (Normalized Difference Red Edge Index)** – Chlorophyll content, early-stage stress detection.

Table 1 : Study data overview

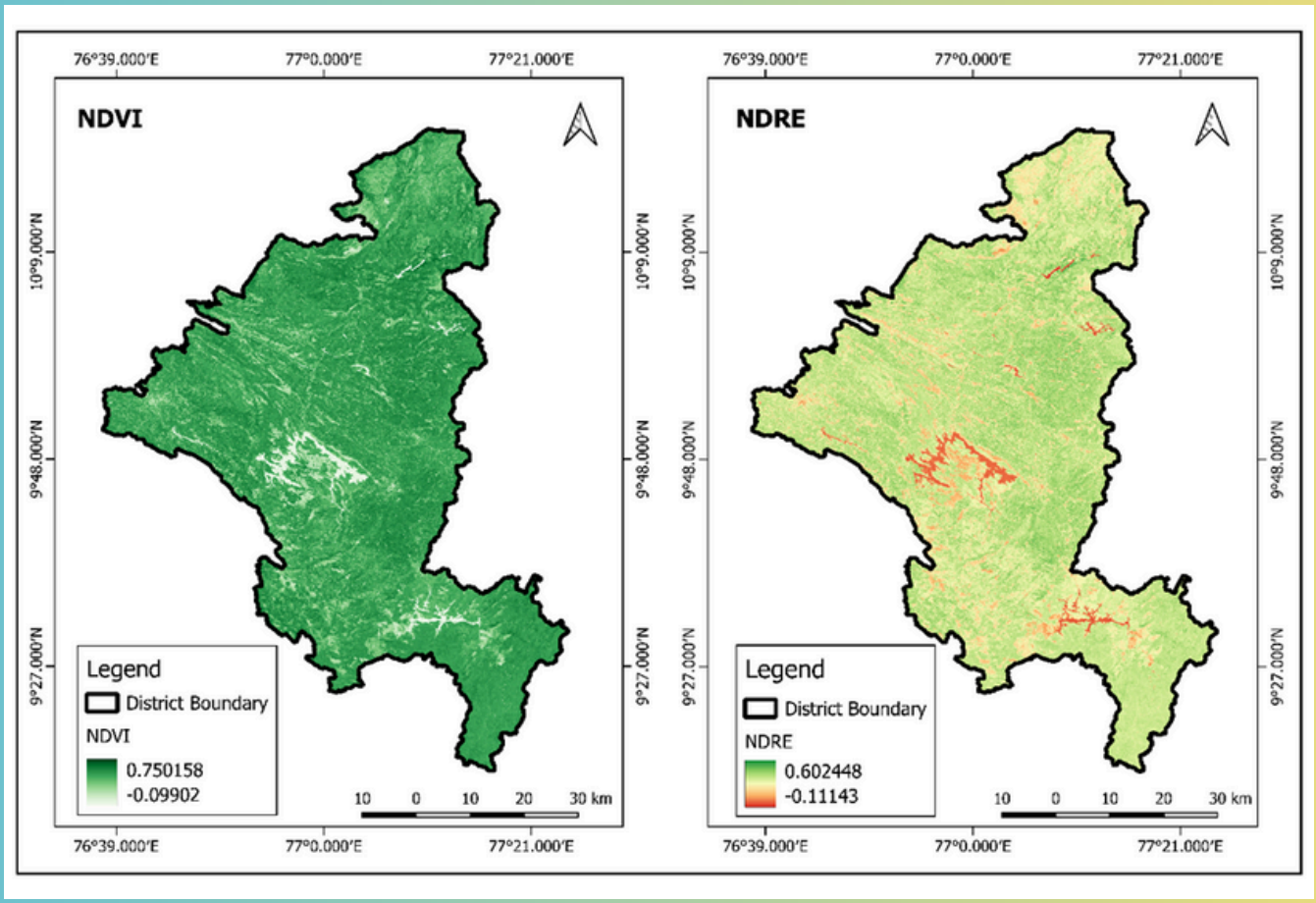

Figure 1 : Calculated NDVI and NDRE

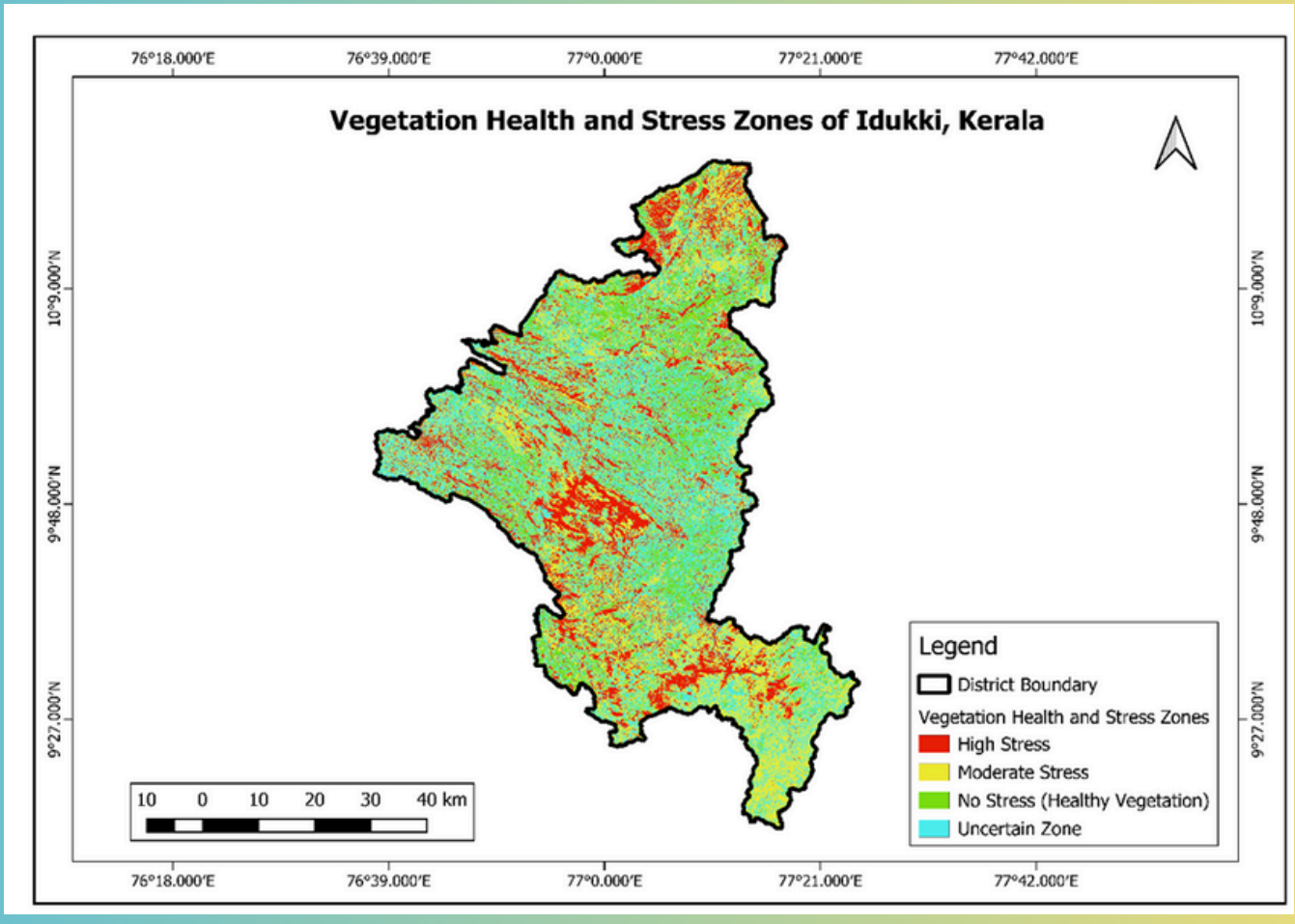

Figure 2 : Vegetation health and stress zones

KEY FINDINGS:

- Idukki **shows predominantly healthy vegetation**, especially in forest-dominated western and northern areas.
- High stress zones occur mainly in the central and southeastern regions, matching low NDRE values.
- NDVI indicates strong overall greenness, but NDRE reveals early stress.
- Plantation and agricultural belts show greater variability, suggesting sensitivity to moisture and nutrient changes.
- The combined maps confirm that NDRE is more effective for early stress detection, while NDVI captures general vegetation vigour.

Overall, the district maintains good vegetation health, with localized pockets of stress requiring attention.

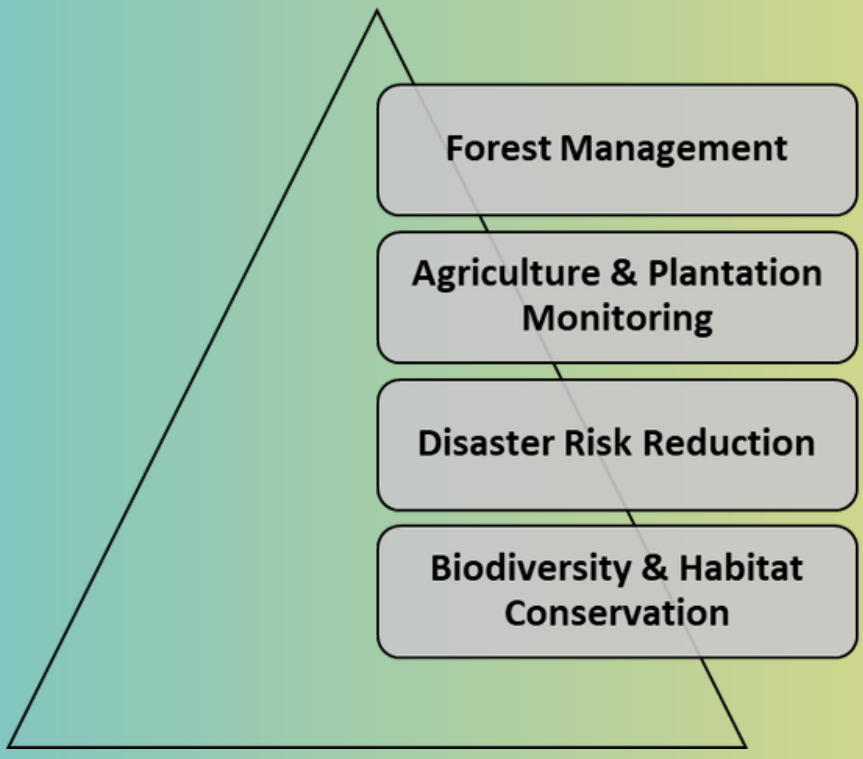

Figure 3 : Applications

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