

# Targeting Nutrition Vulnerability in Tribal Gujarat Using TRAINS: A GIS-Based Framework for Village-Level Prioritization and Convergence

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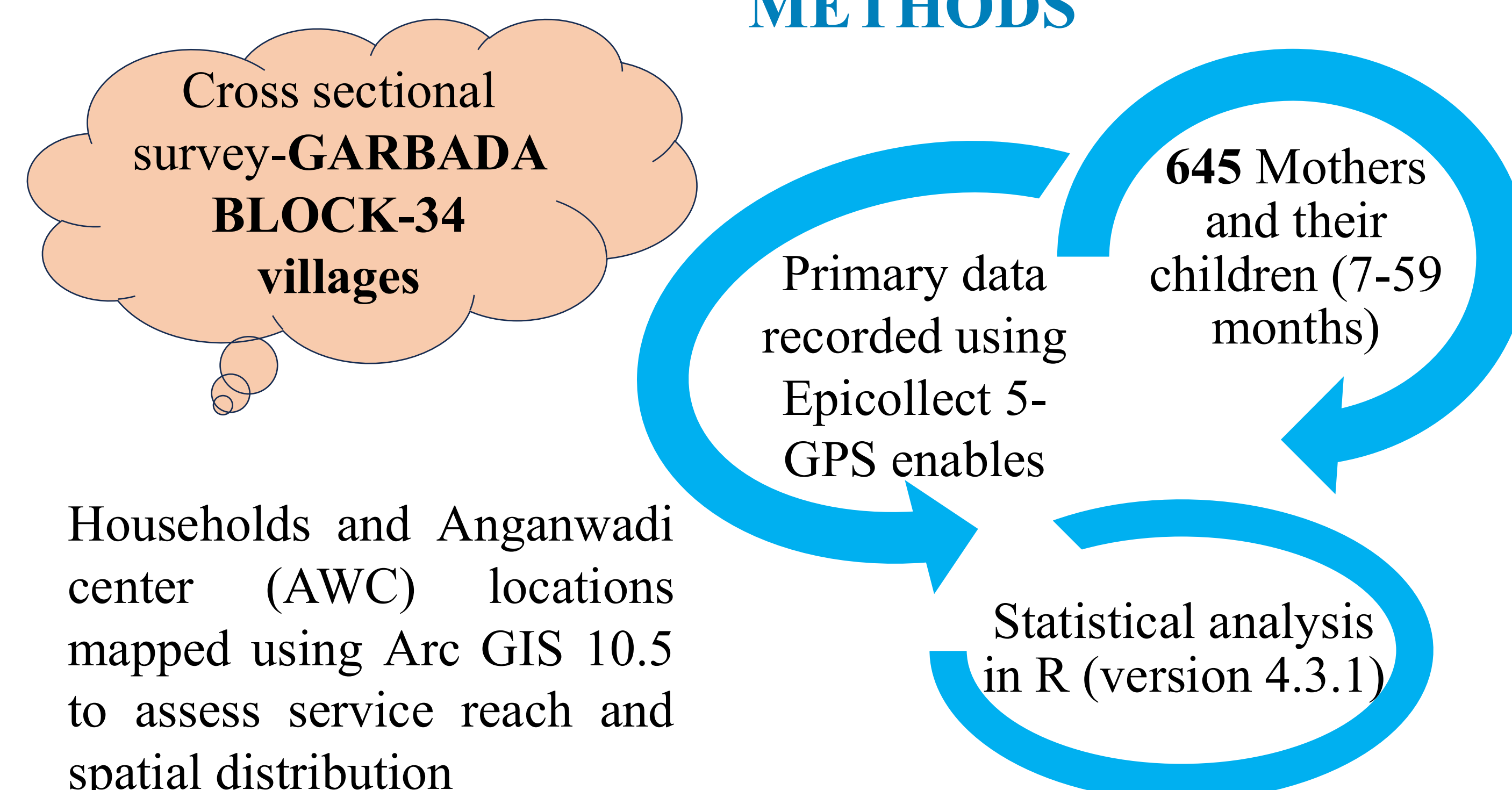
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## BACKGROUND

- ❖ Tribal regions of Gujarat experience pronounced nutrition vulnerability, as evidenced by NFHS-5 findings of persistent child undernutrition, maternal thinness, and limited dietary diversity.
- ❖ In Garbada block of Dahod District, these challenges are further underscored by marked village-level disparities, highlighting an urgent need for targeted interventions through localized planning and convergence.
- ❖ The objective of this study was to utilize the **Targeted Resilience & Agriculture-Informed Nutrition Strategies (TRAINS)** GIS-based framework for the precise identification and village-level prioritization of nutrition vulnerability in tribal Gujarat, enabling targeted interventions and strategic convergence to improve nutrition outcomes in the most affected communities

## METHODS



We developed a **Food and Nutrition Security Index (FNSI)** using Principal Component Analysis (PCA) of key indicators: Minimum Dietary Diversity–Women (MDD-W), Food Insecurity Experience Scale (FIES), landholding size, crop diversity, and livestock assets. The **Targeted Resilience and Agriculture-Informed Nutrition Strategies (TRAINS)** framework combined FNSI with child underweight (Weight-for-Age Z-score, WAZ < -2), maternal underweight (Body Mass Index, BMI < 18.5), low MDD-W, and Anganwadi Centre (AWC) access to identify high-priority villages for convergence.

## RESULTS

- ❖ Marked village-level disparities were observed in nutritional status. Child underweight (7–59 months) ranged from 18% to 62%, with 14 of 34 villages crossing the 50% high-burden threshold.
- ❖ Maternal underweight (22–58%) showed a similar pattern, with 8 villages exceeding 45%, indicating intergenerational vulnerability.
- ❖ Multidimensional vulnerability (FNSI) was highest in Garbada, Minakyar, Bharsada, and Patiya, driven by low crop diversity, small landholdings, and household food insecurity.
- ❖ Anganwadi service reach varied substantially, and poor access aligned with high-burden villages, intensifying nutrition risks.
- ❖ GIS-based village profiling revealed hotspots of child and maternal undernutrition, consistently paired with low dietary diversity across Garbada Taluka.
- ❖ The combined FNSI and TRAINS analyses identified a cluster of high-priority villages, underscoring the need for targeted, village-specific convergence across nutrition, agriculture, and ICDS services.

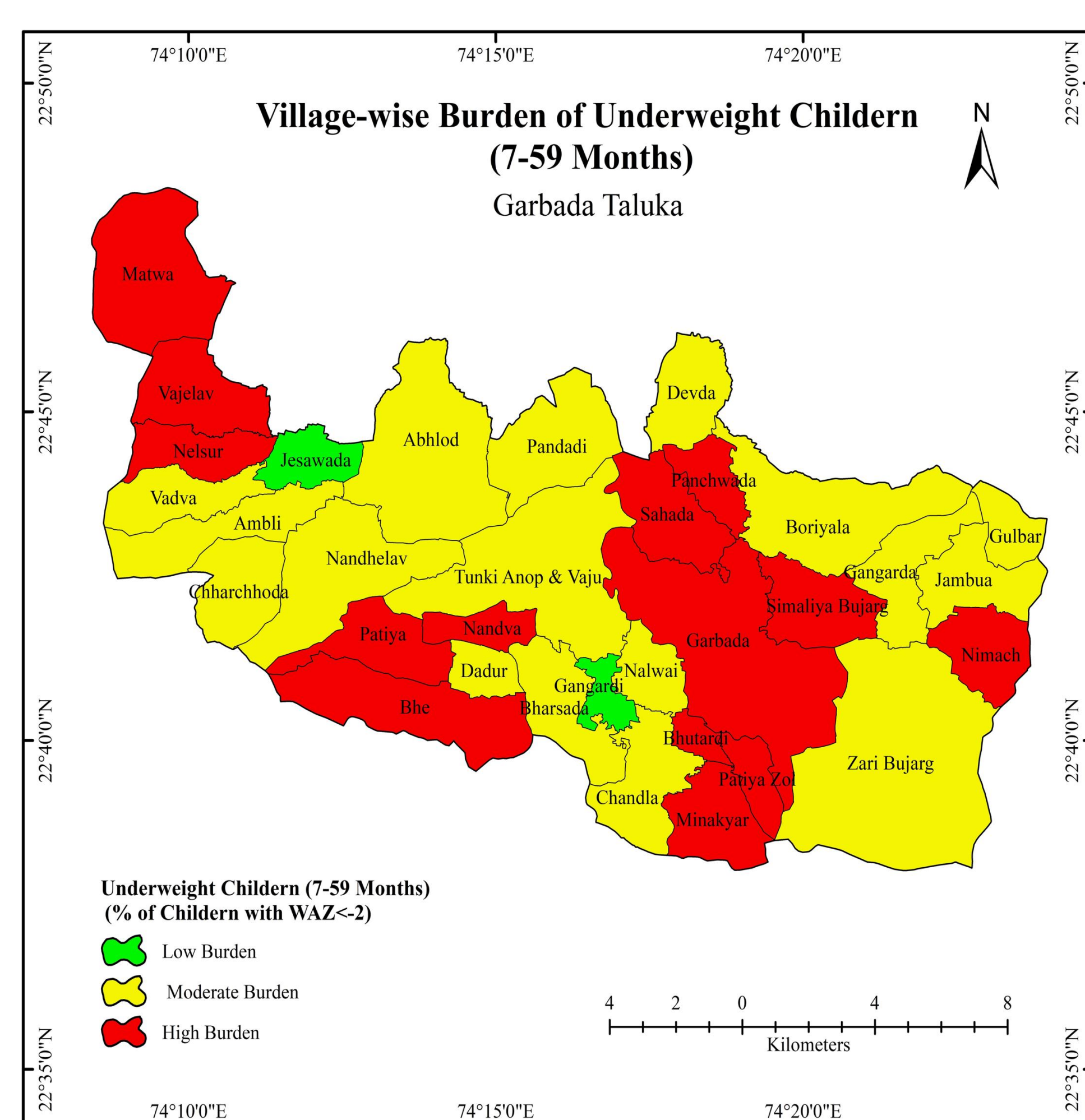


Figure 1. Village-Wise Burden of Underweight Children (7–59 Months), Garbada Block, Dahod District, Gujarat, India.

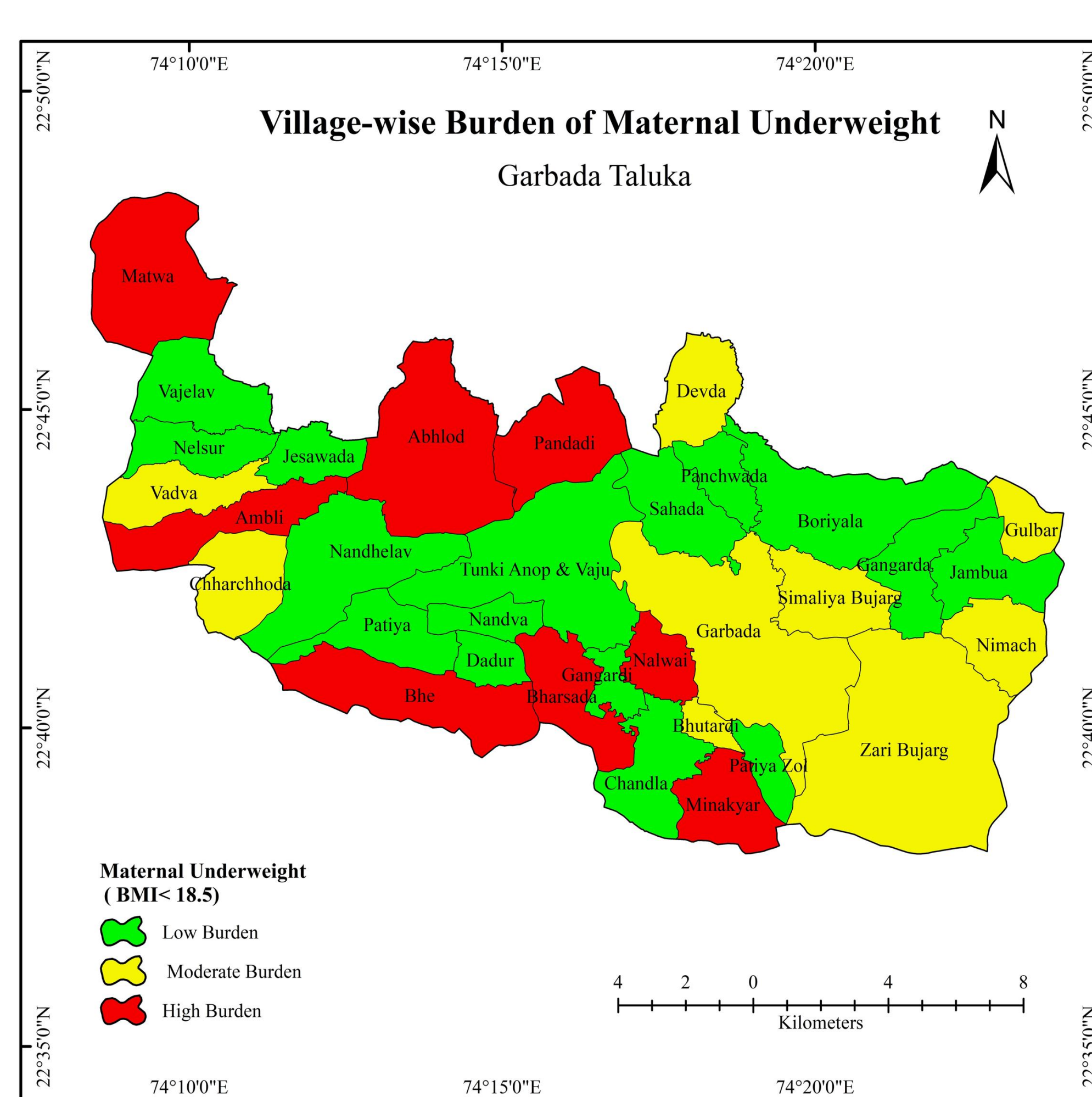


Figure 2. Village-Wise Burden of Maternal Underweight (BMI < 18.5), Garbada Block, Dahod District, Gujarat, India.

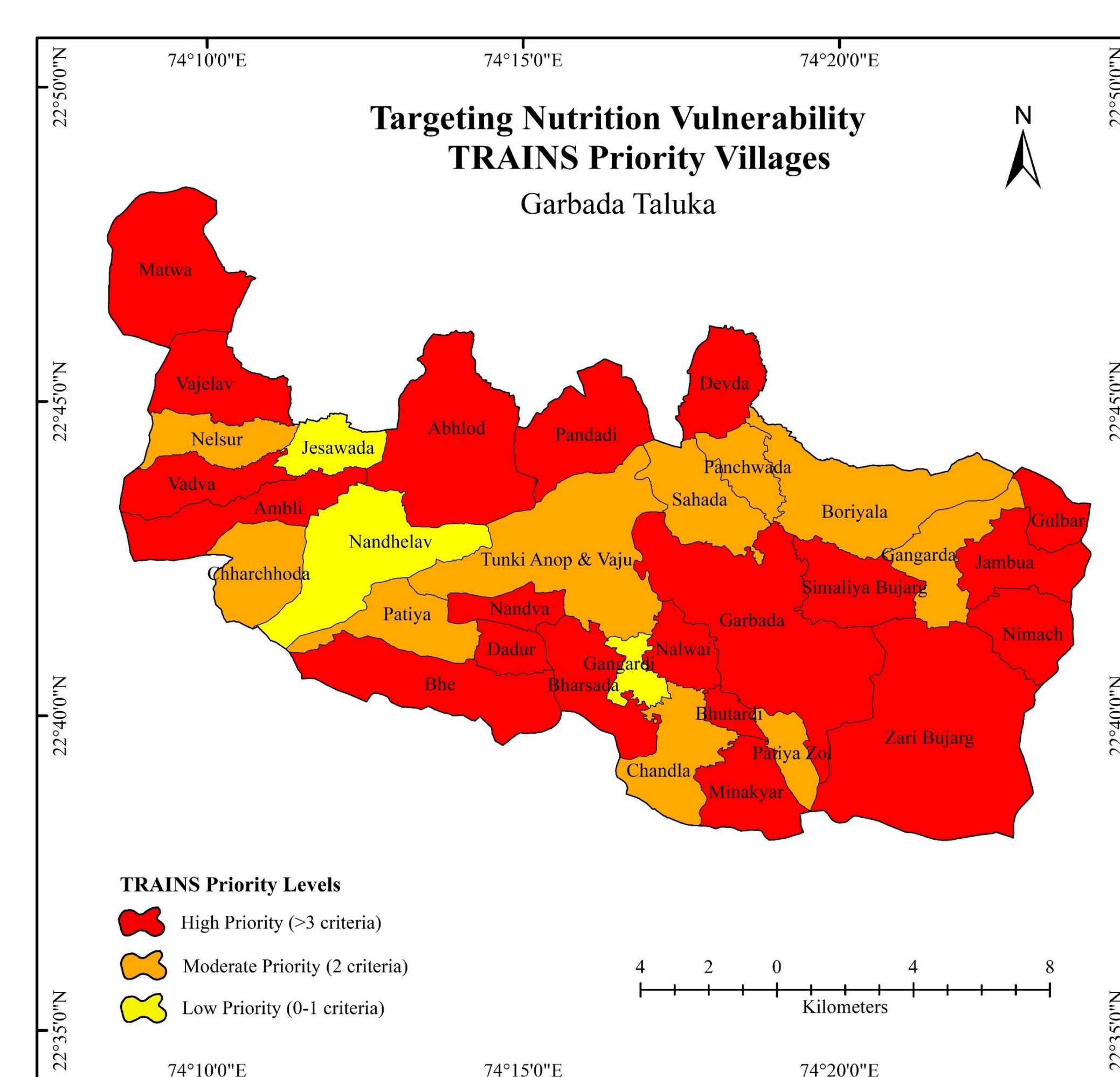


Figure 3. Village-Level Priority Classification Using the TRAINS Framework, Garbada Block, Dahod District, Gujarat, India.

## CONCLUSION

High-burden villages with overlapping nutrition, food security, and service-access risks require focused multisectoral action. By integrating village-level data through a GIS-based framework, TRAINS offers a practical tool for prioritizing vulnerable tribal communities and guiding convergence across ICDS, health, and agriculture. This approach strengthens local nutrition resilience and supports more targeted, evidence-based planning. TRAINS is a new, easy method that turns complex data into simple action maps, helping any block quickly identify and support the villages that need help the most.