From Informality to Inclusion: A Systems Driven Doughnut Framework for Sustainable Redevelopment of Dharavi, Mumbai

Adeesh Diwan[1], Namita Pragya[2] and Rajul Jain[3]

[1,2,3] Department of Faculty Science, Adani University, Ahmedabad, India
adeeshdiwan.im24@adaniuni.ac.in

Abstract. The Dharavi Redevelopment Project done by Adani Group represents one of world's largest and most complex urban transformation programs which currently involves the rehabilitation and resettlement of approximately 600000 to 1000000 residents spreading across 240 hectares in Mumbai, India. This research paper will be focused on analyzing the redevelopment of the whole project area through the frameworks of doughnut theory and systems analysis. This will help in evaluating how this large-scale development will be addressing both social foundations and planetary boundary(s). We will be drawing on qualitative field observations and secondary data from official project sources. Through this, we aim to examining the DRP renewal project human centric approach to urban regeneration. This analysis will help us reveal how the DRP's multi-dimensional strategy which currently involves rehabilitation, livelihood preservation and infrastructure transformation will help to rejuvenate Dharavi. Also, through systems analysis, we evaluate the project's 360-degree holistic approach to three factors (i) infrastructure integration, (ii) stakeholder coordination and (iii) sustainability metrics. Our findings reveal that while the project has huge potential for achieving social equity and environmental sustainability, its full success will be completely dependent on the community participation and focusing at regenerative design principles throughout the transformation process.

Keywords: Dharavi Redevelopment Project, informal settlements, Doughnut Economics, systems analysis, hybrid urbanism.

1 Introduction

1.1 Urban Informality, Redevelopment and the Challenge of Transformation

Rapid urbanization, in developing economies, presents a big challenge for sustainable development. India's urban population is projected to reach approx. 600 million by 2031 and informal settlements housing is to reach approx. 65 million people across major metro cities [1] Dharavi, as it is located in the heart of Mumbai, poses this challenge, a 535 acres area home to an estimated 600000 to 1000000 residents and is characterized by extreme population density which exceeds 277000 persons/ sq.km. It is developing as an informal economy and it is currently generating an annual turnover of $700 million

R. Mehta et al. (eds.), *Proceedings of the International Conference on Infrastructure Development and Sustainability (ICIDS 2025)*, Atlantis Highlights in Sustainable Development 9,
https://doi.org/10.2991/978-94-6239-685-2_15

to $1 billion.

Traditional urban development models have failed informal settlements as they give importance on physical renewal over human well-being which has given displacement, livelihood loss and lastly social fragmentation. The Dharavi Redevelopment Project was recently awarded to Adani Properties Pvt. Ltd. in July 2023 and now, it represents a big paradigm shift (both, mindset and on country level) towards humancentric transformation.

Traditional redevelopment schemes in Mumbai have frequently prioritized the extraction of land value through high rise rehousing and saleable development while underestimating the importance of embedded livelihoods and social networks [2]. Experiences from earlier slum rehabilitation projects reveal recurrent patterns of displacement to peripheral locations, breakdown of work–live proximities, and heightened vulnerability for low-income households [3]. These outcomes foreground a central question: how can large scale redevelopment in contexts like Dharavi be designed to foster inclusion, livelihood security, and ecological integrity rather than gentrification and socio spatial exclusion?

1.2 The Dharavi Redevelopment Project: Scale, Actors and Current Status

The Dharavi Redevelopment Project (DRP) was first conceptualized in the early 2000s as an integrated township redevelopment scheme which covers lot of multiple sectors which is under a special planning authority [4]. We see after several stalled attempts and also competitive bidding processes, the Maharashtra government also approved a revised DRP with the Adani Group and is selected as the lead private developer in 2022–2023 [5]. A Special Purpose Vehicle (SPV) has also been constituted with 80% equity which is held by the Adani Group and then 20% by the state, which aligns with Mumbai's broader market driven model of slum redevelopment [5].

Also, recent official communications and the media reports have indicated that the notified DRP area is also about 251 hectares, of which around 47–48 hectares are allocated for rehabilitation, a similar area for saleable components, and approximately 40 hectares for open spaces and amenities, implying about 16% of the area reserved for open space [5]. Built up area for free sale components is also expected to reach approx. 140 million square feet which enables cross subsidization of rehabilitation costs [5]. The implementation horizon is also projected at roughly 18 years and the rehabilitation phases front loaded over the first seven years [6].

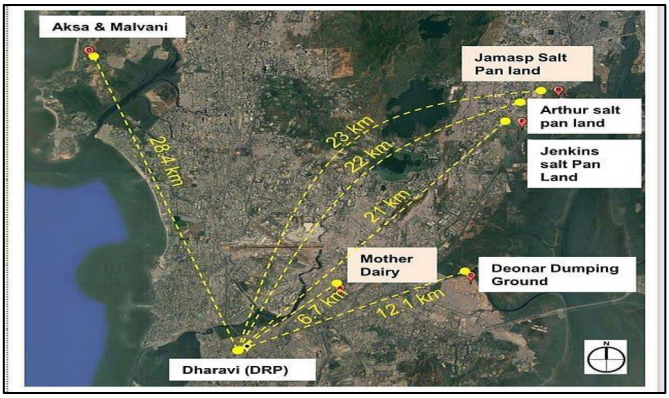

Fig.1. Proposed DRP Land Use Plan [7]

The formal objective of the DRP is also to transform Dharavi into a world class integrated township while also ensuring the rehabilitation of existing eligible residents and businesses (See figure 1) [5].

2 Research Aim and Questions

Rather than treating Dharavi as a space of deficiency, we approach it as a complex socio environmental system with intrinsic strengths and vulnerabilities.

The central research question is:

> *How can the Dharavi Redevelopment Project be designed and governed to create a "safe and just space" for its residents, balancing social foundations and planetary boundaries within a systems framework?*

We operationalize this question through three sub questions:

1. Social foundations: To what extent does the DRP address key dimensions of social foundations housing, livelihoods, services, health, and participation for Dharavi's residents?

2. Ecological ceilings and resource flows: How does the project engage with planetary boundaries at the local scale, particularly in terms of land use, energy, emissions, and urban ecosystems?

3. Pathways to regenerative and distributive development: What alternative design and governance pathways can align the DRP with regenerative and distributive principles informed by Doughnut Economics?

3 Contribution and Structure of the Paper

This paper makes three main contributions to the literature on informal settlements and sustainable urban redevelopment:

1. It operationalizes the Doughnut Economics framework for a large, complex informal settlement in the Global South, building on emerging efforts to translate the doughnut to cities [8].
2. It develops a multi scalar systems analysis of Dharavi that connects micro level livelihoods, neighborhood scale spatial configurations, and city/global networks of value and governance [9].
3. It generates policy relevant design and governance recommendations for aligning a large-scale public–private redevelopment with principles of climate justice, livelihood security, and urban inclusion [2].

The paper is organized as follows. Section 2 reviews the conceptual framework, focusing on Doughnut Economics, hybrid urbanism, and systems thinking in informal settlement redevelopment. Section 3 details the methodology and data sources. Section 4 presents empirical findings across four themes: social foundations, ecological ceilings, community participation and governance, and infrastructure integration. Section 5 discusses implications for regenerative and distributive redevelopment pathways. Section 6 concludes with lessons for Dharavi and other informal settlements globally.

4 Conceptual Framework

4.1 Doughnut Economics and the Urban Doughnut

Kate Raworth's Doughnut Economics framework proposes a visual and analytical model for sustainable development constituted by an inner ring of social foundations and an outer ring of planetary boundaries[8].The safe and just space for humanity lies between these rings: below the inner ring, people face deprivations in essentials such as housing, health, energy and political voice; beyond the outer ring, ecological systems face degradation through climate change, biodiversity loss, and other planetary scale pressures.

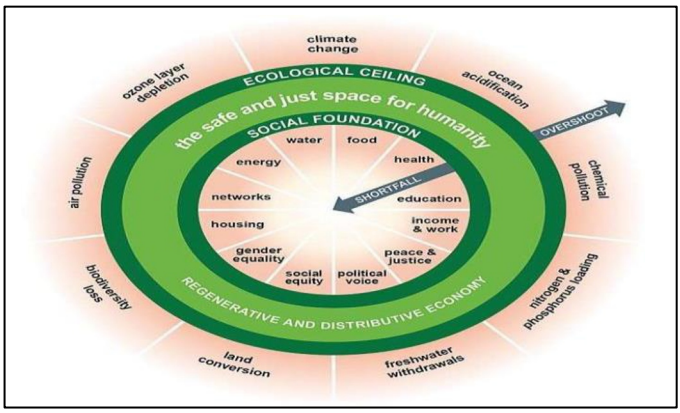

Fig.2. Doughnut Economics, 2016

Recent work has sought to operationalize the doughnut at national and city scales, generating indicators that monitor social deprivation and planetary degradation over time [10]. [11] develop a "revised doughnut" using global datasets to track social and biophysical trends, showing that most countries still fall short of meeting social thresholds within planetary boundaries [11] Urban applications such as those in Amsterdam, Copenhagen and smaller municipalities translate the doughnut into city level "portraits" combining local and global impacts [12]. These experiences show that the doughnut is not a fixed metric set but a platform for participatory selection of context specific indicators of social foundations and ecological ceilings (See figure 2).

4.2 Hybrid Urbanism and Informality in Dharavi

1. Dharavi is widely recognized as a paradigmatic case of hybrid urbanism where residential, commercial, industrial and communal uses co-exist in dense, fine grained spatial configurations [9]. [9] conceptualizes Dharavi as a hybrid settlement whose built form, socio economic practices and governance relations blur conventional distinctions between formal and informal city, generating both sustainability potentials and vulnerabilities (See figure 3).

The hybrid character is expressed through:

- Personality and sociability: Strong community ties, caste and occupation-based clusters, and multi-generational networks.

- Form and typology: Narrow lanes, mixed use structures, incremental self-build housing, and live–work units.

.

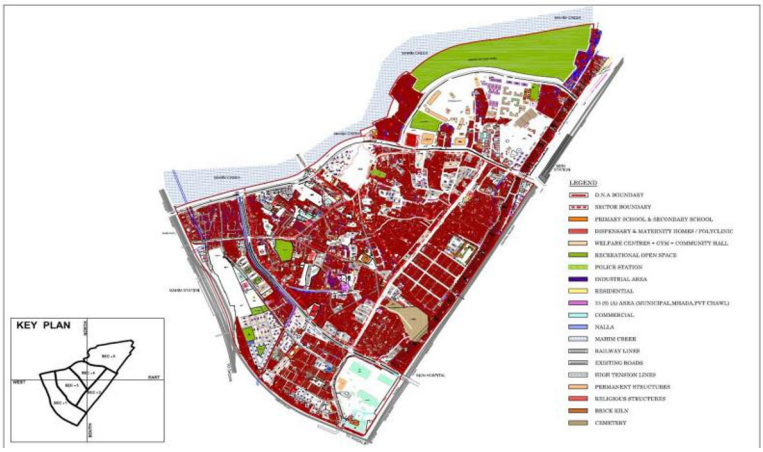

Fig.3. Proposed Map of Dharavi (Dharavi Notified Area, 2025).

Critical scholarship has also demonstrated that informality in Mumbai is not simply the absence of state control, but co-produced by state institutions, political parties and market actors who strategically tolerate or formalize informal practices to manage land, labour and electoral constituencies [13].

4.3 Systems Thinking and Informal Settlement Redevelopment

Systems thinking foregrounds interdependencies, feedback loops and nonlinear dynamics within socio technical and socio ecological systems [14]. In informal settlement redevelopment, this approach emphasizes:

- The coupling of housing, infrastructure, livelihoods, and governance systems.
- The presence of feedback loops (e.g., how relocation affects income, which in turn shapes rent arrears, maintenance, and re informalization).
- The importance of multi actor coordination among government agencies, private developers, civil society organizations and residents.

[4,15] demonstrates how early-stage design decisions in informal settlement redevelopment particularly building typologies, ventilation strategies, and energy systems have significant life cycle energy and thermal comfort implications [15]. These studies illustrate why redevelopment must be evaluated as a system of systems, where decisions in one domain (e.g., FARs and building heights) reverberate across others (e.g., microclimate, energy use, livelihood spaces).

In this paper, systems analysis is used to map and qualitatively assess key subsystems relevant to Dharavi's redevelopment: (1) housing and built form; (2) livelihoods and economic circuits; (3) infrastructure and environment; and (4) governance and participation.

4.4 Aligning Doughnut and Systems Perspectives

We integrate the Doughnut framework and systems thinking by treating social foundations and ecological ceilings as properties of an evolving urban system. Social foundation indicators (e.g., secure tenure, decent work) are embedded in socio economic subsystems; planetary boundary indicators (e.g., emissions, land use intensity) are attached to biophysical subsystems.

5 Methodology and Data

5.1 Research Design

To have a holistic understanding of Dharavi's transformation trajectory under the DRP [16], we did the analysis and is based on a combination of:

1. Systematic review of peer-reviewed literature on Dharavi, Mumbai's slum policies, informal settlements, and Doughnut Economics.

2. Document analysis of policy documents, planning reports, official statements, and technical studies on slum redevelopment and informal settlement upgrading.

3. Secondary quantitative data compilation on population, density, livelihoods, land use allocation, and energy implications from reputable sources (international organisations, government agencies, and peer reviewed studies).

The goal is not to produce new household survey data but to synthesise and re interpret existing empirical knowledge through the integrated conceptual lens outlined in Section 2, thereby expanding the earlier extended abstract into a full-scale academic paper (See figure 4).

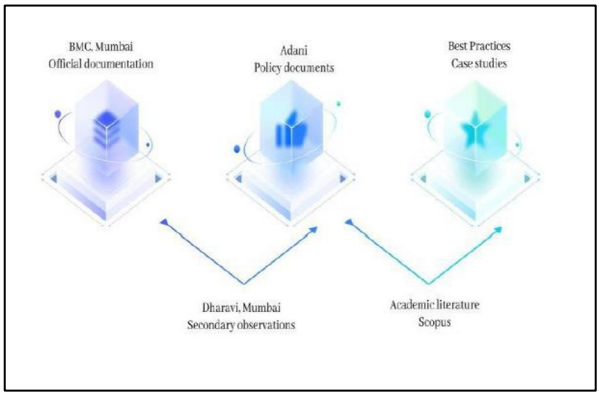

Fig.4.: Research design

5.2 Data Sources and Selection

Data was drawn from four main categories of sources:

1. Peer reviewed journal articles and academic theses

    - Analyses of Mumbai's slum policies, redevelopment outcomes and informality [17].
    - Energy and environmental modelling of informal settlement redevelopment in Dharavi and comparable contexts [15].

2. Official and para official documents
    - Government notifications, media reports quoting officials, and planning summaries on land allocation, built up area and timelines for the DRP (See table 1) [5].

Target Population was based on the data below:

Table 1.

Sector	Residential (R)	Res. Comm. (RC)	Comm./Ind. (CI)	Religious	Total	%
Sector 1	7,497	22	2,513	47	10,079	17.31
Sector 2	11,523	67	2,837	79	14,506	24.91
Sector 3	10,088	79	2,273	68	12,508	21.48
Sector 4	9,132	32	1,964	60	11,188	19.21
Sector 5	8,515	130	1,571	42	10,258	17.61
Grand Total	46,755	330	11,158	296	58,539	100.00

3. Grey literature and policy briefs
    - Case based analyses of Dharavi's redevelopment, governance and gentrification risks [13].

4. Contextual data on urban informality and vulnerability
    - Quantitative assessments of slum vulnerability, housing deficits and pandemic risks in Indian cities [17].

For the tenants, analysis in Appendix 1 was based to find the tenements [7]

Comparative case material on slum redevelopment and relocation strategies in Mumbai and other Indian cities [3]

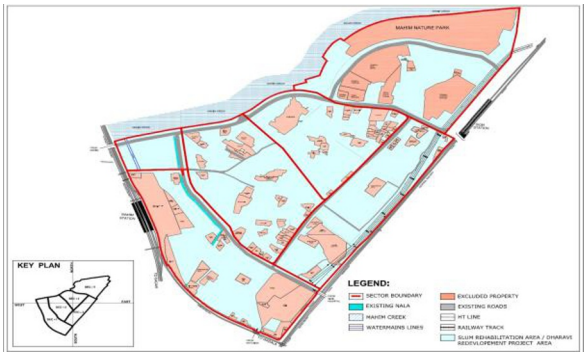

Fig.5. Data gathered from the land use plan [7]

Source selection followed three principles:

- Relevance to Dharavi and/or DRP (direct empirical focus or conceptual linkage) (See figure 5).
- Methodological rigor, prioritizing peer reviewed sources and well documented studies.

6 Operationalization of the Doughnut for Dharavi

To operationalize the Doughnut Economics framework in Dharavi, we identified context specific indicators under two dimensions. The empirical foundation for this operationalization draws extensively from the Dharavi Redevelopment Project (DRP) planning document and comprehensive survey data conducted during 2007–2009 by the Mashal Survey team, which documented existing conditions across 5 sectors and 97 clusters covering approximately 58,243 structures [7].

6.1 Existing Urban Structure and Demographics

Of these 58,539 structures, approximately 80.27% are residential only, 19.15% are commercial or industrial, and 0.56% are residential cum commercial (See table 2).

6.2 Housing Stock Characteristics and Carpet Area Distribution

Table 2. Distribution of Existing Housing Units by Carpet Area [7]

Carpet Area Range	Number of Structures	Percentage
5–15 sq.m. (60–150 sq.ft.)	28,036	83.57%
16–30 sq.m. (170–300 sq.ft.)	4,462	13.30%
>30 sq.m. (>300 sq.ft.)	1,052	3.13%
Total	**33,550**	**100.00%**

To operationalize the Doughnut Economics framework in Dharavi, we identified context specific indicators under two dimensions:

1. Social foundations (inner ring) – This has been adapted from [8,18] and urban applications [8][8]:
   - Health and environmental quality (indoor air, crowding; only 1 hospital and 26 schools, mostly in temporary structures) [7][7].
   - Education and skills (26 schools across 5 sectors, concentrated in Sector 3).
   - Political voice and participation in decision making (30–35 distinct nagars /neighborhoods with embedded governance networks).
2. Ecological ceilings (outer ring) – downscaled and contextualized:
   - Land use intensity (built up coverage, open space ratios).
   - Energy demand and emissions (operational and life cycle).

6.3 Land Availability and Sector wise Distribution

The DRP planning calculations reveal critical constraints on developable land [7]:

Table 3. Land Availability Analysis for Dharavi Redevelopment Project

Land Category	Area (sqm)	Area (Ha)	% of Total
Gross Notified Area	2,403,688.65	240.37	100.00%
Existing Roads	116,609.61	11.66	4.85%
Excluded Properties	739,679.56	73.97	30.77%
DRP Developable Area	1,547,399.48	154.74	64.38%
Slum occupied (33.10A)	1,343,143.69	134.31	55.87%
Old buildings (33.9A)	204,255.79	20.43	8.50%

This 31% reduction from total DRP area to net developable area reflects: proposed road widening (269.38 hectares equivalent), non-buildable amenities (46.37 hectares), and high-tension line setbacks [7] (See table 3 and table 4).

Table 4. Sector wise Land Area Calculations and Net Developable Area (DRP Area 2016)

Sector	Gross Area (sqm)	Excluded (sqm)	Road Area (sqm)	SRA/DRP Area (sqm)	Non Build (sqm)	Developable (sqm)
Sector 1	574,756	207,135	24,326	343,295	16,813	251,889
Sector 2	398,243	63,468	21,064	313,712	29,557	242,873
Sector 3	471,481	85,732	22,628	363,121		293,121
Sector 4	338,754	70,951	11,684	256,119		218,119
Sector 5	620,455	312,394	36,907	271,154		208,154
Total	**2,403,689**	**739,680**	**116,610**	**1,547,401**	**46,370**	**1,214,156**

The distribution of developable area is unequal across sectors, with Sector 3 containing the largest developable footprint (293,121 sqm) and Sector 5 the smallest (208,154 sqm) [7].

Systems Mapping and Analytical Strategy

We developed a conceptual systems map of Dharavi and the DRP along four interlinked subsystems:

1. Housing and built form subsystem
   - Existing typologies (ground+1, ground+2 structures, incremental housing).
   - Proposed high rise rehousing towers and saleable development.

2. Livelihoods and economic subsystem
   - Structure of the informal economy (manufacturing, recycling, services).
   - Integration into city and global value chains [5].

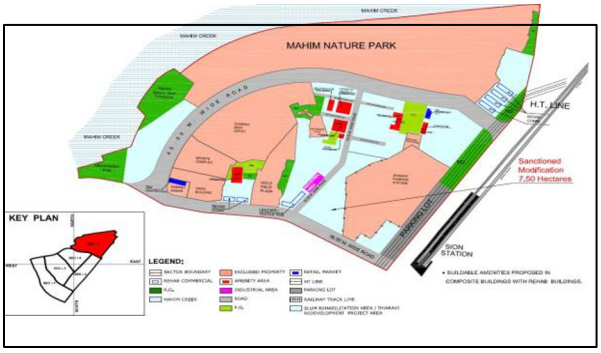

Fig.6. Proposed Plan by DRP [7]

3. Infrastructure and environmental subsystem
   - Planned infrastructure upgrades, energy systems, and open spaces.
   - Potential impacts on local microclimates and life cycle energy demand (Nutkiewicz, 2018)[15].
4. Governance and participation subsystem
   - Actors: state agencies, SPV, municipal bodies, civil society, community-based organizations.
   - Instruments: slum redevelopment regulations, TDRs, rehabilitation entitlements.

Using this map (See figure 6), we systematically analyzed how DRP interventions modify relationships within and between subsystems, and how these modifications affect the ability of Dharavi to remain within the doughnut's

safe and just space.

7 Overall Doughnut Alignment Score for DRP

7.1 Composite score

To calculate the alignment score, we combine the three sub-indices:

$$D = \alpha S + \beta E + \gamma G, \alpha + \beta + \gamma = 1,$$

Typical choices:

- α high if priority is social justice (e.g., 0.4–0.5).
- β high if strong emphasis on staying within planetary boundaries (e.g., 0.4–0.5).
- γ captures cross cutting importance of systems governance (e.g., 0.1–0.2).

Safe and just space conditions

Beyond the average score D, we imposed minimum floor conditions to remain faithful to Raworth's "safe and just space" idea (See figure 7):

- Social sufficiency condition:

$$\mathrm{m_i in} s_i \geq S_{\min}.$$

For example, require all social indicators to be at least 0.6–0.7 (no severe deprivation).

- Ecological safety condition:

$$\mathrm{m_j in} e_j \geq E_{\min}.$$

For example, require all ecological pressures to have $e_j \geq 0.5$ (no catastrophic overshoot). Then, define DRP as doughnut aligned if:

$$\begin{cases} D \geq D^* \\ \mathrm{m_i in} s_i \geq S_{\min}. \\ \mathrm{m_j in} e_j \geq E_{\min}. \end{cases}$$

with chosen thresholds $D^*, S_{\min}, E_{\min}$ (e.g., 0.6–0.7) based on expert consensus and policy norms.

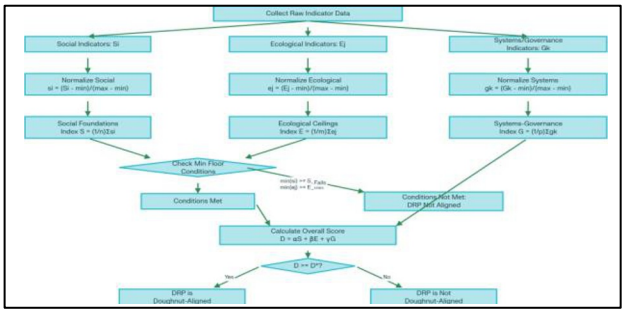

Fig.7. Mathematical Framework

8 Findings

8.1 Housing Adequacy and Rehabilitation Entitlements

Existing housing in Dharavi ranges from single room tenements (typically 10–20 m²) in dense clusters to slightly larger units in more consolidated areas, with very limited access to formal sanitation, piped water and safe building materials [17]. Overcrowding, poor ventilation, and high fire risk are recurrent concerns. The DRP promises formalized housing with self-contained units for eligible residents, which if designed and implemented inclusively could significantly improve the housing adequacy and basic services pillar of the doughnut (See figure 8).

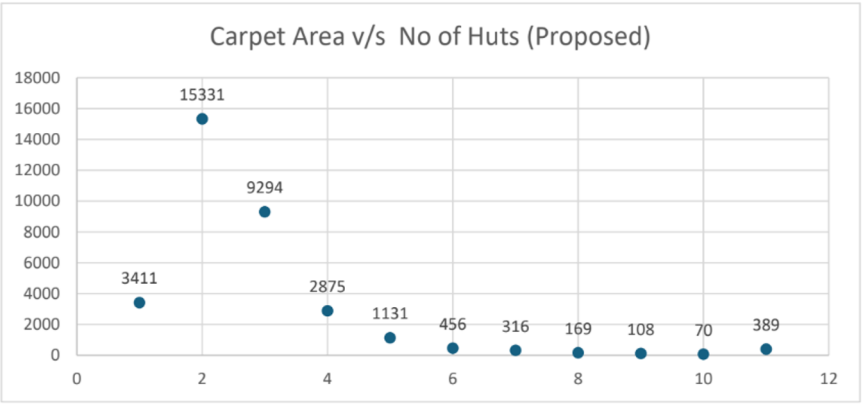

Fig.8. Proposed carpet area versus number of huts

At the same time, the allocation of approximately 140 million square feet of saleable built-up area indicates substantial densification in selected parcels, which will:

- Decrease urban heat island effects if not mitigated through design (e.g., reflective materials, shading, vegetation) [15].
- Place less additional pressure on transport and infrastructure networks, potentially increasing energy consumption and emissions.
- Create harmony high amenity enclaves and congested rehabilitation blocks (See table 5).

Table 5. Below notified area [7] will help to allocate equitable distribution across all the households in a proper manner

DESCRIPTION	SECTOR 1	SECTOR 2	SECTOR 3	SECTOR 4	SECTOR 5	GRAND TOTAL
Gross Area	574756.14	398243.24	471480.86	338753.89	620454.52	2403688.65
Excluded Area	207167.06	63467.61	85732	70951.29	312991.6	739679.66
Existing Road Area	24326.48	21064.09	22628.34	11683.95	36906.75	739679.56

SRA/DR P area for (FSI purpose)	343294.6	313711.54	363120.52	256118.65	271154.17	1547399.68
Non Buildable Area (nalla, watermain, tata pylon)	16812.5	29556.7	0	0	0	46369.2
Road Widening Area	74593.54	41281.99	69120.18	34607.18	49781.73	269384.62
Developable Area	251888.56	242872.85	294000.34	221511.47	221372.44	1231645.66
Non Buildable D.P. reservations	19739.09	13370.99	23020.66	20313.47	66000.99	142324.35
Buildable Amenity Plots	0	13537.6	10382.27	0	0	23920.38
Net Plot Area (Density Purpose)	232157.47	216228.1	260543.89	201200.02	155371.45	1065500.93

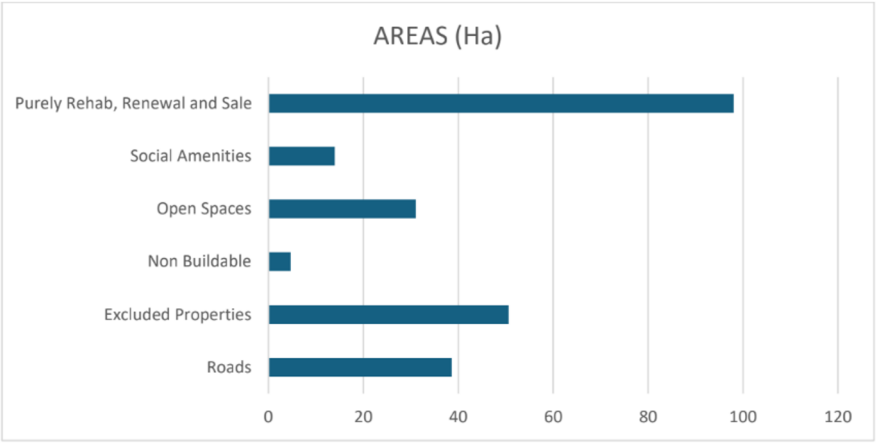

Fig.9. Area-wise analysis

Current Built Up Area design [7] of Dharavi at a large scale indicates that a large-scale transformation is happening in Dharavi and it is going to increase in near future depending on the people rehabilitated (See figure 9).

8.2 Water, Sanitation, Waste and Environmental Health

However, large scale redevelopment also typically increases per capita water and energy consumption, and the centralized relocation of waste and wastewater treatment systems introduces new vulnerabilities if not adequately planned and funded (See figures 10 and 11). A systems perspective highlights the need for:

- Decentralized or modular wastewater and solid waste treatment are integrated with neighborhood level green infrastructure.
- Designs that minimize pollutant loadings into nearby water bodies.
- Mechanisms to ensure that higher service standards remain financially and institutionally sustainable over time.

Fig.10. Existing Water Supply [7]

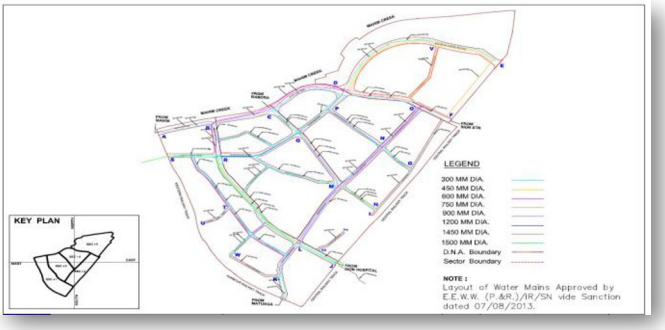

Fig.11. Proposed Sewerage Supply [7]

8.3 Governance, Institutions and Multi Actor Systems

A consistent finding across the literature is that the institutional structure of the state including intergovernmental fragmentation, party politics, and market instruments has played a central role in producing and reproducing informality in [13].

8.4 Population Projections and Rehabilitation Capacity

Table 6. DRP Population Projections and Tenement Holding Capacity [7]

Tenement Category	Number of Units	Basis
Rehab tenements (650 Ts/Ha @ 78% density on 106.55 Ha net area)	54,020	650 Ts/Ha × 106.55 Ha × 0.78
Sale component residential (50% of total built up area)	18,027	106.55 Ha × 650 Ts/Ha × 1.33 × 50%
Existing S.R. Scheme areas (80% residential density)	10,204	19.7 Ha × 2.5 FSI × 0.80
Total Projected Tenements	~85,251	
Total Projected Population (5 persons/tenement)	~426,255	Expected by end of development
With natural growth adjustment (+15,000)	~450,000	10 year build out period

9 Conclusion

From a Doughnut perspective, redevelopment should thus focus on strengthening social foundations while preserving and enhancing hybrid sustainability potentials, rather than replacing Dharavi with a conventional, enclave-based township model (See table 6). This requires:

- Recognizing and mapping existing livelihood clusters and value chains before design decisions are finalized.
- Experimenting with mixed use building types that incorporate formalized workshops, small scale production spaces, and flexible live–work units.
- Integrating community led upgrading approaches into the DRP, drawing on experiences from federations of the urban poor and NGOs in India and elsewhere [19].

9.1 Designing for Systems Resilience and Adaptive Governance

Given the DRP's 18-year implementation horizon, socio economic and environmental conditions will likely change substantially over time (e.g., climate risks, labour markets, governance shifts). Key design principles include:

- Feedback loops through regular participatory evaluations, where residents assess wellb eing, livelihood impacts, and environmental quality.
- Redundancy and diversity in infrastructure systems (e.g., multiple water sources, decentralized energy and waste systems) to buffer shocks.

9.2 Aligning with Doughnut Economics: Policy Levers and Metrics

As policy makers and the SPV we should deploy the following levers:

1. Social foundation guarantees

- Legally binding minimum housing standards (size, services, structural safety).
- Protection of livelihood spaces (e.g., quotas for live–work units and affordable commercial spaces for existing enterprises).
- Institutionalized participation rights, including veto or co decision powers on key redevelopment phases.

2. Ecological ceiling safeguards

- Integration of building energy performance standards, passive design and rooftop solar requirements into DRP codes
- Allocation of functional green infrastructure (urban forests, shaded plazas, bioswales) within the 40-hectare open space envelope.
- Monitoring of per capita energy, water and waste indicators relative to city and national benchmarks, with corrective measures when thresholds are approached.

3. Monitoring and accountability

- Co- developed Dharavi Doughnut Dashboard, tracking selected social and ecological indicators over time.
- Independent oversight body including residents, civil society and technical experts to review DRP performance.
- Regular public reporting and opportunities for grievances and course corrections.

Through these levers, the DRP could shift from a conventional market led redevelopment towards a regenerative and distributive urban transformation.

References

1. World Economic Forum: Sustainable construction can help people living in informal settlements. https://www.weforum.org/stories/2023/12/sustainable-construction-urban-informal-settlements/, last accessed 2023/10/25
2. Nijman, J.: Mumbai slums since independence: Evaluating the policy outcomes. *Habitat International* 49, 297–308 (2015)
3. Weinstein, L.: *The durable slum: Dharavi and the right to stay put in globalizing Mumbai*. University of Minnesota Press, Minneapolis (2014)
4. Nutkiewicz, A.: Defining the life cycle energy implications of informal settlement redevelopment: Case studies from Dharavi, Mumbai. In: *Building Simulation 2021 Conference Proceedings*, pp. 1–8. International Building Performance Simulation Association (2021)
5. Hindustan Times: Mumbai's Dharavi redevelopment project: Adani Group to develop 43% of land for free sale (2025). https://www.hindustantimes.com/real-estate/, last accessed 2023/10/25
6. Indian Express: Govt approves master plan for Dharavi redevelopment project (2025). https://indianexpress.com/article/cities/mumbai/govt-

approves-master-plan-for-dharavi-redevelopment-project-10034988/, last accessed 2023/10/25
7. Dharavi Notified Area: Dharavi redevelopment project. Slum Rehabilitation Authority (2025)
8. Raworth, K.: *A safe and just space for humanity: Can we live within the doughnut?* Oxfam Discussion Papers. Oxfam International (2012)
9. Mueller-Wolfertshofer, F.: Learning from Dharavi: Hybridity for sustainable urban (re)development. *Journal of Urban Design and Planning* 299(3), 1–22 (2025)
10. Warnecke, T.: Operationalizing the doughnut economy: An institutional perspective. *Journal of Economic Issues* 57(2), 1–18 (2023)
11. Fanning, A.L., O'Neill, D.W., Hickel, J., Roux, N.: Doughnut of social and planetary boundaries monitors a world that is unsustainable for both people and planet. *Nature Sustainability* 8(9), 1–12 (2025)
12. DEAL (Doughnut Economics Action Lab): Academic articles and reports on doughnut economics. https://doughnuteconomics.org/tools/academic-articles-and-reports, last accessed 2023/10/25
13. Zhang, Y.: Informality as institutionalised state practice: Slum redevelopment in Mumbai. Unpublished manuscript, Indira Gandhi Institute of Development Research (2016)
14. Meadows, D.: *Thinking in systems: A primer*. Chelsea Green Publishing, White River Junction (2008)
15. Nutkiewicz, A.: Energy modeling of urban informal settlement redevelopment. *Applied Energy* 231, 433–445 (2018)
16. Flyvbjerg, B.: Case study research: Small N, large N, and single case studies. In: O'Rourke, T.D. (ed.) *The Oxford Handbook of Prospective Research*, pp. 301–314. Oxford University Press, Oxford (2013)
17. Das, M., et al.: Habitat vulnerability in slum areas of India – What we learnt from COVID-19. *Sustainable Cities and Society* 72, 103037 (2021)
18. Raworth, K.: *Doughnut economics: Seven ways to think like a 21st century economist*. Random House, London (2017)
19. Cities Alliance, GIZ: Global peer learning series: Urban innovation for just and sustainable cities. Cities Alliance (2024)

Appendix

Appendix 1: Category wise calculation

Category	Calculation/Description	Tenements (T/s)
a) Likely residential rehab tenements		
	Density: 650 T/s per Ha Net Developable Area: 106.55 Ha Percentage for Residential: 78% Formula: (106.55 Ha×650 T/s per Ha)×78%	54,020 nos.

b) Likely residential tenements @ 50% of the total salable BUA		
	Salable BUA: 102.19 sq.mts. (1100 sq.ft.) BUA per tenement Formula: ((106.55 Ha×650 T/s per Ha)×40×(1.33×50%))÷102.19	18,027 nos.
c) Residential tenements in the excluded properties		
	Area: 19.7 Ha Residential Tenements: 80% FSI: 2.5 Average Rehab & Sale tenement area: 38.61 sq.mts. Formula: (19.7 Ha×10,000×2.5)×80%÷38.61	10,204 nos.
d) Residential tenements in other developed private properties		
		approximately 3,000 T/s
TOTAL TENEMENTS		
		85,251 nos.