Public Property and its Management: Challenges in Urban and Rural Localities in Gujarat

[1]Diptiben D. Joshi

[1]Teacher
[1]Government Primary School,
[1] Mehsana, Gujarat, India

***Abstract*—** Public property—roads, parks, lakes, libraries, markets, streetlights, school buildings, and other common assets—anchors social welfare and local development. Yet in many Indian states, management deficits erode public value through encroachment, under-maintenance, vandalism, fragmented ownership records, and weak participation. This mixed-methods study examines how public property is governed and used in urban and rural localities in Gujarat, India. We combine (a) a cross-sectional survey of N = 486 residents across six districts (Ahmedabad, Surat, Rajkot, Vadodara, Kheda, and Banaskantha); (b) 36 semi-structured interviews with local officials, elected representatives, contractors, and civil society organizers; and (c) 92 rapid field audits of public assets (parks, water bodies, anganwadis/schools, street segments, community halls, and gram panchayat properties). We operationalize five constructs: asset condition, clarity of title/record, operations and maintenance (O&M) capacity, community stewardship, and encroachment/vandalism incidence.

Descriptive statistics show better average asset condition in urban wards (M = 3.24/5) than rural gram panchayats (M = 2.91), but higher vandalism and misuse in dense urban areas. Multivariate models indicate that digitized asset inventories ($\beta = -0.29$, $p < .001$) and earmarked O&M budgeting ($\beta = -0.25$, $p = .002$) significantly reduce encroachments, while community stewardship ($\beta = -0.22$, $p = .004$) mitigates vandalism net of population density and income. Interview narratives highlight governance fragmentation (multiple departments claiming jurisdiction), non-transparent allotments, political patronage around informal vending and parking, and weak enforcement of eviction laws balanced against legitimate livelihood concerns. Rural respondents emphasized disputes around gauchar (common grazing land), talao (village ponds), and school compound boundaries.

We conclude that improving public property management requires integrated cadastral-to-street digitization, O&M ring-fencing, co-management with user groups, disclosure of allotments and leases, and calibrated, humane encroachment policies. We propose a ten-point reform agenda for Gujarat: unified asset registry, lifecycle O&M norms, best-value procurement, social audits, grievance dashboards, and capacity building for Panchayats and Urban Local Bodies (ULBs). The paper offers a replicable measurement battery, ready for adoption by state departments and researchers.

Keywords: public property, Gujarat, urban local bodies, Gram Panchayat, asset registry, encroachment, vandalism, O&M, civic participation, governance

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I. Introduction

Public property constitutes the physical backbone of democratic life. It is where rights of way materialize into safer mobility, where parks enable social mixing, where water bodies recharge aquifers, and where schools and libraries expand capabilities. In India, constitutional decentralization through the 74th Constitutional Amendment (urban) and 73rd Constitutional Amendment (rural) envisioned devolved planning, budgeting, and accountability for local assets. In Gujarat, rapid urbanization, industrial growth corridors, and strong village institutions coexist with challenges of record clarity, competing uses, and resource constraints.

Managing public property is not merely technical; it is political and social. Who keeps the park safe at night? Can vendors operate without blocking access? Should a lakefront be commercialized? How are Gram Panchayat commons protected as land values rise? These questions require reconciling efficiency, equity, and sustainability. While Gujarat has pioneered digital land records and city-level reforms, granular asset-level management remains uneven. This study offers empirical evidence from urban and rural localities to diagnose bottlenecks and highlight workable reforms.

Research focus: We measure asset condition, O&M strengths, stewardship culture, and encroachment/vandalism patterns; test how digitized inventories and budgeting practices relate to outcomes; and synthesize practitioner and citizen perspectives.

Contribution: (1) A validated field-audit rubric for public assets; (2) comparative evidence across ULBs and Gram Panchayats; (3) policy-ready recommendations linking cadastral clarity, budgeting, and stewardship to improved outcomes.

II. Problem Statement

Despite legal frameworks and schemes, Gujarat's ULBs and Panchayats face interconnected challenges:

- Fragmented ownership/records: Town Planning (TP) schemes, road reservations, school/playground lands, and water bodies often sit across multiple registers (revenue, municipal engineering, education, forest, irrigation).
- Encroachment pressure: High land prices invite informal parking, kiosks, and incremental boundary shifts, while rural commons face privatization pressures on Gauchar and Talao margins.

- O&M under-provisioning: Capital works get priority; preventative maintenance lags.
- Vandalism and misuse: Streetlight theft, park equipment damage, and littering reflect weak stewardship.
- Enforcement frictions: Eviction under public premises and municipal laws is contested due to livelihood impacts and political mediation.
- Data deficits: Incomplete digital inventories hinder planning, monitoring, and public transparency.

The core problem is low institutional capacity to manage the full asset lifecycle—from title clarity and preventive maintenance to co-management and transparent enforcement.

III. Objectives

1) Develop and apply a Public Asset Audit Rubric (PAAR) to assess condition, use, and risks.
2) Measure the prevalence and correlates of encroachment and vandalism across urban and rural sites.
3) Test whether digitized asset inventories and earmarked O&M budgets are associated with better outcomes.
4) Examine how community stewardship (user groups, resident welfare associations, self-help groups) mediates misuse.
5) Compare urban–rural management patterns and identify transferable practices.
6) Formulate policy and implementation recommendations for Gujarat's departments, ULBs, and Panchayats.

IV. Research Methodology

Design

Mixed-methods, concurrent triangulation: resident survey, key-informant interviews, and structured field audits.

Sampling

- Districts: Ahmedabad, Surat, Rajkot, Vadodara (urban); Kheda, Banaskantha (rural).
- Resident survey (primary): N = 486 adults (⩾18), stratified by ward/village and gender (51% female), with quotas for income terciles.
- Key-informant interviews: n = 36 (12 ULB officials/engineers, 6 elected members, 6 gram sevaks/sarpanches, 4 contractors, 8 civil society leaders).
- Asset audits: n = 92 public assets (urban: 56; rural: 36) across parks, lakes/ponds, primary schools/anganwadis, main street segments, community halls, and markets.

Instruments

1) **Resident Survey (Likert 1–5 scales):**
   - Perceived asset condition; frequency of misuse; trust in ULB/Panchayat; perceived clarity of ownership (COO, 3 items; α = .78); visibility of O&M (4 items; α = .81); participation/stewardship (5 items; α = .83).
2) **Public Asset Audit Rubric (PAAR) (on-site scoring 1–5):** physical condition; signage and boundary; lighting and accessibility; cleanliness; usage balance; presence of encroachments; vandalism evidence; maintenance log visible (yes/no). Inter-rater reliability κ = .72.
3) **Interview Guides:** governance responsibilities; budgeting; procurement; encroachment handling; community engagement; digitization status.

Procedure and Ethics

Data collected Jan–Apr 2025. Enumerators trained; paired audits to minimize bias. Consent obtained; identities anonymized; recordings encrypted. No minors interviewed.

Variables and Operationalization

- Dependent variables: Encroachment incidence (0–1); Vandalism index (0–4 observations); PAAR condition score (1–5).

- Key predictors: Digitized Inventory (0 – 1 at ward/village level); O&M Earmarking (share of asset category with line-item O&M ⩾3% of replacement value); Community Stewardship Index (CSI, 0 – 5); Clarity of Ownership (COO, 1 – 5).

- Controls: Population density; median HH income; proximity to transit; election cycle year; contractor turnover.

Analysis Plan

Descriptive statistics; bivariate correlations; OLS/Logit models with cluster-robust SEs (cluster = ward/village); interaction tests (CSI × Density). Qualitative coding (reflexive thematic analysis) for mechanisms and implementation barriers.

V. Review of Literature

Public Goods, Commons, and Institutions

Ostrom (1990) challenged the "tragedy of the commons" by documenting conditions where communities sustainably manage shared resources—clear rules, monitoring, graduated sanctions, and nested governance. Urban public spaces, while rivalrous and subject to congestion, can be stewarded through co-production with residents (Joshi & Moore, 2004). In Indian cities, informal uses (vending, parking) coexist with mobility and safety goals, demanding negotiated governance.

Property, Tenure, and Encroachment

Ambiguous tenure and fragmented titles elevate encroachment risks (De Soto, 2000), but Indian scholarship cautions against one-size formalization that displaces livelihoods (Bhan, 2016). In Gujarat, TP Schemes reconstitute land for public purposes, but post-scheme maintenance and boundary enforcement are uneven, inviting incremental encroachments on reservations and road margins.

Asset Management and O&M

Global infrastructure literature emphasizes lifecycle costing: allocating O&M 2–5% of asset replacement value prevents failure and costly rehabilitation (Grigg, 2010). Indian ULBs often prioritize capex over opex due to grant structures, producing maintenance backlogs (World Bank, 2023). Digital asset inventories improve planning, preventive maintenance, and transparency (ISO 55000).

Rural Commons and Panchayati Raj

Gauchar and village ponds (talao) are critical for livelihoods and ecology in semi-arid Gujarat. Studies show that user group involvement and social audits reduce grazing conflicts and boundary shrinkage (Agarwal, 2010). The Gujarat Panchayats Act, 1993 and Mahatma Gandhi National Rural Employment Guarantee works often intersect with commons restoration but need stewardship follow-through.

Regulatory Context

Key frameworks include The Gujarat Town Planning and Urban Development Act, 1976; Gujarat Municipal Corporation Act and Municipalities Act; Public Premises (Eviction of Unauthorised Occupants) Act; government resolutions on gauchar protection; and the 74th/73rd Amendments mandating devolution and ward committees/gram sabhas. National missions—AMRUT, Smart Cities, Swachh Bharat—support asset improvements but vary in O&M sustainability.

Gap: Few studies integrate micro-level asset audits with governance/budget indicators and citizen/official perspectives across both urban and rural Gujarat. This study fills that gap with a replicable measurement approach.

VI. Statistics (Descriptives & Reliability)

Sample Characteristics (Resident Survey, N = 486)

- Gender: 51% female, 48% male, 1% other.
- Locality: Urban 62%, Rural 38%.
- Income terciles: Low 34%, Mid 41%, High 25%.
- Education: Up to secondary 46%, higher secondary 33%, graduate+ 21%.
- Tenure: Owner 68%, renter 32%.

Asset Audit Sample (n = 92)

- Urban (56): 16 parks, 10 lakes/ponds, 10 street segments, 8 primary schools, 6 community halls, 6 markets.

- Rural (36): 10 ponds, 8 school/anganwadi, 8 gram roads, 6 community halls, 4 gauchar parcels.

Scale Reliability

- Clarity of Ownership (COO, 3 items): α = .78
- O&M Visibility (4 items): α = .81
- Community Stewardship Index (CSI, 5 items): α = .83
- Vandalism Index (audit-based, four observed items): KR-20 = .74

Descriptive Means (1–5 unless noted)

- PAAR Condition (overall): 3.11 (SD 0.74)
  - Urban: 3.24; Rural: 2.91
- Encroachment incidence (asset-level, 0–1): 0.37 overall
  - Urban: 0.41; Rural: 0.30
- Vandalism index (0–4): 1.09 (SD 1.02)
  - Urban: 1.31; Rural: 0.78
- COO (resident perception): 3.02 (SD 0.93)
- O&M earmarking (ULB/GP category share ⩾3%): 0.46 (46% of audited categories)
- Digitized Inventory present (ward/village): 0.52 (52% coverage)
- CSI (0–5): 2.38 (SD 1.24)

Correlations (selected)

- Encroachment ~ Digitized Inventory: −.33 ($p < .001$)
- Encroachment ~ COO: −.28 ($p < .001$)
- Vandalism ~ CSI: −.26 ($p = .002$)
- PAAR Condition ~ O&M Earmarking: +.31 ($p < .001$)
- Encroachment ~ Density: +.22 ($p = .006$)

VII. Data Analysis on Hypotheses

Hypotheses

- H1: Digitized asset inventories associate with lower encroachment.
- H2: Higher earmarked O&M (⩾3% of replacement value) associates with better condition.
- H3: Community stewardship reduces vandalism, especially in high-density areas (interaction).
- H4: Clarity of ownership mediates the relationship between digitization and encroachment.
- H5: Urban areas have higher asset condition but also higher vandalism than rural areas.

Models and Results (cluster-robust SEs)

Model A (Logit, asset-level encroachment):

Encroachment_i = β0 + β1 DigitizedInventory + β2 O&M_Earmark + β3 COO + β4 Density + β5 Income + ε

- DigitizedInventory β = −0.29 (SE 0.07), p < .001
- O&M_Earmark β = −0.11 (0.05), p = .034
- COO β = −0.23 (0.06), p < .001
- Density β = +0.15 (0.06), p = .012
- Pseudo-R^2 = 0.21

Interpretation: Digitization and clear ownership records significantly reduce odds of encroachment; density raises risk.

Model B (OLS, PAAR condition score):

Condition = β0 + β1 O&M_Earmark + β2 DigitizedInventory + β3 CSI + β4 Urban + controls

- O&M_Earmark β = +0.25 (0.08), p = .002
- DigitizedInventory β = +0.14 (0.06), p = .021
- CSI β = +0.09 (0.04), p = .031
- Urban β = +0.18 (0.07), p = .010
- Adj. R^2 = 0.27

Model C (Poisson, vandalism count):

ln(Vandalism) = β0 + β1 CSI + β2 Density + β3 (CSI×Density) + β4 Lighting + β5 Urban + ε

- CSI β = −0.22 (0.07), p = .004
- Density β = +0.17 (0.05), p = .001
- CSI×Density β = −0.08 (0.03), p = .012
- Lighting β = −0.11 (0.05), p = .029
- Urban β = +0.09 (0.04), p = .041

Interpretation: Stewardship reduces vandalism, with stronger effects where density is high (supports H3).

Mediation (PROCESS-style bootstrap, 5,000 reps):

DigitizedInventory → COO (a = +0.36, p < .001); COO → Encroachment (b = −0.23, p < .001); indirect effect a×b = −0.083, 95% CI [−0.131, −0.042]. Direct effect remains significant (c' = −0.21, p = .004). H4 supported (partial mediation).

Group Comparisons (t-tests):

- Condition: Urban 3.24 vs Rural 2.91 (t = 2.94, p = .004)
- Vandalism: Urban 1.31 vs Rural 0.78 (t = 3.18, p = .002)
  H5 supported.

Qualitative Findings (themes; paraphrased quotes)

1) **Fragmented Custodianship:**

"The lake edge belongs to irrigation; the garden inside is with parks; the access road is with roads. When damage occurs, no one rushes first." — Urban engineer

2) **Allotments and Political Mediation:**

"Temporary stalls become permanent near bus depots. Elections make removal difficult." — Councillor

3) **O&M as Afterthought:**

"We built a beautiful community hall, but budget has no line for cleaning staff." — Contractor

4) **Rural Commons Under Pressure:**

"Gauchar wajib-ul-arz shows one thing, ground reality is another. Boundaries shift." — Gram sevak

5) **Stewardship Works:**

"Our lake user group does morning rounds; littering dropped. People feel ownership." — NGO leader

6) **Digitization Helps (when public):**

"Once the ward asset map went online, rumors stopped and encroachment reduced." — Ward officer

VIII. Suggestions (Policy & Practice Roadmap)

Unified Public Asset Registry (UPAR):

- Merge municipal, revenue, education, and irrigation records into a geospatial registry (parcel-to-asset mapping).
- Public dashboards with parcel IDs, custodian department, allotments/leases, and O&M status.

Lifecycle O&M Norms:

- Mandate O&M ⩾3 – 5% of replacement value per asset category; create ring-fenced accounts; adopt preventive maintenance schedules (ISO 55000 aligned).
- Publish annual Asset Condition Reports at ward/GP level.

Transparent Allotments & Leases:

- Standardize criteria, tenure, and rents; publish allotment lists and GIS locations; time-bound renewals; third-party audits.

Stewardship Compacts:

- MoUs with RWAs, lake committees, school management committees, and SHGs for cleanliness, surveillance, and light maintenance, with micro-grants and recognition.

Humane Encroachment Protocol:

- Tiered responses: notice—dialogue—relocation/regularization where feasible—graduated sanctions.
- Integrate vending zones, shaded seating, and bicycle parking to reduce spillovers.

Design against Misuse:

- Vandal-resistant fixtures; CPTED lighting; clear sightlines; boundary demarcation with low fencing and planting; maintenance-friendly materials.

Procurement & Contracting Reforms:

- Best-value selection with O&M obligations bundled; performance-based payments tied to PAAR scores; contractor debarment for repeated failures.

Ward/Gram Sabha Social Audits:

- Twice-yearly audits of priority assets; citizen scorecards; grievance redress dashboards with service-level benchmarks.

Capacity Building:

- Training for ward engineers and gram sevaks in asset lifecycle management, basic GIS, and participatory methods; peer-learning across cities/villages.

Environmental Safeguards:

- Water body buffers; silt traps; native planting; permeable paving; regular desilting with disposal protocols; monitoring groundwater recharge.

Funding Convergence:

- Align Smart Cities/AMRUT, Fifteenth Finance Commission grants, SBM-U/G, MG-NREGA (for rural) toward asset rehabilitation with O&M tails.

Data Standards & Open APIs:

- Statewide schema for asset IDs, condition codes, and maintenance logs; APIs for civic apps and research use.

IX. Conclusion

Public property is where constitutional promises touch ground. In Gujarat's towns and villages, we find encroachment risk driven by density and record ambiguity, maintenance gaps from capex-biased budgeting, and misuse where stewardship is weak. Yet the evidence also shows practical levers: digitized, public-facing inventories tighten boundaries; earmarked O&M and design choices preserve condition; stewardship compacts reduce vandalism even in crowded settings; and transparent allotments de-politicize the grey zone between livelihood and illegality.

The paper's measurement toolkit—resident perceptions, PAAR field audits, and governance indicators—can be adopted by ULBs and Panchayats for ongoing monitoring. Implementing the ten-point roadmap would move Gujarat toward lifecycle-based, participatory asset management. Scaling such reforms can protect commons, enhance service delivery, and strengthen trust, ensuring public property remains truly public.

Acknowledgement

I would like to express my sincere gratitude to all the individuals, schools and organizations that have contributed to the publication of this research paper.

First and foremost, I would like to thank my bro Shri D D Joshi, Detective and Research Scholar, for his invaluable guidance and support throughout the research process. His expertise and insights were instrumental in shaping the direction and focus of my research. I am also grateful to the officials of the Education Department, Government of Gujarat for providing me the resources and support I needed to complete this paper.

I would also like to thank my seniors and colleagues at my work place for their feedback and support throughout the research process. In particular, I would like to thank my family members for their valuable insights and suggestions. Finally, I would like to thank all the participants in this study for their time and willingness to share their experiences. Their contributions have been invaluable in helping me to understand the topic and draw meaningful conclusions.

I would also like to express my appreciation to the IJRTI for considering my work and providing the opportunity to publish my findings.

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AUTHOR'S BIOGRAPHY

An author is a Teacher at Government Primary School, Gujarat. She teaches especially social science to the students of upper primary grades. As a teacher she always focuses on learning methodologies for improvement of students' understandings and learning skills. She has won many awards of State and National levels from various authorities and Government for her valuable efforts towards teaching, guidance and skill development fields. She basically possesses qualification of Education in addition to the bachelor and post graduate level degrees i.e. B.Com, M.Com & M. Phil. Her focused aim of research emphasizes on learning and teaching attributes at Government schools of Gujarat.