The Interplay of Urban Natural Capital and Livelihoods: A Study of Community Perceptions and Eco-Restoration Efforts along the Cooum River, Chennai.

Abstract

This research investigates the critical impact of forced resettlement associated with the Integrated Cooum River Eco-Restoration Project on the Natural Capital of the urban poor in Chennai. While the project aims to restore a vital natural asset, its implementation required the displacement of thousands of families, fundamentally altering their livelihood strategies. Using primary data from the resettled population, the study found that 65.7% of respondents perceive environmental problems, and critically, space/land-related issues (52.0%) are cited more frequently than water quality problems (30.0%). This emphasizes that for the resettled urban poor, the loss of proximate, secure living space a core component of natural capital in dense cities is the primary capital shock. (Kozhikode, 2020)The paper concludes that for restoration efforts to be equitable and sustainable, the mandated infrastructural improvements must be complemented by robust social strategies that compensate for lost natural capital at the resettlement sites.

Key Words: Cooum River Restoration, Resettlement, Livelihood Capitals, Natural Capital, Conservation.

1. Introduction

This paper examines the role of Natural Capital in shaping the livelihoods of the urban poor, with a specific focus on the restoration efforts of the Cooum River in Chennai, India. Although natural resources tend to be limited in urban contexts, they continue to serve as critical livelihood assets—particularly in peri-urban, semi-urban, and coastal environments where communities often depend on them for everyday sustenance and resilience. In India, rapid and unplanned urbanisation has severely degraded many rivers, reducing them to channels of untreated sewage. This ecological decline has far-reaching consequences for public health, environmental sustainability, and the livelihood security

of communities living along these waterways. The Cooum River in Chennai, Tamil Nadu, is a stark example of this transformation. Originating in Tiruvallur District, the river travels approximately 65 km, of which nearly 20 km runs through densely populated urban areas, functioning as a major flood carrier for the city. In response to decades of pollution and encroachment, the Government of Tamil Nadu launched the Integrated Cooum River Eco-Restoration Project, implemented through the Chennai Rivers Restoration Trust (CRRT). This initiative seeks not only to rehabilitate the river's ecological functions but also to address issues of resettlement, environmental conservation, and livelihood transitions among affected communities.

1.1 River Restoration, Displacement, and Capital Shock

Urban river rejuvenation projects, such as the Integrated Cooum River Eco-Restoration Project in Chennai, represent critical environmental interventions globally. However, in densely populated cities, these projects often lead to the forced displacement and resettlement of long-term informal settlements that occupy the river's Right of Way (RoW). The Cooum River, a 65 km flood carrier and water source, had become severely degraded, functioning as an urban sewer. The ensuing eco-restoration initiative, managed by the Chennai Rivers Restoration Trust (CRRT), set goals to achieve pollution reduction, ensure sustainable water quality, and improve the riverfront. This environmental agenda, while essential, requires the resettlement of thousands of families by the Tamil Nadu Urban Habitat Development Board (TNUHDB). This displacement constitutes a severe capital shock to the urban poor, concerning their Natural livelihood capitals like, Physical, Human, Social, Financial, and natural capitals. Given the limited scholarly attention paid to Natural Capital in urban settings, this paper addresses a critical research gap by attempting to quantify the significance and reveal the unrecognized components of the urban-natural capital linkage.

This research focuses specifically on:

1. Reviewing the literature on urban river resettlement and the resulting loss of natural capital.
2. Analyzing the post-resettlement (or pre-resettlement threat) status of Natural Capital using primary data from the affected families.

3. Proposing policy suggestions for compensating for the lost capital base in the context of the government's multi-sectoral plan.

2. Theoretical Framework: Natural Capital in Urban Settings

Natural Capital is defined as environmental assets like land, water, and forests, or the resource stocks that provide essential resource flows and services such as erosion control. While its primary target group is often the rural poor, certain natural resources, like rivers, are utilized in urban environments for activities such as fishing, water for washing/drinking, and chicken farming. Furthermore, a safe and clean local environment can be viewed as an asset due to its indirect effects on human health. The Sustainable Livelihoods (SL) framework (DFID) (Chambers&Conway1992) recognizes Natural Capital as one of five core assets. For marginalized groups, the state of local natural resources is intrinsically linked to their resilience, employment, and income, especially where urban agriculture or resource-based livelihoods persist. The successful restoration of the Coum River, therefore, is not merely an environmental endeavor but a crucial intervention into the Natural Capital base of the city's poorest residents

3. Relevance to the Urban Poor

- Natural resources are used less in the livelihood strategies of the urban poor, especially in large urban areas.(Gordon&Meadows,2000)
- However, some urban dwellers consider land and cattle as valuable assets due to the practice of "urban agriculture". Specific groups, like fishing communities in coastal areas, are dependent on access to natural resources.(Tacoli,1998)

3.1 Resettlement and Natural Capital Deprivation

Displacement due to public works, including ecological restoration, systematically depletes the capital assets of the poor, often following the "Impoverishment Risks and Reconstruction" (IRR) model. Specifically concerning Natural Capital, resettlement causes:

- Loss of Proximate Resources: Loss of river access, which might have served for bathing, washing, or informal fishing.
- Loss of Common Space: The new resettlement sites, often high-rise apartments, typically lack the common, open spaces (land) used for social networking, informal markets, or livestock keeping (poultry/cattle were noted in the survey area).

- Environmental Degradation at the New Site: New sites are often poorly maintained, lacking tree cover and clean water/sanitation infrastructure, thus failing to provide the environmental quality of the lost location, however polluted the river was.(Cernea,2000)

Distribution of the respondents by their opinion on Natural Capital in Urban setting

Table:1

Opinion	Response	No. of Respondents (n=373)	Percentage
Environment related problem in the area	Yes	245	65.7
	No	128	34.3
Type of natural resource problem	Land	194	52.0
	Water	112	30.0
	Polluted surroundings	9	2.4
	NA	58	15.5
Tree Plantation	Yes	141	37.8
	No	232	62.2
Solid Waste Management	Yes	201	53.9
	No	172	46.1
Participated in environment protection awareness programmes	Yes	133	35.7
	No	240	64.3
Participated in environment cleaning	Yes	185	49.6
	No	188	50.4
Participated in Nutrition and Health	Yes	222	59.5

awareness programmes	No	151	40.5

The above table portrays the details on the natural livelihood capital pertinent to urban settings.

- A two third 65.7 percent of the respondents perceive an unclean environment, rainwater logging and allied issues, open sewage etc. as environment-related it is justified these pose as environmental issues. About half 52 percent perceived their space related issues and 30 percent perceived water as environmental issues. Adequate water for drinking and domestic purposes is essential for sustainable livelihood. A few of the community people had poultry and cattle in a small number.
- The data on their participation and awareness in environment conservation, A little more than one third 37.8 percent engaged in tree plantation, about half 53.9 percent engage in solid waste management, 35.7 percent participated in environment protection awareness programmes, 43.4 percent in health awareness, nearly half 49.6 percent in environment cleaning and a majority59.5 percent in Nutrition and Health awareness programmes.

The most crucial finding is the prioritization of problems:

- Land/Space: 52.0% perceived their space-related issues.
- Water: 30.0% perceived water as an environmental issue.

The fact that space/land (a component of Natural Capital in urban areas) is cited far more often than water (the focus of the restoration project) strongly suggests that the immediate, lived problem for the resettled community is the cramped conditions, loss of common areas, and insecurity of tenure in the new housing (or the imminent threat of losing their current space). The restoration project itself, by forcing them out, made their space/land the most vulnerable capital asset.

Participation rates in conservation activities are low, especially for long-term investments:

- Tree Plantation: 37.8% participation.
- Environment Cleaning: 49.6% participation.
- SWM: 53.9% participation.

Low participation in activities like tree plantation indicates a lack of ownership or an emotional disconnect from their new environment. When families are struggling with basic livelihood issues stemming from displacement, investing effort in collective environmental stewardship (Natural Capital regeneration) becomes a secondary concern.

4. The Natural Capital Crisis of the Resettled Poor

The primary data from the survey offers critical insights into the real-world consequences of large-scale ecological restoration projects on the livelihood assets of the urban poor. The results confirm a fundamental disconnect between the project's goal (ecological health of the river) and the immediate priorities of the affected community (socio-spatial security). The analysis of the survey responses strongly suggests that forced resettlement has precipitated a crisis regarding the accessibility and security of their Natural Capital.

4.1 Prioritization of Space over Water: The Core Capital Shock

The most salient finding is the inversion of perceived environmental priorities. While the Cooum River restoration is centered on addressing water quality (the river's zero dissolved oxygen and pollution levels), only 30.0% of respondents cite water as their main natural resource problem. In stark contrast, a majority (52.0%) identifies land/space-related issues as the primary natural resource concern.

For the urban poor living along the riverbanks, their informal settlement represented secure, proximate access to the city's economic activities and a relatively large, albeit insecure, land asset. This land/space facilitated specific Natural Capital uses, such as keeping poultry and cattle. Resettlement to high-rise tenements, often miles away from the city centre, transforms this spatial security into cramped conditions and insecurity of tenure, which is perceived as a greater loss than the environmental quality of the river they were forced to leave. The restoration project, by removing them from the riverbank, effectively made their secure living space—the most critical form of natural capital in a dense urban environment—their most vulnerable asset.

4.2 The Disconnect in Environmental Stewardship

The low participation rates in environmental activities signal a crisis in community ownership and stewardship at the new/threatened locations:

- Low Investment in Long-Term Capital: Only 37.8% participated in tree plantation. Tree planting is a long-term investment in community natural capital (shade, air quality, aesthetics). This low engagement highlights a psychological disconnect; families who are

grappling with the fundamental livelihood issues of relocation (loss of income, increased travel costs) are unlikely to invest effort in a place they do not feel a long-term sense of belonging or ownership towards.

- Focus on Immediate Needs: Participation is higher in Solid Waste Management (53.9%) and environment cleaning (49.6%). This suggests that engagement is concentrated on managing immediate public health and hygiene threats (mitigating pollution/health risk, a form of *negative* natural capital), rather than contributing to the *positive* regeneration of the environment.
- Health as Priority: The highest participation rate is in Nutrition and Health awareness programmes (59.5%). This reflects that the public health risks associated with a degraded environment—whether at the polluted riverbank or the poorly maintained resettlement colony—are the most felt consequences of the natural capital crisis.

5. Suggestions and Recommendations for Improvement

To achieve an environmentally successful and socially equitable outcome, the restoration project requires a multi-stakeholder approach that addresses both the ecological deficit in the river and the natural capital deficit of the resettled families. The following recommendations are organized by key stakeholder responsibility:

5.1 Tamil Nadu Urban Habitat Development Board (TNUHDB)

Recommendation	Rationale
Integrate Green and Common Spaces	Compensate for the 52.0% spatial problem by mandating dedicated, well-maintained community gardens, courtyards, and common spaces in all resettlement colonies. These areas should be accessible for social activities and even minor urban agriculture (poultry), thereby restoring a functional component of their lost natural capital.
Proximity Prioritization	Prioritize In-situ or Near-situ resettlement whenever hydrological safety permits. This preserves the crucial proximity to jobs and social networks, which are indirect forms of natural capital access.

Recommendation	Rationale
Environmental Quality Assurance	Ensure that the new colonies meet higher environmental standards than the old slums. This includes proper fencing, drainage, and reliable Solid Waste Management (SWM) to address the 65.7% perception of environmental problems at the new site.

5.2 Chennai Rivers Restoration Trust (CRRT) / Government of Tamil Nadu

Recommendation	Rationale
Shift Awareness Focus	Reroute awareness programs (currently 35.7% participation) to focus on the new residential environments. Campaigns should link SWM and tree plantation to the health and well-being of the specific resettlement colony, fostering a sense of ownership in the new location.
Incentivize Collective Action	Partner with NGOs to offer micro-grants or incentives (e.g., subsidized utilities) for Resident Welfare Associations (RWAs) that achieve target participation rates in tree plantation (currently 37.8%) and colony-level environmental improvement initiatives.
Socio-Ecological Monitoring	Expand project monitoring beyond water quality (Dissolved Oxygen, BOD) to include Social Metrics such as post-resettlement livelihood capital assessment, crime rates, and community-level SWM effectiveness.

5.3 Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB)

Recommendation	Rationale
Dedicated Timeline	Publicly commit to and adhere strictly to the timelines for commissioning all modular and large-scale Sewage Treatment Plants (STPs) and interceptor lines. The success of the entire project hinges on eliminating the sewage flow that causes the current zero-oxygen levels.

Recommendation	Rationale
Colony-Level Water Security	Ensure that the 30.0% perceived water issue among residents is fully resolved in the new resettlement sites by guaranteeing continuous, clean, and treated water supply, preventing any reliance on potentially contaminated sources.

5.4 Public Works Department (PWD)

Recommendation	Rationale
Sustained Flow Management	Beyond initial desilting and baby canal formation, implement a permanent, funded system for managing the river mouth sand bar and maintaining the minimum ecological flow (MEF). This is essential for the river's ecological survival post-restoration.
Boundary Protection	Finalize and demarcate the river's Right of Way (RoW) with permanent structures and bioengineering (e.g., planting mangroves) immediately following clearance and resettlement to prevent future encroachment and the recurrence of the problem.

5.5 Role of the Resettled Families

The role of the resettled families as stakeholders is crucial, not just as recipients of government aid or as displaced communities, but as the primary stewards and end-users of both the newly restored river environment and the natural capital (space, greenery, water) of their resettlement colonies. Their role is dual: to actively participate in Conservation and to sustainably Utilize the available natural resources for livelihood and well-being.

- Maintain the hygiene and environmental quality of the new resettlement colony (local natural capital) through active participation in Solid Waste Management (SWM) and environment cleaning. This prevents pollution migration back into the city’s water systems.

- Act as vigilant eyes for the restored river corridor and the new colony. Report sewage overflows, illegal dumping, and any renewed attempts at encroachment to the CRRT and GCC.
- Actively organize the use of common spaces and community gardens in the resettlement colonies for social engagement, urban agriculture (poultry, small kitchen gardens), and recreational activities, maximizing the limited natural capital available in the high-density dwellings.
- Engage in long-term greening activities at the new sites, such as tree planting and maintenance, to build shade, improve air quality, and contribute to the colony's aesthetic and ecological value over time.
- Leverage awareness programs to advocate for better water quality, sanitation, and waste management from municipal authorities (CMWSSB/GCC), understanding that a cleaner environment is directly linked to better human capital (health).

Conclusion

The Integrated Cooum River Eco-Restoration Project is an ambitious and necessary undertaking that highlights the dual challenge of ecological repair and urban social equity. The primary data provides irrefutable evidence that for the urban poor, the most significant component of their Natural Capital under threat is secure, proximate land/space, a problem cited by 52.0% of respondents, overshadowing the water quality issue at the river mouth. The policy implication is clear: The project's success cannot be measured solely by the return of aquatic life to the river. It must equally be judged by the successful restitution of the lost livelihood capital among the resettled families. True sustainable restoration requires that the infrastructural mandate of the PWD and CMWSSB is inextricably linked to the social mandate of the TNUHDB, ensuring that the new resettlement environments are not zones of depleted natural capital. By implementing targeted suggestions that prioritize green spaces and community ownership at the resettlement sites, the project can transform its social cost into an investment in the city’s long-term socio-ecological resilience. The ultimate measure of the project's success lies in fostering a renewed, equitable, and participatory relationship between Chennai's citizens and its revitalized riverine system.

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