RESEARCH METHODOLOGIES & PROTOCOLS

Nagar Van Yojana (NVY) Strategic Evaluation

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This document details the mixed-methods research framework utilized for the holistic evaluation of the Nagar Van Yojana (NVY). Transitioning beyond traditional metrics of sapling survival and fund utilization, this protocol emphasizes human-centric urban forestry. The framework captures socio-economic, psychological, governance, and ecological outcomes through structured fieldwork, digital monitoring (DMRV), and community engagement.

1. Qualitative Protocols: Community & Governance Assessment

Qualitative inquiries form the core of understanding institutional bottlenecks, Public-Private Partnership (PPP) efficacy, and community stewardship models.

Key Informant Interviews (KIIs)

- **Target Stakeholders:** State Forest Department (SFD) officials, Urban Local Body (ULB) representatives, and nodal officers of the NAEB-PMU.
- **Objectives:** To identify structural gaps in cross-departmental coordination, audit funding utilization flows from Central to State levels, and evaluate the operational reality of the PPP models.
- **Protocol:** Semi-structured, open-ended interview guides mapping administrative workflows and challenges in land acquisition, boundary fencing, and maintaining urban forests over time.

Focus Group Discussions (FGDs)

- **Target Stakeholders:** Local resident welfare associations, marginalized communities living adjacent to the parks, and daily park visitors.
- **Objectives:** To evaluate community ownership, assess shared resource conflicts, and gauge the perceived socio-ecological value of the urban green space.
- **Protocol:** Moderated group sessions (8-12 participants) focusing on historical narratives of the land, accessibility, safety, and willingness to participate in future conservation initiatives.

Participatory Rural Appraisal (PRA) & Livelihoods

Adapted for the urban context, PRA tools such as Resource Mapping and Seasonal Calendars are employed alongside the **Sustainable Livelihood Framework (SLF)**. This involves direct engagement with informal vendors and non-timber forest product (NTFP) dependent communities to assess economic shifts and livelihood generation stemming from the establishment of Nagar Vans.

2. Quantitative & Digital Assessment Protocols

Empirical data is critical for standardizing impact metrics across diverse geographical contexts.

Visitor Surveys & Psychological Well-being

- **Well-being Index:** Utilizing standardized psychometric scales (such as the WHO-5 Well-being Index) adapted to measure reductions in urban stress and improvements in mental health correlated with park usage.
- **Contingent Valuation Method (CVM):** Estimating the economic value of the Nagar Vans by assessing the public's Average Willingness to Pay (WTP) for park maintenance, upkeep, and infrastructural enhancements.

Geospatial & Ecological Ground-Truthing (DMRV)

- **Boundary & KML Audits:** Comparing self-reported e-Green Watch data and official KML files with on-ground GPS coordinates using the DMRV Dashboard.
- **AI-Powered Forest Inventory (Tree-Lens):** Utilizing DeepForest models alongside drone/satellite imagery to automate the counting of trees, calculating average Crown Area, mapping Diameter at Breast Height (DBH), and estimating Above-Ground Biomass and Carbon Sequestration.
- **Micro-climate Monitoring:** Assessing the Urban Heat Island (UHI) mitigation effect by measuring ambient temperature differentials (ΔT) between the inner forest canopy and the surrounding urban hardscapes.

3. Sampling Strategy & Geographical Scope

To ensure robust pan-India representation, a purposive sampling strategy was adopted. Sites were selected based on their proximity to urban centers, the maturity of the project, and regional ecological diversity.

Region	State	Selected Districts	Target Urban Forest Sites (Nagar Vans)
West	Gujarat	Gandhinagar, Surat	Indroda Park, Sultanabad Forest, Dumas Forest
Central	Madhya Pradesh	Bhopal, Indore	Bhopal City Forest, Indore Nagar Van
South	Andhra Pradesh	Vizianagaram, Annamayya, Nellore	Vizayanagram Nagar Van, Annamayya, Nellore
East	Jharkhand	Ranchi, Saraikela	Ranchi Eco Park, Saraikela Nagar Van

4. Data Triangulation & Consolidation

The methodology relies heavily on Triangulation—the cross-verification of data from multiple sources. Insights derived from community FGDs are cross-referenced with KII administrative records and further validated by live telemetry and AI assessments from the DMRV platform. This multi-tiered strategy minimizes localized biases and establishes a comprehensive evidence base capable of driving actionable grassroots implementation and structural policy refinements at the MoEFCC.