beyondUrban

Mitigating urban biases in planning processes in the Mumbai Metropolitan Region

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Faculty of Architecture and the Built Environment
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urban
/ˈəːb(ə)n/

adjective

1. in, relating to, or characteristic of a town or city.
   "the urban population"
   synonyms: built-up, town, city, inner-city, densely populated, townified, citified, metropolitan, suburban, non-rural; More
2. denoting or relating to popular dance music of black origin.
   "hip-hop's traditionally urban vibe"

Contents

Acknowledgements

This has a been long year with many ups and downs. But a lot of people have contributed to making this a report that I am proud of.

I would like to thank my parents Sunita and Selva, for helping me with this opportunity to study at TU Delft. Without them, this would not be have been possible.

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Mike has been essential in helping me stay on track and creating a convincing storyline without drowning in a complex context. I am thankful for his role as my research group coordinator and as a mentor; and for his patience with my hectic schedule. He was really helpful in formulating the project definition.

I am very grateful to Vincent for helping me structuring my project considering that I started with variety of interests in my context. With his guidance I was able to narrow the project to a convincing storyline. I am thankful for helping in defining the strategy. He also helped me in getting my terminology straight to make my defence stronger. I am also thankful for him cheering me up when I was having an existential crisis about my project and my general ability to finish it.

Victor has been very essential to this project; particularly his familiarity with context was crucial to defining the project. And he always has a sympathetic ear to my frustrations with the complexities of the flawed democracy that is India. His guidance has been wide ranging from complex political issues to opinions on my contents page.

Both Victor and Mike have been insistent that I sketch for the project; I am sad to say I procrastinated this till the last minute. But I really had fun with sketches I did do and I am grateful that they encouraged me to do so. I would also like to thank Fransje Hooimeijer and Diego Sepulveda for providing me time to consult on key aspects of my project.

Lastly, but not the least; I would like to thank my friends who have stood by me during this graduation period. I would like to thank Jesse, Karishma, Kendra, Yue, Johanna, IJsbrand, Kseniya; all who helped with reviewing bits of text or graphics, or just general motivation. I would like to thank my research group, Design as Politics - Gustaf, Gereon, Yue (again), Alejandra, Serah, Floortje and Jorien; particularly for their support and feedback. And also, we had a really fun trip to London.

I would like to thank my house-mates: Magda and Chris who have been very supportive; often with wine during this period. Especially the time when I lost my voice during P2 and they both translated my frustrated signing and did my groceries when I could not. The simple things make the biggest difference. I would not have been able to graduate without them.

And I would also like to thank Turkuaz, Alois, Gerard and Ahmed for their love and support. I am also grateful to Ellen, my student counselor and Ingrid for being there when I needed them; especially when my OCD moments became a tad counter-productive.

1

Introduction

Project Definition

Sources

1.0. 'Mumbai is upgrading'. Original Photograph and edited image by Author (2018)

1.1 Abstract

India is urbanizing at a massive rate, and predicted to have 50% of its population classified as urban by 2050. The Mumbai Metropolitan region is an urban agglomerate that represents the emancipatory qualities of urbanisation while simultaneously showing signs of urban decay that reflects a poor urban strategy. This urban decay is however blamed on the city's rural-urban migrants who are seen to contribute to over-crowding in the city leading to a competition for urban resources. The project attempts to identify these labour migrants through various narratives and historic precedents of migration in the city to form an understanding of the shortcomings of the present Metropolitan regional plan. To understand this rural-to-urban transition in the city, the research project identifies that urbanisation neglects to consider the rural landscape that it seeks to change in present day growth models and seeks to propose an alternative strategy for urban India. Review of literature on the subject indicates that rural change occurs by land acquisition and change in land-usage, rural to urban migration (transference of poverty), reduction in the agricultural production and villages reduced to slum like conditions. The design project seeks to propose an alternative model for urbanisation that incorporates the agricultural economy to improve the edge city sub-region of Vasai-Virar with examples at various scales.

Keywords: urbanisation, rural landscape, urban agglomerate, land acquisition, labour migration

1.2 Project Motivation

A Bollywood anecdote

1.1

In their movie *Nostalgia for the Future*, a documentary on "the architecture of the home, modernity and the making of the Indian citizen" (Kishore & Shivkumar, 2017a), the directors Avjit Mukul Kishore and Rohan Shivkumar use a clip from a 1954 Hindi movie, *Amar*. They explain this in a discussion (Kishore & Shivkumar, 2017b) of the documentary screening: that the 1954 film can be read as a political allegory. In the movie, Dillip Kumar[i] is a lawyer; alluding to makers of modern India, many who were lawyers like Nehru (the first Indian Prime Minister) and Mahatma Gandhi. Kumar visits a village on business and is smitten by the local milkman's daughter despite being betrothed himself. On a stormy night, she seeks refuge in his house while escaping the village goon, instead of taking the typical role as a hero, he rapes her in what can only be speculated as a moment of insanity. She does not report the rape, and instead falls in love with him and he spends the rest of the movie torn by guilt (Khan, 1954). It is a bizarre plot, and most Indian movies do not cast an anti-hero in a central role, so it is understandable the directors would read this as a political allegory. The directors say that following India's Independence from its colonisers, Nehru set the country on a part towards modernity. Modern India was to be a cosmopolitan utopia, that would save the country from its rural backwardness and its former colonial callousness. And fast-forward to 1992, when our socialist leaning policies failed, a new era of neo-liberal economics would benefit the country instead. Throughout all of this, the agrarian roots of the country have been devalued by the urban politics that Kumar represents (Kishore & Shivkumar, 2017b). And despite this, like the village belle (possibly suffering from Stockholm syndrome), rural migrants move to cities looking to benefit from urban cosmopolitanism but struggle to be granted urban citizenship.

Shivkumar speculates that this has resulted in the "guilt of the modern Indian" (Kishore & Shivkumar, 2017b). Architects and urbanists are often products of modernism from last century and the guilt that comes with it. This is possibly a global phenomenon where industrialization and modernism have reduced local systems as inferior or inefficient and not just limited to India. But the consequences in India are pronounced. And as an Indian architect, who has benefitted from the cosmopolitan India that Nehru created in part, I am also a carrier of this guilt. Therefore, it seems apt that an urbanism project such as this would seek to study alternatives for urbanism to ensure that the city does not discredit its rural counterparts. •

The Lawyer (Kumar)
A well meaning urban planner spreading modern urban values to the countryside.

The village belle
The unsuspecting rural landscape, hopeful for development unaware of the consequences of urban expansion.

The activist
Advocating for cohesive rural and urban development.

1.2

Notes

[i] Kumar is a famous Indian actor who plays the titular role Amar (short for Amarnath).

Sources

1.1. Amar (1954) movie poster.
1.2. [Above] The plot thickens - a political allegory for the impact of modern urban values on the rural landscape.
Screenshots from Amar (1954) Re-visualised by Author (2018)

1.3 Introduction

Background: City, State and Nation

India is a federal nation. As of 2018, it is divided into 29 states and 7 union territories. Each state is marked with different levels of urbanization. States like Bihar, Assam and Himachal Pradesh (see map on p. 6) have lower levels compared to states like Tamil Nadu, Punjab, Maharashtra, Gujarat and the National Capital Region (NCR) of New Delhi. The latter states and the four mega-cities (Delhi, Kolkata, Mumbai and Chennai) have a higher level of per capita income and higher levels of in-migration (Bhagat, 2014).

Mumbai Metropolitan Region (MMR)

The Metropolitan area of Mumbai (MMR) is India's most populous metropolitan region together with the National Capital Region (NCR) of New Delhi. The MMR covers a region of 4400 sqkm and houses 21.7 million people. The region consists of 19 municipalities and 982 villages. Mumbai is also India's financial and entertainment capital. It boasts of GDP of $124 billion, the highest of all Indian cities. It contributes to 40% of the state's GDP and 6% to the national figure. One third of the income tax and 60% of Indian custom duties are generated in India (London School of Economics and Political Science, Cities Programme, Urban Age Project, Alfred Herrhausen Gesellschaft für Internationalen Dialog, & Urban Age India Conference, 2007; Nove-Josserand, 2013). Mumbai's governance involves intervention by the national, state and local levels. As the financial capital, the national government has a big stake in Mumbai with a number of powerful departments that provide services and resources for the city. Its characteristic as an economic powerhouse makes it favourable for migrants, both permanent and seasonal.

Two-thirds of the population - approximately 12.4 million people - live in the municipality of Greater Mumbai on one-tenth the area [1.6]. Attempts to move the population towards the northern and eastern regions of Thane and Navi Mumbai as new independent urban centres have failed. With two-thirds of the jobs located in Greater Mumbai, the residents of the outer suburbs commute to the centre every day, making the city very depended on its extensive urban rail system. Morphologically the city grew from the southern tip to the northern part of the island, and then eastward beyond the peninsular region. With 300km of suburban rail and 95 stations, making use of the city's linear geography, the trains carry 6.4 million people daily. But the city's over dependency on the rail-system has resulted in an unimaginable over-crowding for any other rail systems world over. Every minute, trains arriving at Chatrapati Shivaji Terminus and Churchgate Station inject 2,000 people into the southern city core (Rode, 2007).

It is estimated that by 2050 its population will grow to 30 million. The city produces 11,000 tonnes of waste every day which either straight to landfill (Deonar and Mulund landfills are the largest in Asia) or into the rivers. It is an example of a city that is outgrowing its location and infrastructure. Mumbai is the centre of many a crisis. Be it the floods, water shortage, overcrowding, crime, etc. Despite this, a thousand people migrate to Mumbai every day looking for better economic outcomes. Over 50% live in slums and some in makeshift homes, often on pavements (London School of Economics and Political Science et al., 2007).

But Mumbai is also an archetype of the developing world, that represents a more deep-rooted problem. One that seeks to abandon and strain its local systems in the pursuit of economic growth. •

Notes

1.3. A rough scale comparison of India with Europe, Maharastra with Germany and Mumbai with the Ranstad. India is a complex federal system with multiple states with their own cultures and languages comparable to the nation-states of the EU.

Image Sources

1.3. Compilation and Illustrations by Author (2018).

India
Federal Nation - 29 states
Union Territories - 7
Population 1.3 billion
Area - 3,287,590 sqkm
Population Density - 382p/sqkm
Languages - Official - 22, Main - 122,
Dialects - 1599, Scripts - 66
Elected Officials - 545/250

Maharashtra
Population - 101.5 million
Official Language - Marathi, English
Area - 307,713 sqkm
Population Density - 343 p/sqkm
Districts - 35
Main Languages Spoken - Marathi, English, Hindi, Gujarati, Parsi

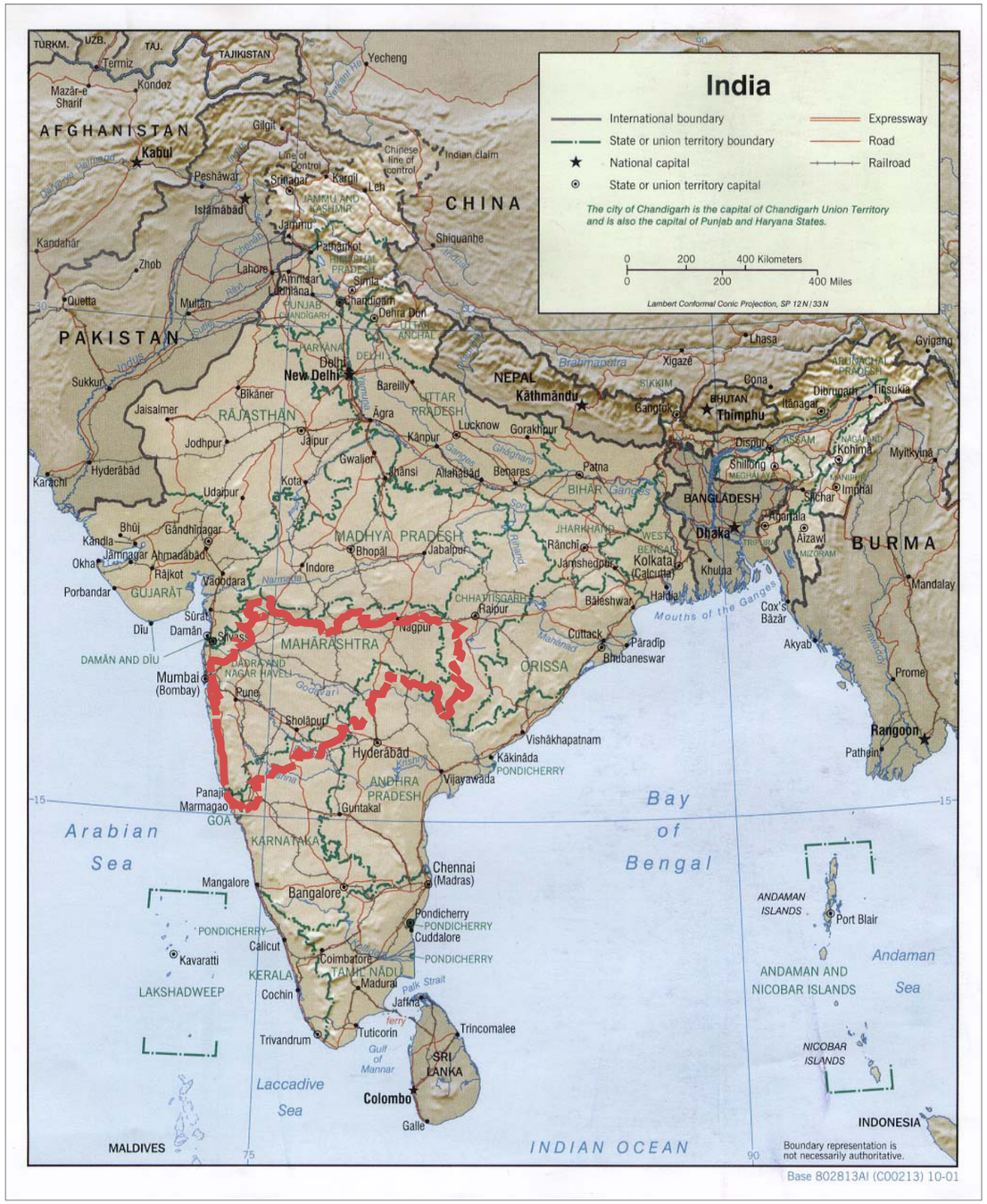
MMR
Population - 21.7 million
Area - 4355 sqkm
Population Density 4080 p/sqkm
Municipalities - 17
Villages - 994

European Union
The Republic of India in comparison to the European Union which covers 29 nation-states and 0.5 billion population.

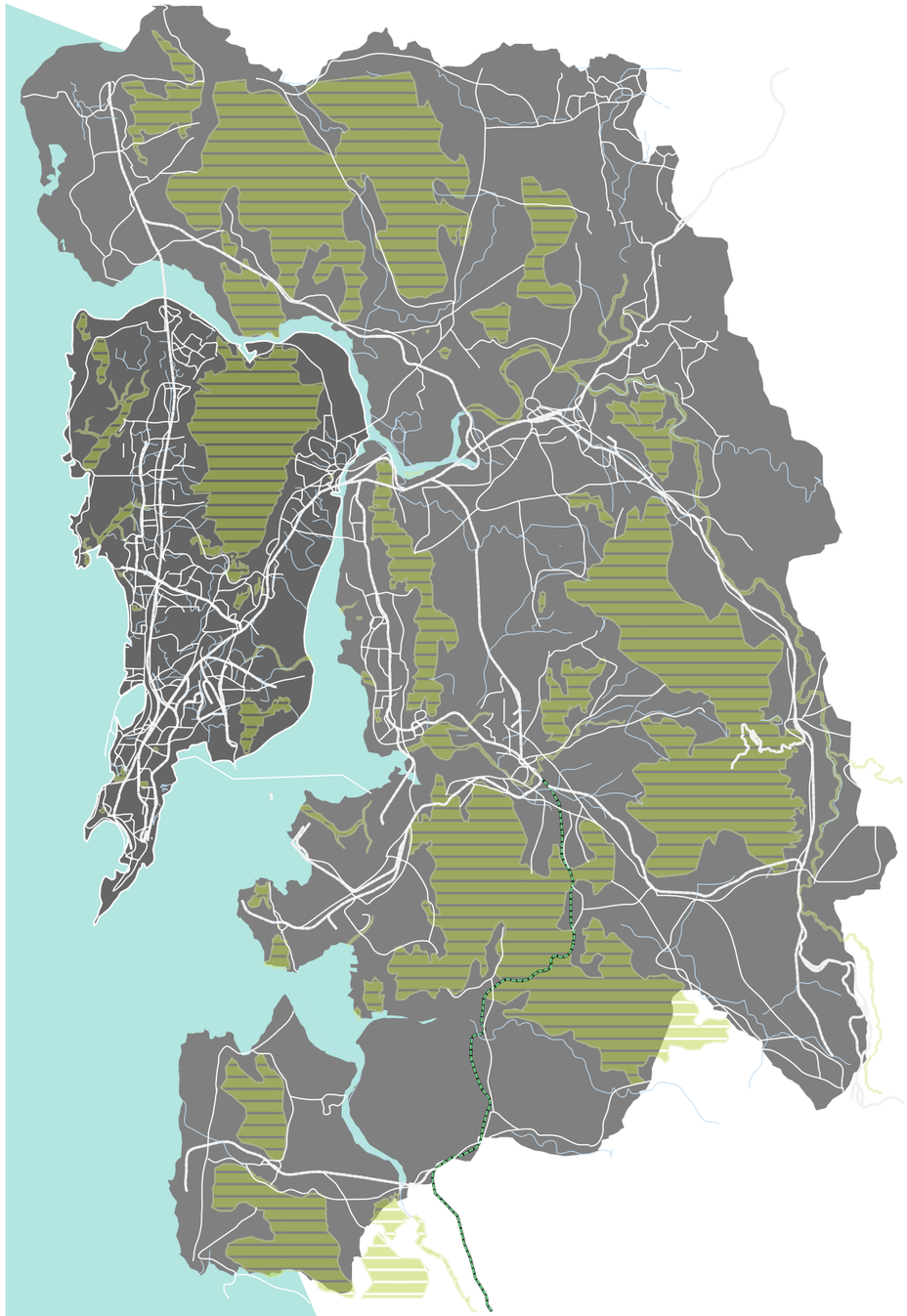
Germany
The State of Maharashtra in scalar comparison with Germany - 357,376 sqkm and a population of 83 million

The Ranstad
The MMR in comparison to the Ranstad, the Netherlands. The Ranstad houses a population of 8 million.

1.3



1.4



1.5

Mumbai Metropolitan Region (MMR)

Greater Mumbai

Mumbai Island City

1.6

Notes

Mumbai, formerly anglicized as Bombay is located next to the intersection of states Gujarat and Maharastra and is the capital of Maharashtra. Gurjarat was formally known for its traditional mercantile community and Maharastra for its farming.

Sources

1.4. Map of India, with location of Maharashtra, Mumbai's home state, since 1951. Source - (U.S. Central Intelligence Agency, 2001) Edited by Author (2017)

1.5. The Metropolitan Region of Mumbai (MMR). Source - Author (2018)

1.6. Location Map of Mumbai with urban hierarchies. Source - Author (2017)

1.4 Problem Field

A self-destructing but emancipatory machine

Cities can be a means of emancipation, positive economic outcomes, access to social and physical infrastructure, woman empowerment, and educational possibilities for rural-urban migrants. Labour migrants leave their agricultural vocations, to join the service industry in cities like Mumbai. But how sustainable is this labour movement? While migration increases is a positive factor in the life of migrants, it can simultaneously expose them to economic, social and environmental stressors. For instance, migrants in the city of Mumbai are exposed to many vulnerabilities like disaster and climate change, poor housing security, poor health and discrimination from linguistic regionalism. Additionally, the city's infrastructure systems are overwhelmed with the increased influx of migrants.

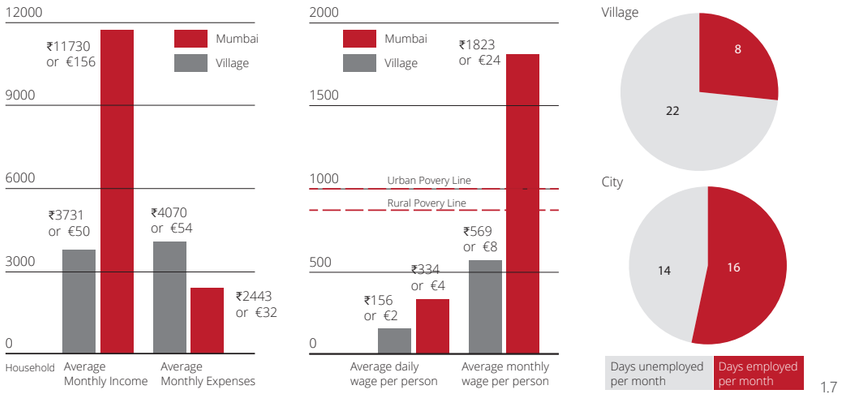
On August 29, 2017, Mumbai received 300mm rainfall in a span of 24 hours, leading to the city flooding. But this is not new, Mumbai floods every year during the monsoon (Nagendra, 2017). The man-made sewer systems are overwhelmed, and the natural drainage systems are clogged. A month later, on September 29, evening rush-hour at Elphinstone train station resulted in a stampede killing 23 people and injuring 38 (Chaubey, 2017). It is an example of how population growth has out-paced the city.

But cities cannot (and should not) curb or restrict rural-urban migration for self-preservation. They have a great emancipatory effect. They offer possibilities for better education, social mobility and women empowerment. In a survey of 60 migrants residing in Ghatkopur (a slum in Central Mumbai) by IndiaSpend, a non-profit data journalism initiative, found that each adult earned Rs. 1823 (approx. 24 EUR) per month. A salary that put them above the urban poverty line (Rs 1000 or 13 EUR) by 80% (Waghmare, 2016a). This is the dream that city of Mumbai represents in the mind of Mumbai's migrants.

At present Mumbai's solution to the land shortage, is to encroach into its hinterland. What does that mean for the city of Mumbai and its migrants?

Emancipatory Machine

1.7. [Left] Graph showing monthly income and expenditure for a rural-urban migrant household in Mumbai versus their home village. [Centre] Graph showing individual wages with respect to the poverty line. [Right] Days of employment of the average labour migrant per month, in comparison to urban and rural life.



1.7

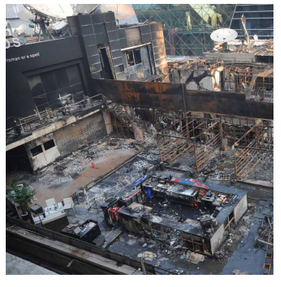
Urban Catastrophes

1.8.1

August 29, 2017. Flooded street in Mumbai after receiving more than 300mm of rainfall in a span of 24 hours. The natural and man-made drainage systems are blocked leading to annual incidents of flooding during the monsoon season.

1.8.2

September 29, 2017. Evening rush-hour at Elphinstone train station resulted in a stampede killing 23 people and injuring 38. The area around the station has densified rapidly and the infrastructure has been overwhelmed by the increased footfall.



1.8.3

December 28, 2017. there was a fire accident at the Kamala Mills Compound in Lower Parel area of Mumbai which resulted in the deaths of 14 people. Corrupt and overwhelmed authorities have been unable to reinforce building regulations.

1.9

Politicians are quick to blame migrants for the signs of urban decay in Mumbai. Actor turned politician, Hema Malini is quoted to have said that migrants entering the city should be regulated.

Notes

1.8. Self-destructing machine: Urban catastrophes in Mumbai reflecting overwhelmed infrastructure and governance systems.

Image Sources

1.7. Data source (Waghmare, 2016). Graphic redrawn by (Author, 2017).

1.8.1. Flooded street in Mumbai. Photograph Source (Kashyap, 2017)

1.8.2. Photograph of Elphinstone Stampede. Photograph by (Elphinstone stampede, 2017)

1.8.3. Photograph of Kamala Mills Fire. Photograph by (Padalkar, 2017)

1.9. Screenshot of an India Today Article describing politician Hema Malini's comments after the Kamala Mills Fire. Source (India Today, 2017). Retrieved by Author (2017)

1.4

Migration and natural growth of the city has forced it to expand over local eco-systems. Agrarian, fishing communities and forest villages all serve the city providing resources labour etc., The destruction of these local systems also extend to ecologically sensitive areas like wetlands, mudflats, saltpans and mangrove forests. This has far reaching consequences - intensified impact of natural disasters, declining agriculture and food insecurity.

Furthermore, the dependence on Greater Mumbai as the core city for livelihoods has overwhelmed the urban infrastructure.

The negative consequences of this is most visible on migrants as they struggle for formal housing, basic infrastructure and amenities. They form a section of the urban poor who struggle for urban citizenship; they wait in uncertainty for job opportunities in the construction or service industry. Some migrant women seek employment as sex workers as a means of livelihood, which is illegal and unregulated in India; putting them in vulnerable situations.

Planners and developers in Mumbai need to be more conscious of the impact of its urban expansion. Further, Mumbai as the city's financial capital has far-reaching consequences. It is a role model to smaller metropolises, towns and villages. Urban trends (like construction techniques, (un) sustainable practices can extend to a larger region. Particularly considering the circular nature of migration. •

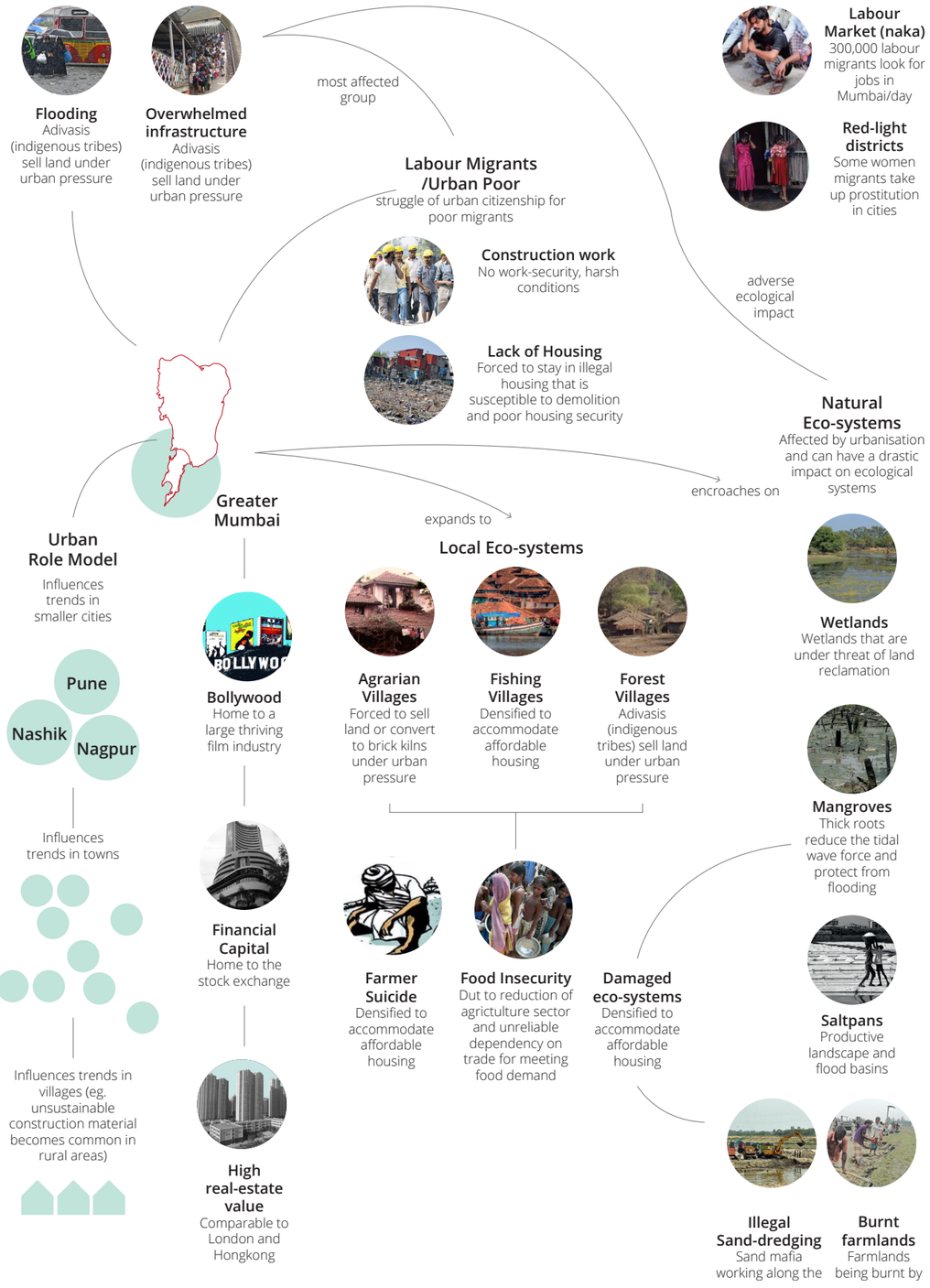


Image Sources

1.10. Problem Field. Illustration by Author (2018).

1.5 Problem Statement

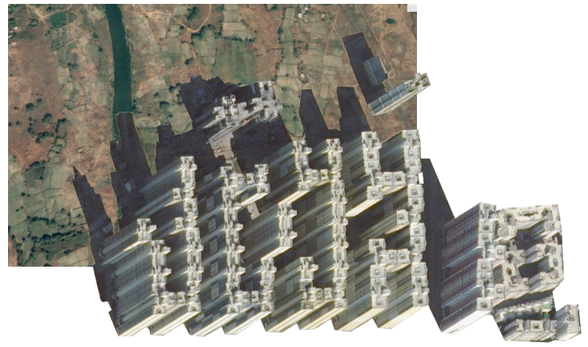
The urban bias in the regional planning processes

India is currently undergoing a rural-urban flux and one of the main reasons is that the country is in the midst of a relatively quiet Agrarian crisis. While the 1970s and 1980s were seen as a glorious period for farmers with supportive policies from the national government, successive governments have seen a demise in public sector investments into agriculture. The 1990s saw a decade of major economic liberalization and reforms, resulting in immense urban expansion, with policy makers focused on urban housing, social and physical infrastructure for cities, with less focus on rural development (Sharma & Vora, 2017). Also, there has been a shift in national policy from ambitions of food self-reliance to importing food from African and BRIC countries. But this shift in policy has resulted in high rates of rural unemployment (Sharma, 2017). Additionally, the National Crime Records Bureau has reported high rates of farmer suicide, with 11,458 in 2016 and 12,602 in 2015. Maharashtra, the home-state of Mumbai, has seen the highest rates with 4291 deaths in 2015 (Kedia, 2017).

The National Skill Development Council has laid a target of reducing the population engaged in agriculture related jobs from an existing 57 percent to 38 percent in 2022, in the name of economic reform. This is with the belief that it is essential to move the bulk of the population from rural areas to cities for economic growth. Traditional food production would be replaced by corporate farming and food imports (Sharma, 2017). Mumbai is expanding its boundaries, acquiring the villages of its immediate hinterland to be reclassified as “urbanisable” land. The rural landscape is being rewritten without contemplation of the consequences to the social, economic and cultural fabric of these areas.

The problem statement can be defined as follows, there is an urban bias in regional planning in the Mumbai metropolitan region that favours specultative real-estate development and industrial growth that displaces typically non-urban livelihoods (labour migrants, indigenous tribal groups, fishing communities, farmers, etc.,) and encroaches the peripheral ecologies of the MMR leading to an unsustainable future.

This bias is leading to a large-scale urbanisation in India. But, can and should Indian metropolises alone support the aspirations of 1.3 billion Indians? The quality of life that rural-urban migrants can anticipate are abysmal. They transition from rural poverty to urban poverty, with the benefits of a few urban systems. The romanticisation of labour migrants needs to be critically looked at and urbanists should seek to create opportunities for urban livelihoods linked to rural roots. •



1.11
Speculative Land Acquisition from farmers for real-estate.

1.12

Displacement of typically non-urban livelihoods (labour migrants, indigenous tribal groups, fishing communities, farmers, etc.,) due to the urban biases in planning processes in the metropolitan region.

1.13
Informal and formal urbanisation of ecologically sensitve areas like mangroves with consequences of flooding.

Sources

1.11. Speculative Land Acquisition. Original Maps ESRI (2016). Collage by Author (2018).

1.12. Displacement of non-urban groups. Original Photographs [Left-to-right]: Fishing women, Woman from the Warli tribe (Menon, 2014), Farmer in Vasai (MS Gopal, 2011) and Rural-Urban Migrant (Nikam, 2016) displaced from Latur. Collage by Author (2018).

1.13. Disregard for Urban Ecologies. Original Image (Kakatkar, 2010) Edited by Author (2018).

1.6 Research Questions

Background

The urbanization of the Indian populace is an ambitious project to provide better economic development for rural dwellers. By 2050, it is estimated that nearly 50% of India's population will live in cities or towns. The future of the Indian village is to become a suburb to the Indian city. This research hypothesizes that the rural livelihoods being urbanized need to be accommodated and not obliterated for effective and sustainable urban change. Review of literature on the subject indicates that rural change occurs by land acquisition and change in land-usage, rural to urban migration (transference of poverty), reduction in the agricultural production and villages reduced to slum like conditions.

As defined by the Design as Politics studio, this project can be defined as with terms conflict, position and price. The conflict in this project is the shifting lines between the urban and rural divisions. The project positions itself as a negotiation. It seeks to mediate the emancipatory qualities that the city bestows on the labour migrant, without compromising its own existence. It seeks to mediate the community model of the hinterland without losing the benefits of urbanisation. The price of this mediation is that both the city and its peripheries cannot retain its current state of real-estate driven urbanisation.

Ultimately, this project seeks to address the growth of Mumbai's hinterland to ensure sustainable development of the region and its inhabitants.

Main Research Questions

In what way does regional planning in the Mumbai Metropolitan Region manifest an urban bias in development processes that results in a rural to urban population flux?

How can development and planning processes in Mumbai encourage balanced growth with equal emphasis to agrarian or rural lifestyles?

Sub-research Questions

1) What constitutes the rural conditions in the metropolitan region of Mumbai? And in what way is the rural landscape transforming in the process of urbanization? *[Literature review – which frames the rural landscape as rural land ownership, rural populace, physical village forms and agricultural production]*

2)How does the city of Mumbai facilitate (or disallow) a migrant's right to the city? *[Access to housing and basic services in Mumbai]*

3) How does present day urbanisation affect rural livelihoods in the MMR? *[Casestudy of rural-urban migrants from newspapers, journals, documentaries etc, and analysis of urban villages and slums, new "urbanisable" land status for rural areas, speculation and blight, food security and agriculture jobs]*

4) How can urbanization effectively transform rural livelihoods to meaningful urban citizenship, without compromising the quality of life in the city? *[designing urban typologies with opportunities for rural livelihoods]*

5) What is the current form of urban governance in Mumbai, and how must it be redefined to be a more effective facilitator of positive spatial change?
[Literature review with case studies for policy change]

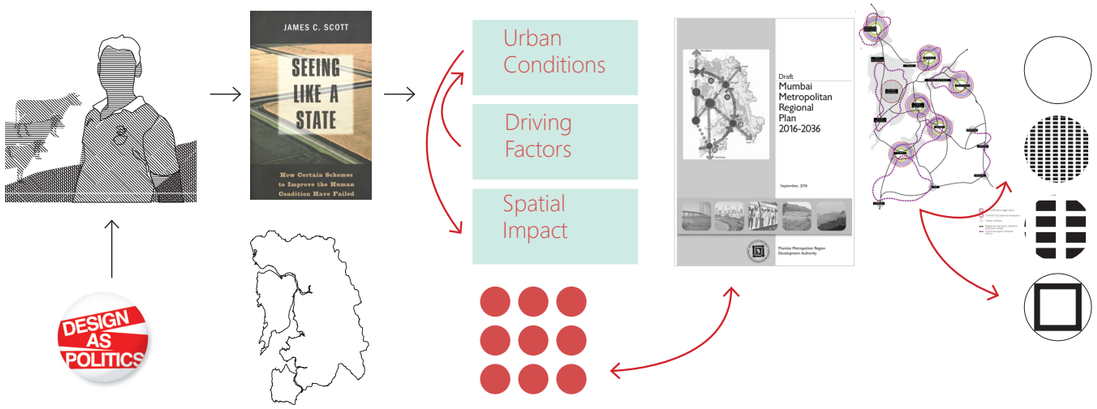
6) What is the present model of urbanisation as per the development authority plan and what interventions require to improve the effectiveness and sustainability of the master plan? *[transport oriented, urbanisable land, etc, should include provisions for stronger civil society, etc]*

7) How can urban development marry pro-environment and pro-poor initiatives in a spatial manner? *[design strategies]*

1.7 Methodology

Preview, methods and project structure

Project Preview



Design as Politics
The studio looks at *Cities of Comings and Goings*; a research on cities dealing with issues of migration. Narratives of rural-urban migrants is the starting point for this project.

Literature Review
A study of how the rural landscape is affected by urbanisation with respect to the Mumbai Metropolitan Region backed by *Seeing Like a State* by James C. Scott

Themes
Looking at the metropolitan region through 9 themes - a study of urban conditions, driving factors and the spatial impact

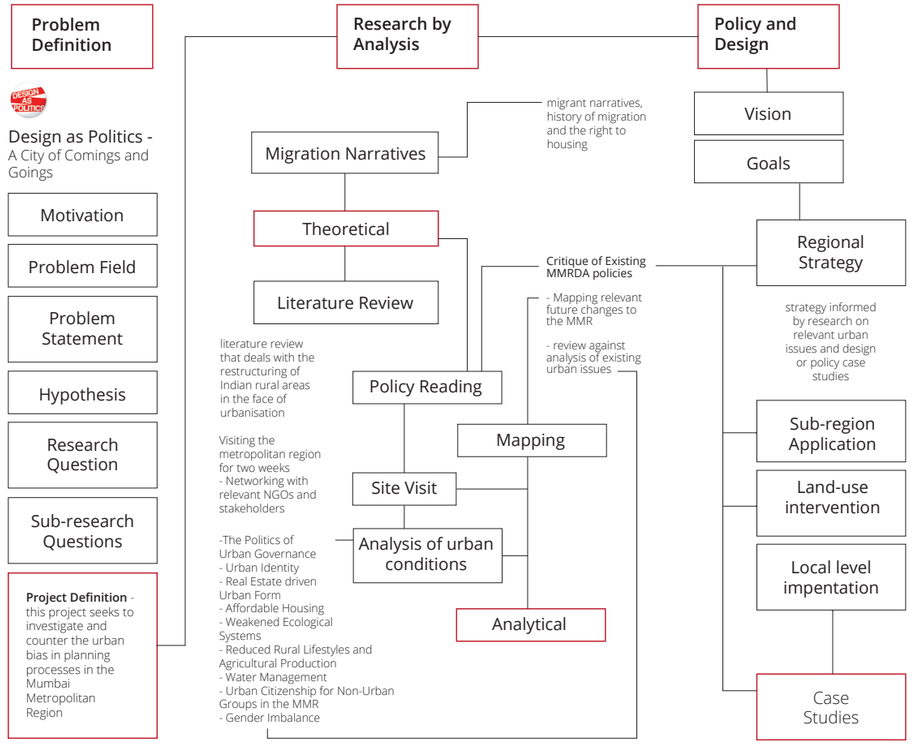
Policy Review
The themes identified in the urban system are evaluated against the policies proposed for them or ignored altogether in the regional plan for MMR 2016-36.

A new structure for the MMR
Supported by strategies at various scales - region, sub-region, local and policies to ensure growth.

1.14

The project uses literature review of books, journals, case studies policy documents, newspaper reports, mapping and site visit to establish the basis for the research.

Project Methodology



1.15

Sources

1.14. Project Summary. Illustration by Author (2018).

1.15. Project Methodology. Illustration by Author (2018).

1.8 End Products

Identifying and countering the urban bias

Identifying the Urban Bias

1. Collection of migration narratives to understand the city's history of migration from rural to urban areas. It looks at Mumbai's evolution from a collection of fishing villages to its current form. It also looks at narratives of rural-urban migrants to inform conditions of present day labour migration.

2. Literature review of Seeing Like a State by James S. Scott to understand the impact of development models on local tradition systems. Includes supporting literature to study Mumbai's potential impact on its immediate rural landscape. Some literature have a direct correlation, while other literature talks about India in general or the state of Maharashtra.

3. Review of urban conditions, driving factors and the spatial impact based on a set of research themes.

4. Policy review of the metropolitan region development authority's regional plan for 2016-36; reviewed against the research themes including an overview of the authority's goals, strategies an overview.

Countering the Urban Bias

1. A new strategy that combines urban and rural values for the development of edge cities in the MMR.

2. Developing a policy and design toolkit to implement the regional strategy set around the research themes.

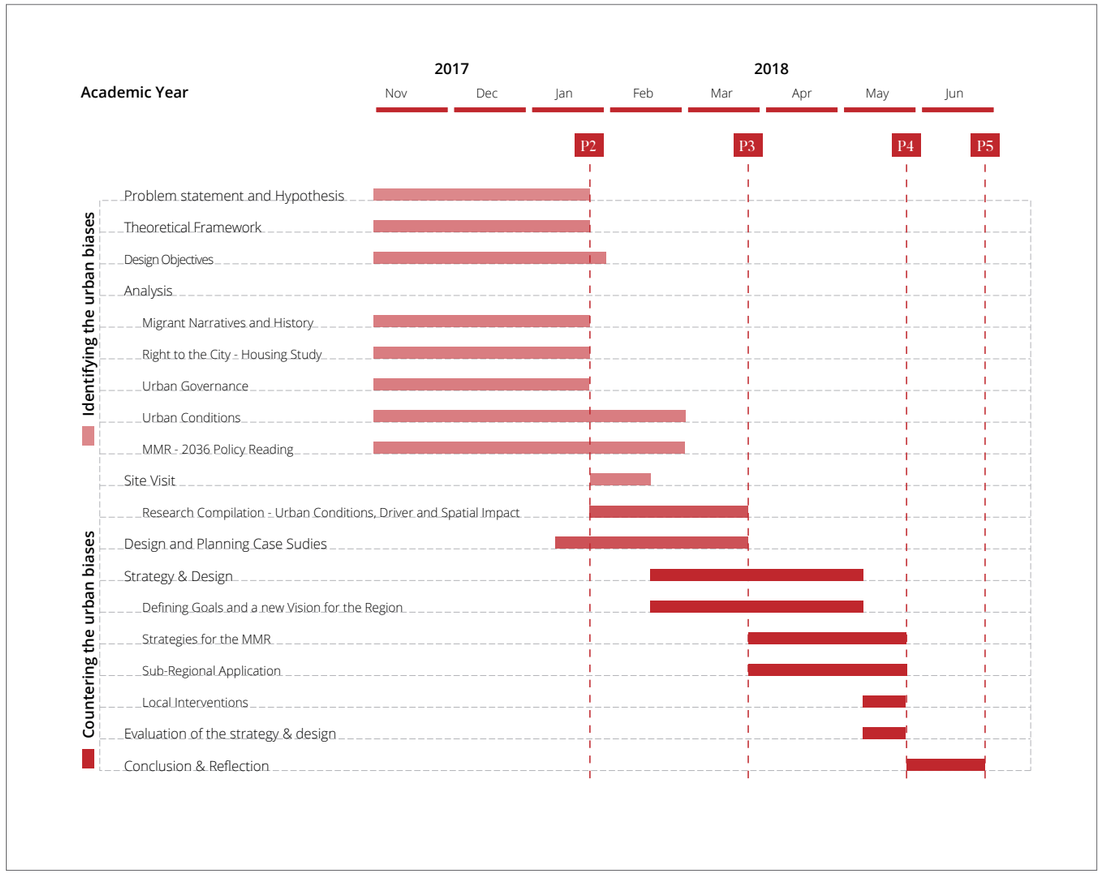
3. Different elements of the policy and design toolkit are tested at various scales

    a. Effects on a hypothetical village at the edge of urban transformation.
    b. The decentralisation of the Vasai-Virar sub-region with defined roles. Project proposal for various land-use types to address the regional strategy.
    c. Land-use intervention - Redefining a program and spatial realisation of the future of the salt-pans
    d. Pilot Project to initiate the transition at a local scale
    e. Define a new role for the metropolitan governing authority.

4. Spatial Impressions to convey experiential qualities of the proposal for Vasai-Virar sub-region project interventions.

Time Frame

Planning for graduation time management



P1 Goals
Formulate project idea under a research group with elaboration on the problem field, main and sub research questions, hypothesis, methodology, and project framework.

P2 Goals
Refine project introduction. Literature review to back up the project. Partial conclusion of research with supporting analysis and recommendations to proceed towards design.

P3 Goals
Summation of trip visit and additional input into research. Developing a design strategy that best addresses the analysis of the research stage. Supporting case studies to justify project.

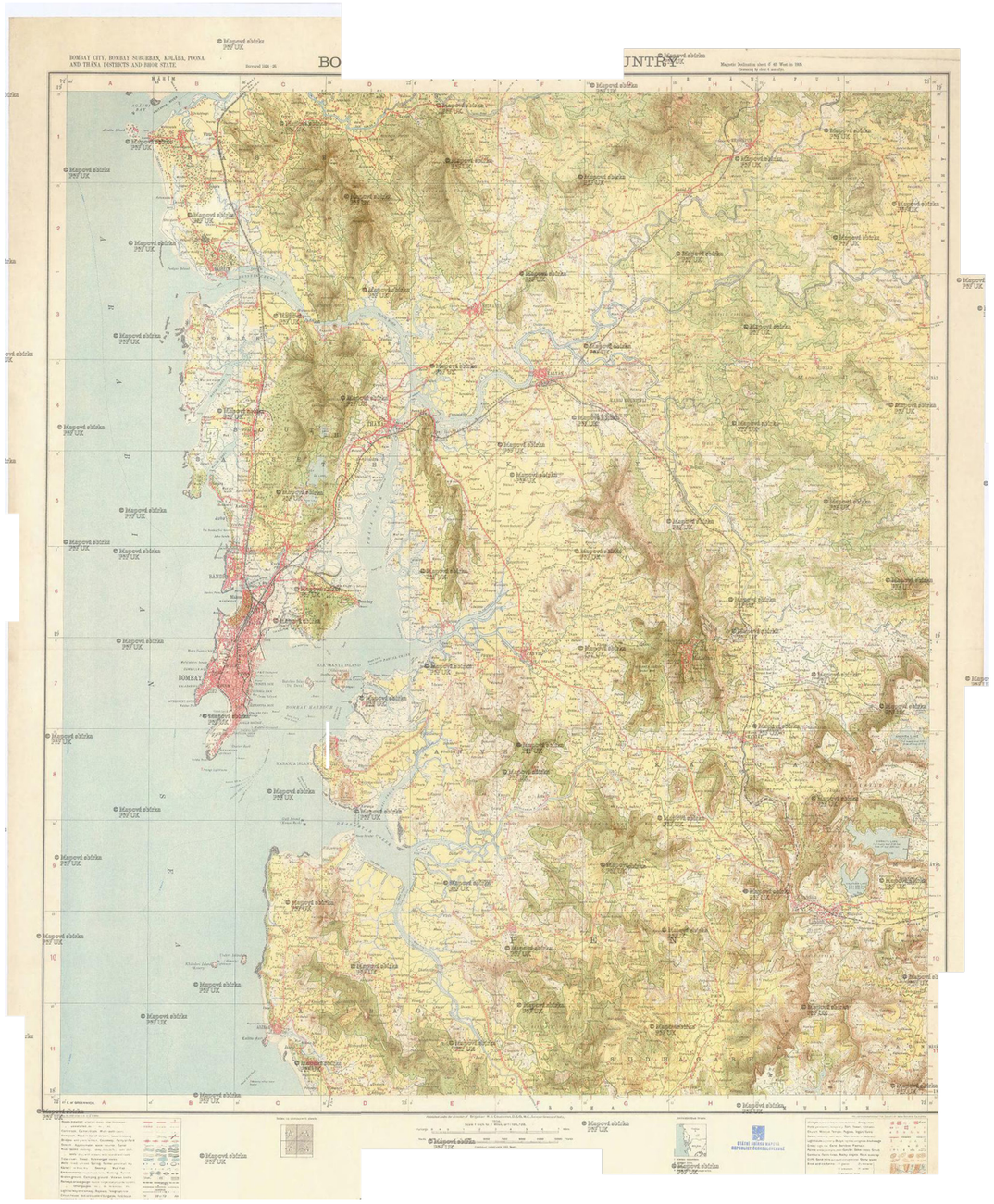
P4 Goals
Final design narrative with a report, presentation and poster. This stage with preliminary products - new vision, regional strategies, sub-regional stratetegies and localisation of the project.

P5 Goals
Elaboration of report and final presentation. Conclusion and reflection of the project.

2

Migration Histories

Identifying the urban bias through narratives on migration



Sources

2.0. 'Bombay and Surrounding Country' depicting the extents of modern day metropolitan Mumbai between 1924-1926. Published in 1934. Map Source - (Calcutta : Survey of India, 1934)

2.1

Historical Background

A short (but fairly long) history of migration and urbanisation in Mumbai

Two decades of repeated Portuguese assaults on the western shoreline of the Indian sub-continent.

1532

The Portuguese Governor-General of India assaulted the Fort of Bassein (now Vasai) with a fleet of one hundred vessels, forcing the ruling Gujarat Sultanate to concede Bassein and its surrounding territories.

1668

By 1668, the Crown leased Bombay to the East India Company who saw to develop the islands as a potential commercial hub to rival neighbouring ports like Surat and Vasai

The British East India Company

1686

The Company moved its western headquarters from Surat (now in Gujarat) to Bombay, now a fortified walled town

Few sparsely populated villages.

Vasco da Gama lands in Calicut on May 20, 1498

1534

The Treaty of Bassein 1534 surrendered Indian claim over the seven islets that constituted Bombay to the Portuguese king.

1661

The Portuguese gifted Bombay to the British Crown, when Charles II married Catharine of Bragazna.

Population of **10,000**

Portuguese British Crown

When the British gained control of the islands, it was barely 18 square miles (45 sq. km) of land. Land had to be reclaimed to make it commercially more viable.

Hindu, Muslim and Zoroastrian merchants from wealthy mercantile communities of Gujarat flocked to Bombay.

To understand rural-urban migration in Mumbai, it is important to contextualize the city and the flow of people in the city's history. Mumbai reigns India as its financial capital. Unlike its political counterpart, New Delhi, it was never an indigenous Indian city (Mehrotra, 1991). It was but a few sparsely populated villages. Mumbai's genesis, erstwhile Bombai, began when Vasco da Gama disembarked on the south-western coast of India, in the city of Calicut. The next two decades followed repeated Portuguese assaults on the western shoreline. In 1532, the Portuguese Governor-General of India assaulted the Fort of Bassein (now Vasai) [image] with a fleet of one hundred vessels, forcing the ruling Gujarat Sultanate to concede Bassein and its surrounding territories. The Treaty of Bassein 1534 surrendered Indian claim over the seven islets that constituted Bombay to the Portuguese king. The indigenous people of the island lived by farming, fishing and trade. The conquest did not affect their economic livelihood but were subjected to extreme religious fanaticism (Prakash, 2010). A similar form of fanaticism echoes in present day Mumbai in the guise of right-wing regionalism.

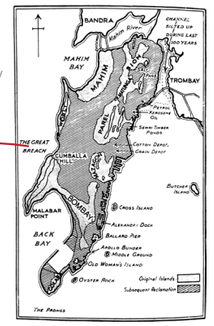
While the Portuguese primarily pioneered for Christianity and trade, they opened the doors for other European maritime travellers (Prakash, 2010). In 1661, the Portuguese gifted Bombay to the British Crown, when Charles II married Catharine of Bragazna. The gift came as a "surprise" to the royal family, who initially speculated that the islands were "somewhere near Brazil" (Perur, 2016). By 1668, the Crown leased Bombay to the East India Company who saw to develop the islands as a potential commercial hub to

Official of the East India Company. 17th century painting by Dip Chand.

The Hornby Velard, an embankment planned under the governorship of William Hornby was completed, protected low lying areas from floods. This allowed for additional reclamation.

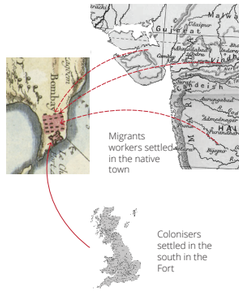
1738

The Hornby Vellard connected Malabar Hill to Worli and prevented the low lying areas of Bombay from flooding and open to reclamation



1838

Bombay grows as a port city and a hub of commerce



Population of **60,000**

Bombay represented equal opportunity for both European and indigenous traders who flourished through the port.

Migrants from rural areas come to Mumbai in search for better lifestyles.

1838 the reclamations had converted Bombay from seven islets to a single island.

1853

First train between Bori Bunder to Thane

rival neighbouring ports like Surat and Vasai (Gupta, 1999; Karmarkar, 2014).
When the British gained control of the islands, it was barely 18 square miles (45 sq. km) of land. In order to make the city more economically viable, land had to be reclaimed from the sea.

In 1686, the Company moved its western headquarters from Surat (now in Gujarat) to Bombay, now a fortified walled town. Hindu, Muslim and Zoroastrian merchants from wealthy mercantile communities of Gujarat flocked to Bombay. During this period, the population of Mumbai rose from 10000 in 1661, to 60000 (Gupta, 1999). The city was segregated with the merchants settling in the northern parts of the city as the "native" or "black" town, with the colonisers settling in the south.

During the 18th century, the new port city flourished with the influx of immigrants, with some even settling beyond the fort walls. The growing population needed more space, leading to reclamation of land submerged below the sea. In 1738, the Hornby Velard, an embankment planned under the governorship of William Hornby was completed, protected low lying areas from floods. This allowed for additional reclamation. Despite the demographic and geographic growth it remained a remote British outpost, due to poor connectivity with the rest of India. Following the abolition of the Company's monopoly on the Indian Ocean in 1813, the city grew exponentially with an influx of private European traders. Additionally, the private traders circumvented around the Company's monopoly on Opium trade with China by importing Opium from Malwa in Central India. The high profit margins "strengthened colonial government's monetary reserves, paid for the costs of the empire, and filled the coffers of Bombay's mercantile community". And by 1838 the reclamations had converted Bombay from seven islets to a single island (Prakash, 2010). With the city's economy flourishing, the shipbuilding industry migrated from Gujarat. Many flourished from the opium trade not only the Europeans but also the Parsis,

Sources

2.1. Time-line Part 1 featuring 16th century to mid-19th century by Author (2018)
Images sourced from the public domain and edited by Author.

India reverts back to the British Crown

1857

The East India Company could maintain its authority through an army of 45,000 Europeans and 230,000 Indian sepoys. While most sepoys were proud to serve in the army, their loyalty to it always took second place to their religion – there was among the British a Protestant agenda to convert the Indian masses to Christianity.

The Sepoy Mutiny or the First War of Independence was crushed by the Company but led to widespread devasatation all over the country.

1858

The Indian revolt brought to light grave defects of the governance systems of the East India Company, forcing the Government of India Act 1858. The Act called for the liquidation of the East India Company and India was reverted to the British Crown.

Population of
566,000

1857

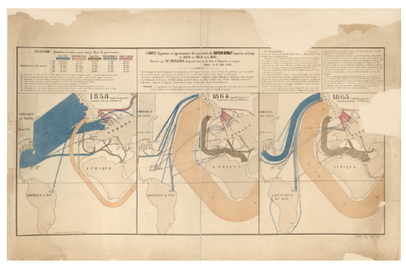
Local train service commences between Virar and Backbay

1867

The Crown's commitmen to social welfare of the native population was reflected in the breakout of the plague.

1896

In parallel to the drug trade, Indian merchants also developed a thriving cotton industry. The American Civil was in the 1860s had led to a shortage of cotton imports in England, allowing the Indian cotton industry to succeed. Cotton supplies from the region moved through Mumbai's port to be dispatched to England.



1872

Establishment of the bombay Municipal Corporation

A number of cotton spinning and weaving mills were established in the late half of the 19th century, offering employment opportunities for many (Prakash, 2010). The industry was dependent on the Chinese yarn market, and faced heavy discrimination from the Colonial policies reducing competition for English textiles.

Hindu Banias, Marwaris and Konkan Muslims. Unlike the Eastern parts of the country, the East India company did not have complete autonomy over the Western region, allowing indigenous businessmen to flourish. This suited the British, who depended on Indian merchants for facilitating cotton and opium exports to China. In 1859, then a flourishing port city, Mumbai's population was recorded as 566,000 (Prakash, 2010). It had nearly quadrupled in a span of two decades. Simultaneously, the Indian revolt of 1857 brought to light grave defects of the governance systems of the East India Company, forcing the Government of India Act 1858. The Act called for the liquidation of the East India Company and India was reverted to the British Crown.

In parallel to the drug trade, Indian merchants also developed a thriving cotton industry. The American Civil was in the 1860s had led to a shortage of cotton imports in England, allowing the Indian cotton industry to succeed. Cotton supplies from the region moved through Mumbai's port to be dispatched to England. The thriving industry contributed nearly 75 million pounds to Mumbai's wealth, allowing the growth of the stock companies, banks, insurance agencies and the like. But following the end of the American Civil War, the prices of raw cotton plummeted forcing the industry to diversify. A number of cotton spinning and weaving mills were established in the late half of the 19th century, offering employment opportunities for many (Prakash, 2010). The industry was dependent on the Chinese yarn market, and faced heavy discrimination from the Colonial policies reducing competition for English textiles. Mumbai's economy was built on shaky ground under severe trade constraints. But despite this, it profited due to the availability of cheap labour. Migrants flocked to the city from the city's immediate and extended hinterland. The demographic, economic and colonial pressure on the countryside forced many from the countryside to seek urban employment. By the 1910s the city reached a population of one million. The demographic was rich in both religious and linguistic diversity. The city offered professional commercial occupations to industrialists, bankers, brokers, shipping

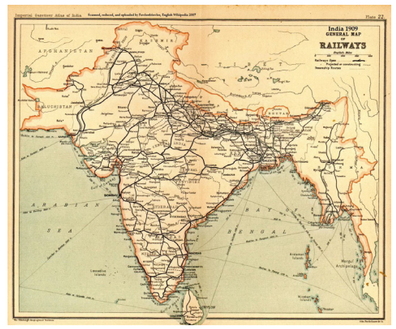
The epidemic threatened colonial and economic order, forcing the British government to Bombay City Improvement Trust in 1898 that would focus on physical infrastructure and housing.

1898

Establishment of the City Improvement Trust

1909

Extensive railway network all across the country



While the construction of the railways have been pointed out by colonial apologists as benefitting the sub-continent; it was conceived by the East India Company to extract resources like coal/iron/cotton to ship to Britain. It followed discriminatory practices against the native population who were not allowed to travel in the same compartments as the British.

The demographic, economic and colonial pressure on the countryside forced many from the countryside to seek urban employment.

1910

Population of
1,000,000

1928

Civil Aviation begins with the Juhu Aero-dome

The citizens of such colonial cities were expected to work in commercial capitalistic institutions or cheap labour all encased in Gothic revival architecture.

1943

Bengal famine leaves 3million dead; British government denies request from viceroy to stop food exports.

Exarcebates unrest in the country against the Crown

1945

The Crown musters a 2.5 million volunteer force from India to fight in the World War II.

The war leads to dissent and economic distress paving way for India's Independence.

agents, etc. And simultaneously offered opportunities for artisans, dockworkers, mill-hands and casual labourers. But Mumbai was built on colonial conditions, on cheap labour with bare minimal social and physical infrastructure. The Crown's commitment to social welfare of the native population was reflected in the resultant plague epidemic of 1896-97. The epidemic threatened colonial and economic order, forcing the British government to Bombay City Improvement Trust in 1898 that would focus on physical infrastructure and housing. Its establishment signaled a turn in colonial urbanism (Prakash, 2010).

The citizens of such colonial cities were expected to work in commercial capitalistic institutions or cheap labour all encased in Gothic revival architecture. And simultaneously,

> "[...] settle their disputes in British courts, study in Western-style schools and colleges, travel on new roadways and rail-ways, write letters delivered by the postal system, stroll in its arcaded walkways, relax and play sports on the *maidans*, and value the public space of fountains and squares marked by the statues of imperial figures. There was never any doubt that entry into this urban order was conditional on the acceptance of colonial authority, that alien power and culture underpinned the public space of avenues, parks, educational institutions, and learned societies. There was also little likelihood that the poor could live the ideal of colonial urbanism, but then this ideal was staged as the pedagogic model that the natives were expected to learn from and emulate."
>
> (Prakash, 2010)

While Mumbai's elite conformed to colonial urban society living in mansions, its poor lived in mud-shanties. The labour migrant coped with the uncertainties of the urban life by maintaining links to the village. Migrants erected shanties and village-structures in the city as a means to resonate social and cultural heritage. This was the origins of Mumbai's identity as a city of two worlds.

Sources

2.2. Time-line Part 2 featuring Mid 19th Century to Mid 20th Century by Author (2018)
Images sourced from the public domain and edited by Author.

2.2 Narratives on Migration

Migration in the MMR

In the 2001 census, 43.7% of the population were migrants (Jha et al., 2015). While the city observes permanent and semi-permanent migration, large parts of Mumbai's migrants are seasonal migrants. This form of temporary migration occurs amongst the poor and socially disadvantaged groups. It is a "a livelihood strategy amongst rural households" (Bhagat, 2014). These migrants originate from the home state of Maharashtra (37.4%), Uttar Pradesh (24.3%), Gujarat (9.6%), Karnataka (5.8%) amongst other states. Most migration data sources are from the 2001 census. Figures for this decade are unclear or are from other private sources. These migrants do not have legal housing arrangements, they appropriate public spaces, pavements or otherwise unoccupied parts of the city (like areas neighbouring landfills). They are often subject to bad weather, lack of sanitation facilities, no access to potable water, no personal security, no education or health services. These migrants are predominantly male, who cite "work/ employment/business" as the main reason for migration (Jha et al., 2015). However, national figures show that there is an increase in female migration after marriage. It would seem that men move to the cities for better employment prospects and their wives/ children move after the male migrant settles down. Hence, there has been a significant increase in the female migration workforce (Bhagat, 2014).

A deepening agrarian crisis in the rural areas of India causes these farmers to move. In her book Street Corner Secrets, Svati Shah (2014) writes,

> "Poor, working-class people who migrate to cities like Mumbai are members of the legions whom globalization has further dispossessed, as evidenced by the rising rates of farmer suicides and malnutrition in rural areas, where neoliberal economic reforms have reduced or eliminated agricultural subsidies and forced farmers to compete in global markets amid unstable prices for commodities like cotton and sugar. Deepening poverty in rural areas has meant that survival for landless workers there is decreasingly viable, prompting greater numbers of people to migrate for work and contributing to an expanding pool of labor in urban informal economies." (Shah, 2014)

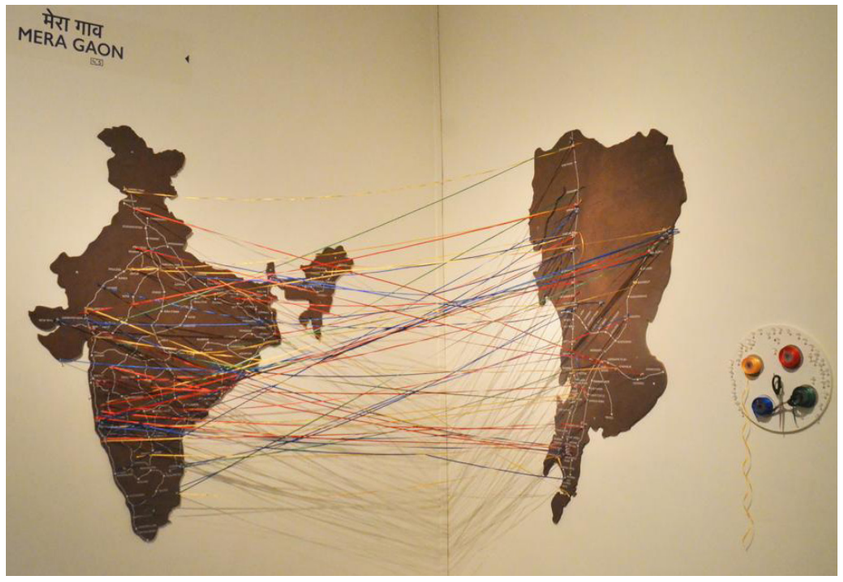
Until the economic crisis of the 1980s, cities in the developing world comprised of permanent vocations backed by a low-wage service oriented jobs. However, these cities today have dramatically changed, with informal temporary service jobs taking the forefront. These jobs include small unlicensed shops or street-vending sites, domestic work, short term work construction or manufacturing (Saunders, 2011). Many former agricultural workers, now survive through Mumbai's day wage labour markets, located in different parts of the city. These are city squares or street crossings with labourers seeking daily wage employment can be recruited by potential employers or contractors. These markets are held in the morning and are called mazdoor nakas. Shah (2014) documents that some of these migrants have been in Mumbai for twenty years, some for a few months. For some, their lives in Mumbai is a part of a circular itinerary, seasonal migration. They all lived with poor or no access to basic municipal services, no water, no stable housing and uncertain incomes. For the women, some negotiations for economic survival included sexual commerce (Shah, 2014).

Notes

2.4. 'Mera Gaon' - photograph of an exhibition which looks at patterns of reversible migration between village-city and the consequent mobile lifestyles that devlop. In super installation a visitor can participate by putting one pin on the place from where their family migrated from and another pin on where they live now in the city with bright ribbons. And if you originated from the city, you get to put two pins in the same place of your origin.

Image Sources

2.4. 'Mera Gaon' - Exhibition Source - (Bhau Daji Lad Museum & Nair, 2017).



2.4

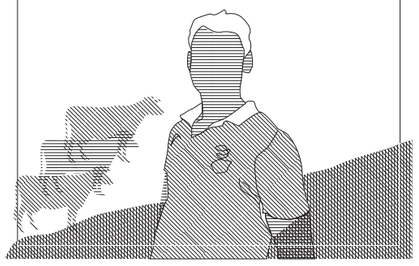
2.2 Post Card Stories of the Rural-Urban Flux

These stories are illustrative of migrants and the conditions that they are exposed to due to urbanisation.

"Since we stay just 5 km from Udgir city, the children were getting water to drink through tankers coming from the municipal area [but it] wasn't enough for my cattle, and I could not see them die in front of me. So, I let them drink our share of water, and came here to earn."

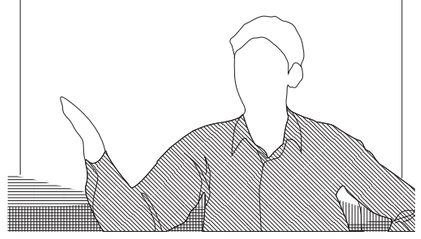
After two successive years of drought, Babban Chavan, 25, a farmhand and owner of 10 goats and two cows, left his family (wife, four children and ailing parents) behind and migrated 550 km from his home in arid Latur in southeastern Maharastra. Working in Mumbai's construction industry, he earned Rs 900 every day, triple the Rs 300 he earned back home. He moved from an unskilled labourer to a skilled construction worker. He aspires to become a construction supervisor, he hopes the his children will become graduates and find jobs in the city.

-(Waghmare, 2016b)



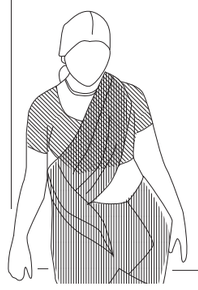
"If I can't go and earn in Mumbai, I can't support my family. I want to earn as much as possible, so that I don't have to stay there too long each time, then I [can] come back and spent time with my family. After all I have a life too, I too miss my family. What if I die in Mumbai? My family wouldn't even know."

- Sunil Pal (Leahy & Fontanella-Khan, 2010)



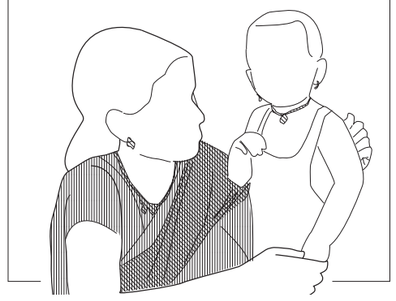
Marathwada farmhand Yashodabai, 38, lives in a home of four bamboo sticks and two tarpaulin sheets in the central Mumbai suburb of Ghatkopar. There is no electricity or water. It is either too hot or too wet. When it rains,food—cooked and raw—clothes and medicines get wet. Still, she came to Mumbai during the summer heat, travelling 600 km from her drought-hit village in southeastern Maharashtra. Despite the privations of the city, she and her husband, Govind, can feed three of the six children with them and earn enough to, hopefully repay a Rs 1.5-lakh (2000 euros) loan from a moneylender.

-(Waghmare, 2016c)



Sunita Ram Rathod, 32, has taken a day off from construction work to deal with unfinished household business, washing utensils and clothers. In her 30s, Sunita washes utensils with grey-coloured, sewage-like water and places clean utensils on the ground, where sand is also contaminated by sewer water. A housewife and a farmhand, she migrated 550 km in March from her village, Marsangvi in the south-eastern district of Latur, after two successive years of drought.

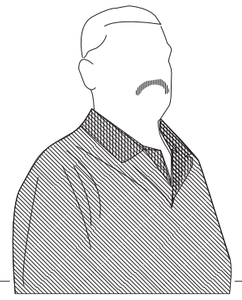
-(Waghmare, 2016b)



"I was like other migrants when I arrived here. After I got married, I sold my wife's jewellery to start [a sweets and snacks] business. Mumbai is the place where hard work pays. You can achieve anything and everything here. "

-Krishna Murti Pillai (Krishna convinced his wife to use gold they were given for their wedding as a seed investment to start producing snacks and sweets. Today, they have turned that initial investment of INR 5,000 (65 EUR, as per present conversion rate) into a small food empire with a monthly turnover of INR 1,00,000 (1300 EUR).

-(Leahy & Fontanella-Khan, 2011)

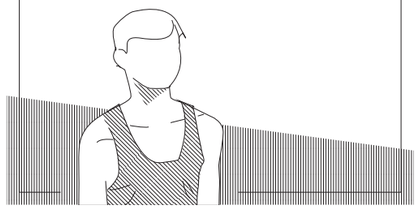


"I never brought my wife to Bombay as once women come here, they don't want to go back to the village. They become more aware of the rights (kaayda kanoon) and forget their culture (sanskaar)...like my bother's wife...she also came from the village but now she doesn't want to go back to village as life here is easier ..."

- (Jha et al., 2015)

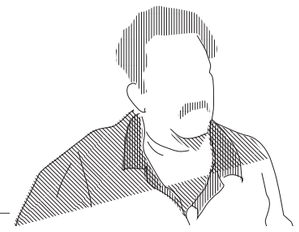
"Coming from another place always gives you a jhatka (jolt), because of non-ownership of residence I am an outsider to the city. We are always treated as outsiders (parpranti), because of that we do not have any izzat (honour) here. We do not have a place to stay; it makes us lose our astitva (identity). We can experience it in our daily lives while going to market for vegetables, travelling in train and bus etc. Even if many do not say it straightforwardly to us, I can hear their talk about us and it makes me feel bad and insulted."

-(Waghmare, 2016c)



"... The land area under cultivation reduced. Earlier there was a time when the farm land produced more than enough to feed 70 family members. Now it cannot even produce enough for 7 members. Our position became very weak. I came here and now agricultural production is entirely dependent on the labourers. Every year, in the different agricultural seasons, I had to invest approximately Rs. 25000 (350 EUR). Earlier we were very rich and could support more than 200 labourers. During the time of harvest, labourers were allowed to take as much as they can carry [...] we had more than enough produce with very little investment cost, but later it became difficult to manage the cost for agriculture with reduced production. It was a business of loss. I had to invest this huge amount of time to start agriculture as per seasonal needs [...] there was only outflow of money and very less income from agriculture."

- (Jha et al., 2015)



Notes

2.5. Stories extracted from various journal articles, newspaper articles and documentaries.

Sources

2.5. Illustrations by Author (2017).

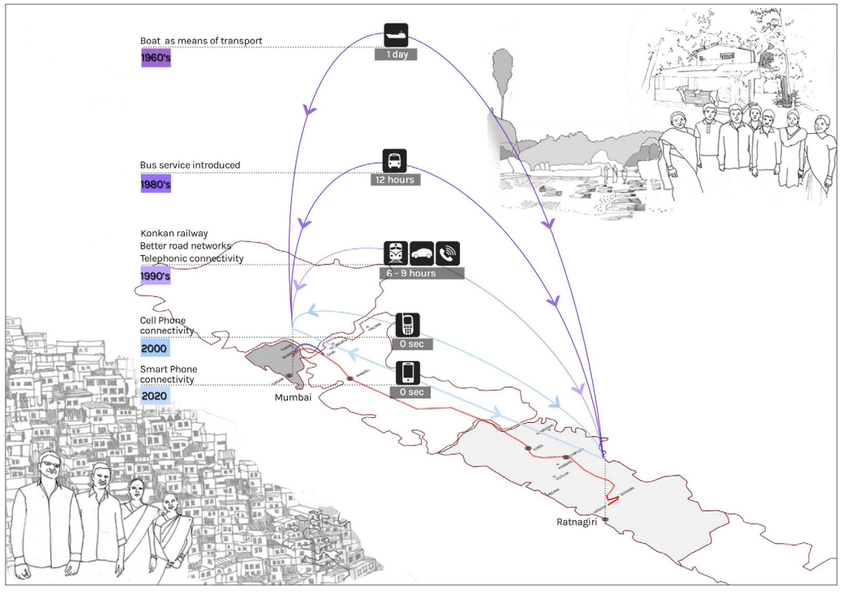
2.2 Conclusion: Circular Life of rural-urban flux

As seen with the comparison [2.8] labour migrants leading circular lifestyles between rural and urban areas struggle with both conditions.

Urban livelihoods offer social and economic mobility but expose migrants to harsher physical conditions - small living spaces, flooding, hot summers, poor water management leading to diseases etc.,

Rural conditions offers the potential for a healthier lifestyle (less pollution, clean water, less STDs) but the decline of the agricultural economy has left them with an uncertain future.

But this circular lifestyle of these migrants offers an oppurtunity for metropolitan planning to undertake capacity building through these migrants. Improving the agricultural economy in the metropolitan region can have transferred effect on other rural areas in the extended region.



2.6

Image Sources

2.6. 'Mumbai's Circulatory Migration'. Source - (urbz, Echanove, & Srivastava, 2014)

2.7. Rural vs Urban Livelihoods for the Circular Migrant. Illustrations by Auhor (2018).

Rural life or the labour migrant

Uncertain income – Average Rs 569 per month and 7.5 EUR per month

On average families live 30% below the rural poverty line.

Outstanding debt.

Family food security at risk. Families go hungry, livelihoods exposed to drought.

Better health – environment conditions better, less exposure to sexually transmitted diseases and diseases from unhygenic urban conditions.

More spacious houses – 167 sqm per household (maximum recorded size)

Family stability, parents and children living together.

Water 115 lt per day in their villages, but 30 minutes away and cost 18 Rs per day (24c)

Less options for upward social mobility

Urban life or the labour migrant

Better economic outcomes - each adult earned Rs. 1823 (approx. 24 EUR) per month. A salary that put them above the urban poverty line (Rs 1000 or 13 EUR) by 80%. Promises of upward social mobility.

Repay loans undertaken for weddings, dowry, for paying off land, construction of a new house, education

Water - 43 lt. per day per family but quicker to get and free of cost (provided by the municipality with tankers)

Split-up families. Fathers work in cities, mothers and children work in the village.

Children and teenagers drop out of school (lack of primary schools for children living in slums or child labour). Lack of amenities in slums.

Less living space – 4 – 9 sqm per household. Live illegally in rough shelters—tarpaulins held up by bamboo sticks. Poor climate security – flooding or too hot

Housing security - Slum demolitions, no access to legal housing options. Reduced personal security – prone to theft and minor criminality

Poor health – unhygienic conditions, exposed to STDs, HIV/AIDs

Cost of food can be twice as much as rural areas, but family food security is not a problem.

2.7

Section References

Bhagat, R. (2014). Urban Migration trends, challenges and opportunities in India (Background Paper). Internation Organization for Migration.

Gupta, S. (1999, November 17). History of Mumbai: Mumbai/Bombay pages. Retrieved 28 October 2017, from http://theory.tifr.res.in/bombay/history/

Jha, M. K., Pushpendra, Vyas, M., Hebbar, R., Bandyopadhyay, M., & Singh, S. (2015). Cities, Rural Migrants and the Urban Poor - II: Migration & the Urban Question in Mumbai. Policies and Practices, 73.

Karmarkar, D. (2014). Migration in Colonial Bombay during 18 th and 19th Century AD. In Internal and International Migration: Issues and Challenges. Ulhasnagar.

Leahy, J., & Fontanella-Khan, J. (2010). Part 1: A voyage from rural to urban India. Retrieved from https://www.ft.com/video/5085cb6a-bf46-3b5f-9e19-55df826465f8

Leahy, J., & Fontanella-Khan, J. (2011). The Indian dream, part 3: Down and out in the Maximum City. Retrieved from https://www.ft.com/video/6df3d12b-cf1e-3f67-bdb0-99516b044078

Mehrotra, R. J. (1991). Bombay City: One Space, Two Worlds. Architecture + Design, Vol VIII(No 6). Retrieved from http://www.rmaarchitects.com/essays/one-space-two-worlds.pdf

Perur, S. (2016, March 30). Story of cities #11: the reclamation of Mumbai – from the sea, and its people? The Guardian. Retrieved from http://www.theguardian.com/cities/2016/mar/30/story-cities-11-reclamation-mumbai-bombay-megacity-population-density-flood-risk

Prakash, G. (2010). Mumbai fables. Princeton Oxford: Princeton University Press.

Ramnath, N. (2016, September 13). Single woman seeking a house in Mumbai? 'Bachelor Girls' tells you why it's like hell [Text]. Retrieved 13 November 2017, from https://thereel.scroll.in/816356/single-woman-seeking-a-house-in-mumbai-bachelor-girls-tells-you-why-its-like-hell

Saunders, D. (2011). Arrival city: [how the largest migration in history is reshaping our world]. London: Windmill Books.

Shah, S. P. (2014). Street corner secrets: sex, work, and migration in the city of Mumbai. Durham: Duke University Press.

Sundaram, R. (2009). Pirate modernity: Delhi's media urbanism. London ; New York: Routledge.

Waghmare, A. (2016a, June 14). Short Of Land, Water, Education; Not Aspiration: Babban's Story. Retrieved 28 October 2017, from http://www.indiaspend.com/cover-story/short-of-land-water-education-not-aspiration-babbans-story-11730

Waghmare, A. (2016b, June 15). Rural Jobs Collapse In 2016 Fuels Migration: Yashodabai's Story. Retrieved 28 October 2017, from http://www.indiaspend.com/cover-story/rural-jobs-collapse-in-2016-fuels-migration-yashodabais-story-98694

3 Literature Review

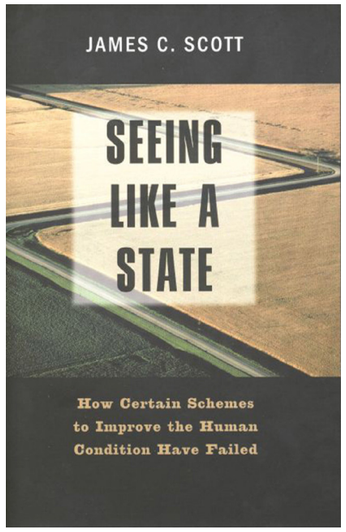
Transformation of the Rural Landscape in the shadow of urbanisation

Abstract

For a variety of reasons, such as globalization, neo-liberal policies, globalised food supply chains, corporate controlled, and mono-crop agriculture has led to the undermining and destruction of self-sufficient agrarian economies in Africa and Asia (Saunders, 2011). The present dominant economic thinking in India supports shifting the population engaged in rural based occupations towards industrial and urban based occupations. This transition model boasts better employment rates, output, exports, investments etc., with two main implications. That is, large scale labour migration and urban expansion. This political redefinition of the rural landscape however does not consider local economic, social and cultural outcomes. Such a large scale social engineering project like urbanization of the population come cloaked in emancipatory ideas, but have potentially destructive consequences (Scott, 2008). This paper is a literature review of structural changes to the Indian rural landscape as a consequence of urbanisation with a primary focus on impact of city agglomerates on adjacent villages. The paper identifies that peri-urban agriculture, adequate and suitable affordable housing for labour migrants, appropriate jobs, change in land acquisition policy, and a civil society are the key aspects towards the development of a new rural-urban paradigm for India that considers sustainable growth of the hinterland and prioritizes the well-being of its inhabitants.

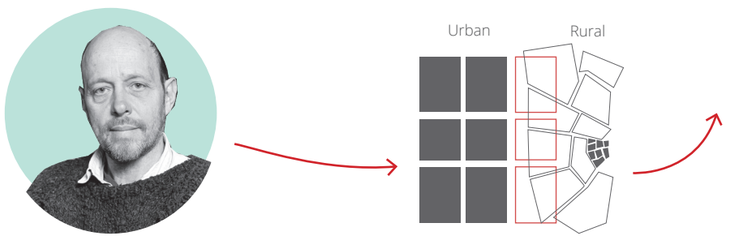
Keywords: urbanisation, rural landscape, urban agglomerate, land acquisition, labour migration

Literature Review Preview



James C. Scott's book Seeing like a State sets a narrative of how development models seeking to improve the human condition can have an adverse impact.

Similarly, through supporting literature, it was apparent that urbanisation is also a development model that seeks to transform rural conditions as a means of uplifting the countryside. But instead it has an adverse impact on local systems.



Supporting literature shows that city expansion can affect landowners, who are handicapped by the change in land-notification, it affects the poorer non-landowners who take up unpleasant service jobs in cities, it has spatial implications for the traditional village form and it changes agricultural production (with some examples in the MMR).

Notes

3.1. Relevance of the literature review in understanding the urban bias against the rural landscape.

Sources

3.1. Collage by Author.
Covers sourced from Immerwahr, D. (2015), Sathe, D. (2017), Saunders, D. (2011), Scott, J. C. (2008)

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3.2

P. Chidambaram

The country's former finance minister, P. Chidambaram has expressed that India must aim for 85% of the population living in urban areas for economic growth

Introduction

India, like many other developing countries, is urbanising at a massive rate. The urban population grew from 290 million persons in the 2001 census to an estimated 308 million in 2008 (Sankhe et al., 2010). By the year 2050, more than 50% of the Indian population is estimated to become urbanised. At present need for urbanisation is fueled by conditions of rural poverty, neo-liberal policies impairing traditional agriculture and globalisation. The country's former finance minister, P. Chidambaram [3.2] has expressed that India must aim for 85% of the population living in urban areas for economic growth; aspiring towards western models that show increase growth in proportion with urbanisation (Sathe, 2017). In this vision for India, every village will become a suburban extension of a city. With an existing 800 million persons living in rural areas (as of 2011) this transformation can be potentially disruptive. Therefore, it is important for urban research to comprehend the scale of this rural-urban transformation that occurs with rampant urbanisation.

In India, transformation of the rural heartland can be seen as four types. The first is the revolution of agricultural methods as seen in the Green Revolution of the 1970s and 1980s. The second is through urbanization by out-migration from rural areas which results in financial remittances that go towards development of the village. This third is institutional in the form of sugar-cooperatives or up-stream industries like the wine industry. The fourth is when the government changes land use for SEZs or large-scale infrastructure like the damming of river (Sathe, 2017). Such a transition is a means of the state government simplifying natural human systems, resulting in bureaucratic simplicity. Traditional agricultural systems are rooted in complex but illegible processes, requiring state officials to seek a large transformation of such communities (Scott, 2008). However, it is also a means for governments to marginalize certain strata of society. Urbanisation in developing countries are accompanied with urban reforms that aspire to become 'world-class cities'. These world class cities often do not wish to accommodate the rural poor who migrate to urban poverty. Furthermore, coupled with global economic policy, agriculture becomes an activity that is no longer viable and de-legitimised. Shortly after the British left India, the United States researching rural development invested heavily in rural areas. Gandhian thought of the time insisted on the negation of everything modern as a western evil and promoted Indian traditional lifestyles. But this line of thinking is a distorted notion of peasant life that disregards general level of health, material well-being and quality of life bolstering archaic elements of traditional structures (Immerwahr, 2015). And it reflects in India's rural policy even today, often encouraging small farm holdings. The system of land inheritance has drastically reduced the size of farm holdings from pre-colonial era resulting in high unemployment and declining yields (Sathe, 2017; Saunders, 2011). This results in a large part of the population trapped in rural-urban limbo. The need for a new inclusive urban lifestyle is paramount.

Existing theory on urbanisation in India looks primarily at urban governance, finance, transportation infrastructure, affordable housing and jobs, often in statistical terms (Sankhe et al., 2010). This review seeks to identify literature that deals with the restructuring of Indian rural areas in the face of urbanisation, with the objective of developing parameters for sustainable urban transformation of the rural landscape in India.

Transforming the Rural Landscape

For the purpose of this review, 'rural landscape' implies the agricultural land, the physical village form, agricultural production and rural demographic.

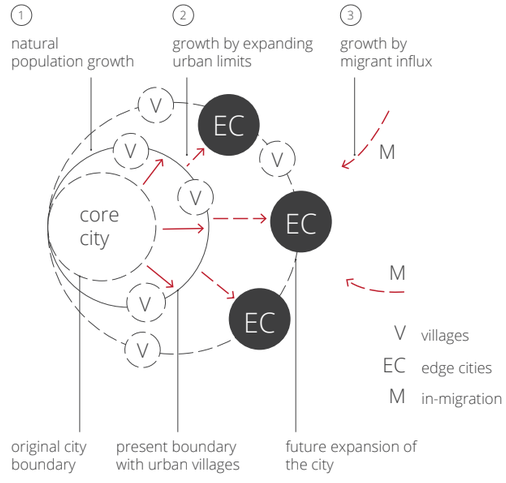
The transformation of the rural landscape is impacted both by urbanisation as a result of migration and urban growth by expansion. But it is important to differentiate between natural urban growth and urbanisation. Tacoli, McGranahan, & Satterthwaite (2015) write that urbanization is the "net result of complex migratory movements between rural and urban areas" and the urban growth is the result of people accumulating in or near urban settlements resulting in the "progressive extension of urban boundaries [with] the creation of new urban centres". Both rural transition and urban growth are often accompanied by economic growth that is misleading termed as development. This economic growth does not imply social development (Tacoli, McGranahan, & Satterthwaite, 2015).

This rural transformation manifests itself in many ways [3.3]. It is, a) the creation of large urban agglomerates (UAs) as seen in Indian cities like Mumbai and Delhi as a result of urbanisation. It also b) represents the urban growth of smaller two-tier towns (Christiaensen & Todo, 2014). And thirdly, it is also, c) the re-organizing of the agricultural systems to increase production with urban principles (Scott, 2008). The scope of this review and subsequent discussion will be delve into the impact of UAs on the rural hinterland.

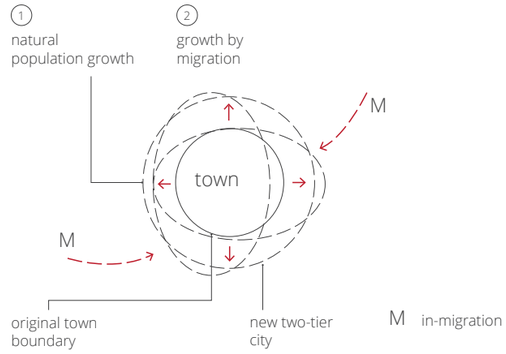
Urban Agglomerates (UAs)

Large cities transform the rural landscape by drawing migrants to cities and acquiring land from nearby villages. These either result in urban poverty and poorly organised peri-urban areas. Rural areas in close proximity to large cities and town urbanise faster, with landuse patterns changing and increased influx of migration. The following sub-sections

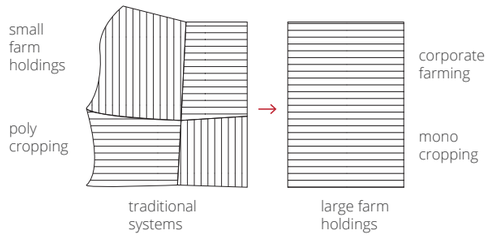
a) Urbanisation by a Metropolis



b) Urbanisation of a town



c) Urbanisation by economic re-structuring



Notes

3.3. [Right] Re-organisation of the rural landscape by urbanisation at different levels inferred from literature.
a) The creation of an urban agglomerate by an expanding metropolis. b) The expansion of a small town into a two-tier city. c) The economic re-structuring of rural systems.

The Metropolitan Region of Mumbai fits the first level of urbanisation and is elaborated in this literature review.

Sources

3.2. P. Chidambram. Source - CC. Edited by Author (2018)
3.3. 'Re-organisation of the Rural Landscape by Urbanisation'. Diagrams by Author (2017)

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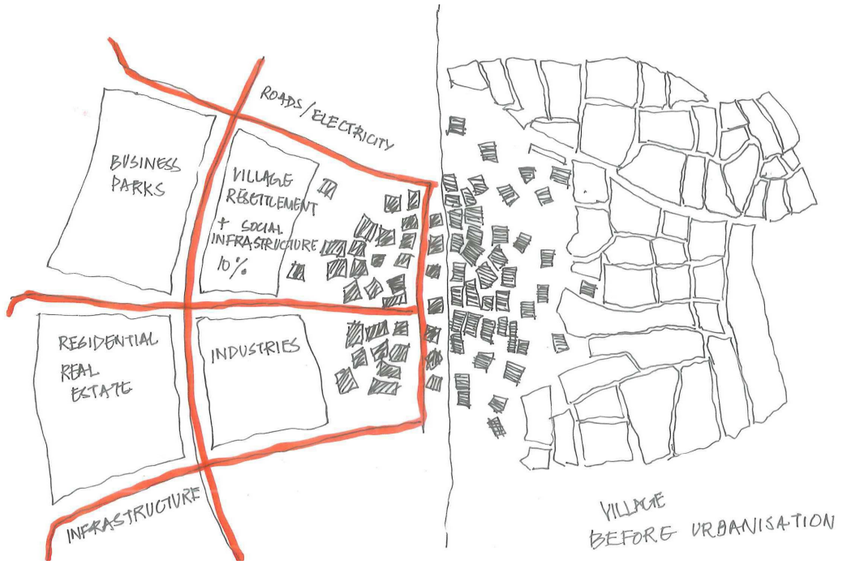

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discuss spatial transformation (physical rural forms in the urban fabric), impact of land acquisition policy (change in land-use notification), demographic change (migration and vocational change) and conditions of agriculture in the urban landscape.

1) Rural Land Acquisition and Special Economic Zones (SEZs).

As cities expand towards its immediate hinterland, it acquires land for SEZs or industries or real-estate, offering compensation to landowners and jobs for the non-landowners. In India, the right to land is a constitutional right but not a fundamental right. This means that under the system of eminent domain, the government has the right to acquire land from private citizens for providing public goods. Land acquisition laws in India have changed since colonial times, including provisions for resettlement and appropriate compensation.

In last few decades, the growth of stronger civil societies has kept development policies in check, ensuring that various stakeholders are accounted for. However, this often does not translate smoothly to reality. When land is notified for conversion, it results in blight limiting the rights of the land-owners and farmers. With agriculture already handicapped to provide self-sustaining livelihoods for farmers, it inhibits them from taking loans against the land.

In his thesis, *The political economy of land acquisition in India: how a village stops being one,* Sathe (2017) writes about the case of Maan. A village near the city of Pune (a Maharashtrian city in close proximity to Mumbai, known for its booming IT industry) that was acquired by the government for the purpose of industrial development. The village is a prime example, caught in a state of flux. Half the land of the village has been acquired (as of 2016) and the other half is still rural. While compensation of land acquisition has improved ten-times since the establishment of civil societies, it does not compare to the ten-fold profits made by the government in the transfer of land after development of basic infrastructure. This leaves the original land owners cheated of their land, along with being stripped off their basic livelihoods. And despite

Notes

3.5 Land acquisition of agricultural land by development authorities for urban landuses like business parks, residential real-estate, industries. Value of the land is increased by the provision of basic infrastructure (red). 10% of the acquired land is used for village settlement and social infrastructure.

3.5. Transformation of the Rural Landscape by a metropolis becoming an urban agglomerate - a summary.
a) Defining the Rural Landscape under an urban agglomerate
b) The impact of the metropolis

Image Sources

3.4. 'Land Acquisition of Agricultural land by development authorities'. Sketch by Author (2017)
3.5. 'Transformation of the Rural Landscape - A summary' Diagrams by Author (2018)

Land Parcels

Land adjacent to rural areas used for agricultural produce.

Demographic Change

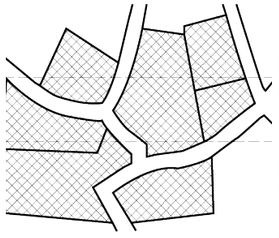
Rural poverty for non- land owners who are farmhands, women and other service workers in the village who potentially lose their basic livelihoods.

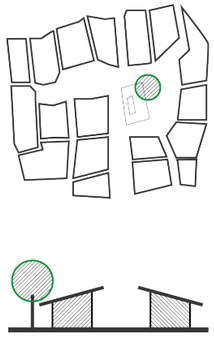
Physical Form

The village physical form before urbanisation with open sppaces and greenery.

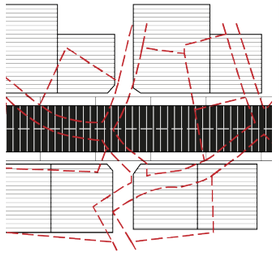
Agricultural Production

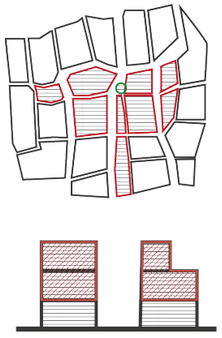
Agricultural production is the main economy for these regions with supporting activities.

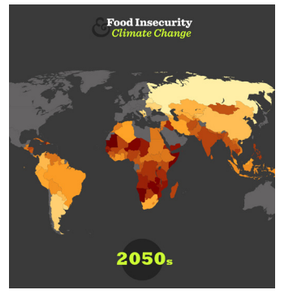




Urbanisation







Land Acquisition

Land acquisition by urban planning authorities, which are re-parcelled with basic infrastructure and sold to government authorities

Demographic Change

Non land-owners move from rural poverty to urban poverty, with insecure housing and work conditions

Physical Form

The village form after expansion is densified to compensate for the lack of affordable housing in the region.

Reduced Agricultural Production

Reduced agricultural production and increased dependence on trade. This could lead to food insecurity in the future based on global conditions

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monetary increase in compensation, it is still insufficient to reinvest in a competitive market and does not make up for the loss in livelihood. Money acquired is only rarely re-invested in profitable ventures (like housing or businesses, often it is spent on daily expenditures, marriages (rural India has a prevalent dowry problem), cars (replacing land as a status symbol) and gambling or prostitution. Further, men in the household receive the compensation, leaving women dependent and helpless in the management of finances. Resettlement measures are inadequate, and jobs are often are insufficient or inappropriate (Sathe, 2017).

Recent political discourse on land acquisition is bent on changing the government's strategy towards land leasing. Present policy pits farmers against industries. A land-leasing system would instead enable a landowner and industrial tenant relationship, ensuring that property rights of individual landowners are not compromised (Swaminathan S & Aiyar, 2015).

2) Rural to urban poverty.

The non-landowners make up for most of rural poverty. They typically constitute cultivators who are directly engaged in farming and life-stock activities, non-cultivators who are engaged in informal, small-scale industries. And thirdly women from rural areas have limited rights and suffer from chronic poverty (Khan, 2001). Jobs provided by new industries and construction projects are limited and do not provide job security for these groups. As these cities expand, they also draw non-landowners from other rural areas in the form of migrants. They find jobs in the city that are often considered degrading or dangerous. These include work in factories, agro-processing plants, domestic servants, bus conductors, rickshaw pullers, street hawkers, petty traders, and construction workers (Bird & Priya Deshingkar, 2007). The acquiring of rural land described above is also a means to generate a surplus amount of cheap labour (Jun, 2011). This is particularly the case with countries like India and China with huge population figures. From basic rural conditions, they migrate to urban poverty. This urban poverty compromises of insecure or limited housing, no safety net, high cost of living, inadequate protection of rights by law, powerlessness within urban political systems leading to unstable urban citizenship. Furthermore, migrants get blamed for over-crowded cities and increased competition in the job market, while they are in fact just caught in the cross-fire of rural-urban transformation. In India, while there are no limits or measures inhibiting rural-urban migration, city governments in their failure to provide adequate affordable housing attempt to discourage migration. Migrants find housing in slums or urban villages (described below). There is little data available for these slums and effective solutions to develop physical and social infrastructure are difficult. But from a statistical viewpoint, urbanisation uplifts the impoverished reducing national poverty levels, but at compromised material well-being and quality of life (Tacoli et al., 2015).

3) Urban Villages: Rural left-overs of Urbanisation

In the Asian context, urban villages are small rural enclaves that get swallowed when cities expand. They are rural relics in an urban landscape. They are predominantly seen in heavily urbanizing cities like Shenzhen and New Delhi. They are the consequence of a difference in land-use rights policy between urban and rural land. They are heterotopic spaces of difference often entertaining black-market services like gambling and prostitution, migrant housing and distinct ethnic identities. In the face of formal urbanisation, these villages foster a unique urbanity that contain informal spatial conditions, high densification leading to slum-like environments and in desperate need for modernization (Bolchover & Lin, 2014; Kumar, 2015). But it also enables diverse spaces, enable small-scale entrepreneurial activities and often the heart of genuine affordable housing for migrants from the rural heartland (Bolchover & Lin, 2014). Slums that result from lack of affordable housing also represent the shock of rural to urban lifestyle transition. This is a historic phenomenon from the colonial era where buildings (like shanties) take on forms akin to rural typologies within the urban fabric (Prakash, 2010). In the case of UK and the USA such settlements fell victims to post-war slum clearance programs (Bolchover & Lin, 2014). But while the living conditions are abysmal, it represents a gateway for rural to urban. Especially when local governments are apathetic to the housing needs of migrants. In Mumbai, residents of urban villages have densified, with some owners creating additional tenements to rent for additional income. While rehabilitating these villages or slums, the government only compensates housing (25 sqm of affordable housing) without considering the livelihood offered by renting out additional space (Johari, 2015).

Notes

3.6.1. Mumbai's mazdoor nakas are wage labour markets in city squares or street crossings with migrants seeking daily wage employment. They can be recruited by potential employers or contractors.

3.6.2. For the women, some negotiations for economic survival included sexual commerce (Shah, 2014).

Sources

3.6.1. Daily wage migrants. Source (Kakodkar, 2016)

3.6.2. 'Gender Imbalance and Red-light districts'. Original Image – Getty Images/CC.

3.7.1. Map of Dharavi Koliwadi before urbanisation. Source - unkown. Copyright in the Public Domain.

3.7.2. Satellite image of Dharavi. Source - Google Earth. Retrieved by Author (2018).

3.6.1

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Dharavi Kholiwadi before urbanisation and in its original village form. Dharavi Kholiwadi densified and unrecognisable from surrounding slums.

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In Mumbai many slums are a reaction to the lack of affordable housing initiatives from the local governments. Srivastava and Echanove (2014) write that, such slums are often built with experienced construction workers built with bricks, steel and cement. They describe these slums as "home-grown neighbourhoods". These neighbourhoods and urban villages (called *Gaothans* in Mumbai) are denied basic infrastructure that could make them easily functional and desirable. Instead, they are deliberately kept in a status of precariousness and political dependency to marginalize the urban poor. They write that, the government should instead work with local artisans to improve the way buildings are constructed, with financial and infrastructure support (Srivastava & Echanove, 2014).

4) Agriculture in the urban landscape

As the country moves away from rural-based agricultural systems towards an industrialized model, food production takes a set-back. Agriculture is not just a means for survival for the rural poor, it is a means to fight hunger, malnutrition and strengthening food-security. Additionally, it also creates jobs – in farms and markets, and the food processing industry

3.8

('For Up to 800 Million Rural Poor, a Strong World Bank Commitment to Agriculture', n.d.).

Peri-urban areas in the wake of urban expansion is often the poorest parts of metropolitan regions. They are caught in a state of uncertainty between new urban land demarcation and traditional rural systems. In India, these are frequently very fertile lands, but subject to urban pollution of water, air, etc., Small-holder farming communities are often reliant on recycled wastewater for farming which is increasingly contaminated (Marshall & Randhawa, 2017). This is a reflection of poor peri-urban policy, considering that these areas have high quality natural resources and are in close proximity to urban physical and social infrastructure (Vazhacharickal & Buerkert, 2011).

Peri-urban lands are often ambiguous regions, with conflicting priorities. Land for agriculture must compete with industrial and SEZs, who are powerful stakeholders. They are also very susceptible to speculation and blight (Marshall & Randhawa, 2017). Peri-urban land is also acquired for urban recreational spaces, such as bio-diversity parks or city-forests. These land-use types compete with and undermine resources for current and future agricultural uses. Pro-poor initiatives and pro-environmental activists rarely coincide. There is a need for urban policy that marries the significance of agriculture with environmental activism (Marshall & Randhawa, 2017; Priya et al., 2017).

Discussion

"No space disappears in the course of growth and development: the worldwide does not abolish the local." (Falzon, 2004; Lefebvre & Nicholson-Smith, 2011)

In the process of urbanisation, the transformation of the rural areas by development strategies and those acquired by urban agglomerates (UAs) need to be acknowledged. UAs not only draw rural populations from the hinterland and the rural heartland but also swallows land from adjacent villages for industries, SEZs and real-estate development.

To summarize the review it is apparent that transformation of the rural landscape occurs in many ways by a growing metropolitan city. It affects landowners, who are handicapped by the change in land-notification, it affects the poorer non-landowners who take up unpleasant service jobs in cities, it has spatial implications for the traditional village form and it changes agricultural production. But as India urbanises in a fast rate, urban research and development is focused on typical urban issues. A McKinsey Global Institute report published in 2010 advocate that India needs to create a city transformation model along five different areas. These include urban governance, funding, sector policies (transportation infrastructure, affordable housing, job creation, etc.), planning (efficient resource management, economic strategy, etc.,) and urban form (size, scale, density, etc).

The report warns that failure to develop concrete urban policy will result to a severe urban vacuum, predicting urban decay, poor quality of life, high unemployment rate, etc. (Sankhe et al., 2010). Cities like India are facing shortages in many aspects which need to be addressed, however the research and planning models fail to account for the rural framework that the urban fabric seeks to supersede.

Additionally, in a highly competitive global network, cities in the developing world are in constant competition to become 'world-class cities' (Marshall & Randhawa, 2017). India's smart cities program advocated 100 second tier cities competing for urban financing. But urban models should instead focus on the existing system that it is seeking to transform. The following are key factors to consider in this process –

a) Considering agriculture as a part of urban and peri-urban strategies during urbanisation. Agriculture is not only a means for food security for a populous nation, but it provides a dignified livelihood in the right circumstances. Pro-environmental activism needs to go hand in hand with pro-poor initiatives.

b) Accommodating rural to urban demographic change by providing appropriate jobs, skills development and adequate affordable housing coupled with basic physical and social infrastructure. Local governments should not indirectly discriminate against migrants by not providing shelter for the poor.

c) Land acquisition that does not displace rural land owners. In a democracy, land-ownership is a right that should not be taken away without careful compensation and rehabilitation. Government policy should also consider land leasing as an alternative. Additionally, betterment of land and the improvement of providing public goods for all levels of society should be embedded in development policy.

d) Slum rehabilitation should not be a mass housing project, but instead enabling and supporting the urban poor with support to build better live-able homegrown neighbourhoods. In this manner, governments enable and not destroy local self-build systems to naturally gain legal stature.

e) Policies and programs that enable stronger civil societies. Civil

Notes

Food [in]security: Food production takes a set-back. Agriculture is not just a means for survival for the rural poor, it is a means to fight hunger, malnutrition and strengthening food-security. Agriculture also offers meaningful employment in urban areas for the urban poor.

Sources

3.8. Food [in] security. Representative of image. Source - (Hindustan Times, 2017)

societies help in protecting vulnerable communities and ensuring that government policies are not lopsided in favour of larger stakeholders.

Additionally, James C. Scott (2008) writes in his book Seeing Like a State that development planning with a desire to improve the human condition often has fatal results. Large scale urbanisation policy in India is in line with what Scott terms as a large-scale social engineering project that risks being short sighted. Development planning also risk diminishing the human condition and standardizing citizens. To ensure that such schemes are not disasters, it is important that there are small experimental steps to social change, there are provisions for reversibility, design for flexibility and must be inclusive for entrepreneurial human ingenuity (Scott, 2008).

Scott also advocates that development planning should acknowledge "indigenous technical knowledge, folk wisdom and practical skills". While traditional systems like poly-cropping and indigenous agriculture methods may not be able to compete with contemporary economic models in production value, they compensate in stability and resiliency. Economic systems lead to harsh consequences like exhaustion of non-renewable resources and reduction of biodiversity while showing profitable margins in short term analysis (Scott, 2008).

Therefore, the model for urbanisation in India must be accommodating of the traditional systems that it over-runs. This can reflect spatially in urban and peri-urban agriculture and in the typology of affordable housing that cities offer to migrants. In policy, it can reflect in the dignity that it provides landowners while changing land use patterns and simultaneously ensuring stronger civil societies.

Conclusion

To conclude, development models for urbanisation in India have to consider the local conditions and the demographic it seeks to transform. The current model can potentially lead to extreme wealth gap and unbalanced urban communities. While typical urbanisation models might be necessary for urban growth, it must conscious of agricultural systems, land conversions, rural physical form and the changing rural demographic. Furthermore, development models must acknowledge traditional systems that it may override, these models while seemingly unviable, they compensate in resiliency. India is a unique context that needs its own sustainable urbanisation model. ·

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Elements of the Rural landscape and potential for the project

1. Rural Land

Rethinking land acquisition and land conversion policy
- spatial implication of policy
- spatial and economic compensation for loss of land and livelihoods
- redressing peri-urban typologies (like business parks) with rural or agricultural types
- aquiring land for co-operate farming systems - taking the load off of small farm holdings

2. Physical Village Built form

New strategy for urban villages acquired by the city
- four tier test project, looking at various villages at different stages of urbanisation
- redevelopment strategy for gaothans without increasing FSI or height restrictions
- improving livability through better design
- affordable housing for migrants

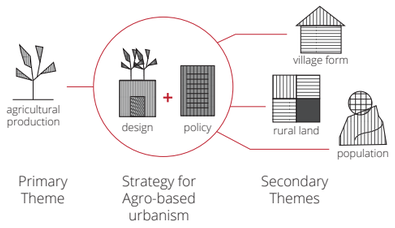
3. Demographic Change

New model for slum redevelopment
- affordble housing project, with livable conditions, rewriting building regulations
- rehabilitation of slums
- creating spaces that generate livelihoods and good quality homes
- improve self-build capacity of home-grown neighbourhoods with better infrastructure and financial capabilities
- boosting local skills like carpentary, masonry , etc.,

4. Agricultural Production

- creating new urban typologies that marry agriculture with urban
- providing jobs and better livelihoods
- improve food security, schools with farming?
- farming lifestyles with access to urban and rural and social infrastructure

New development model for urbanisation in the MMR to address the urban biases in planning and development processes



3.9

Notes

3.9. [left] Conclusion - potential direction for the project.

Sources

3.9. Conclusion. Source - Author (2017)

Section References

Bird, K., & Priya Deshingkar. (2007). Circular migration in India. ODI. Retrieved from https://www.odi.org/publications/2506-circular-migration-india

Bolchover, J., & Lin, J. (2014). Rural urban frameworks: transforming the Chinese countryside. Basel: Birkhäuser.

Christiaensen, L., & Todo, Y. (2014). Poverty Reduction During the Rural–Urban Transformation – The Role of the Missing Middle. World Development, 63(Supplement C), 43–58. https://doi.org/10.1016/j.worlddev.2013.10.002

Falzon, M.-A. (2004). Paragons of Lifestyle: gated communities and the politics of space in Bombay. City Society, 16(2), 145–167. https://doi.org/10.1525/city.2004.16.2.145

For Up to 800 Million Rural Poor, a Strong World Bank Commitment to Agriculture. (n.d.). [Text/HTML]. Retrieved 9 December 2017, from http://www.worldbank.org/en/news/feature/2014/11/12/for-up-to-800-million-rural-poor-a-strong-world-bank-commitment-to-agriculture

Johari, A. (2015, November). Why residents of a Mumbai fishing village want development, but not slum rehabilitation. Scroll.In. Retrieved from https://scroll.in/article/769751/why-residents-of-a-mumbai-fishing-village-want-development-but-not-slum-rehabilitation

Jun, J. (2011, March 14). A Village by the SEZ: The Dafen Sample of China's Urbanization. MAS CONTEXT, SPRING 11(9). Retrieved from http://www.mascontext.com/issues/9-network-spring-11/a-village-by-the-sez-the-dafen-sample-of-chinas-urbanization/

Kumar, M. (2015). Erstwhile villages in urban India. Development in Practice, 25(1), 124–132. https://doi.org/10.1080/09614524.2015.986066

Lefebvre, H., & Nicholson-Smith, D. (2011). The production of space (Nachdr.). Malden, Mass.: Blackwell.

Marshall, F., & Randhawa, P. (2017). India's peri-urban frontier: rural-urban transformations and food security. IIED Working Paper Series. Retrieved from http://pubs.iied.org/10794IIED/

Prakash, G. (2010). Mumbai fables. Princeton Oxford: Princeton University Press.

Priya, R., Bisht, R., Randhawa, P., Arora, M., Dolley, J., McGranahan, G., & Marshall, F. (2017). Local Environmentalism in Peri-Urban Spaces in India: Emergent Ecological Democracy? ESRC STEPS Centre. Retrieved from https://opendocs.ids.ac.uk/opendocs/handle/123456789/13042

Sankhe, S., Vittal, I., Dobbs, R., Mohan, A., Gulati, A., Ablett, J., … Sethy, G. (2010). India's Urban awakening: Building inclusive cities, sustaining economic growth. McKinsey Global Institute.

Sathe, D. (2017). The political economy of land acquisition in India: how a village stops being one. Singapore: Palgrave McMillan.

Saunders, D. (2011). Arrival city: [how the largest migration in history is reshaping our world]. London: Windmill Books.

Scott, J. C. (2008). Seeing like a state: how certain schemes to improve the human condition have failed (Nachdr.). New Haven, Conn.: Yale Univ. Press.

Shah, S. P. (2014). Street corner secrets: sex, work, and migration in the city of Mumbai. Durham: Duke University Press.

Srivastava, R., & Echanove, M. (2014, November 28). 'Slum' is a loaded term. They are homegrown neighbourhoods. The Guardian. Retrieved from http://www.theguardian.com/cities/2014/nov/28/slum-loaded-term-homegrown-neighbourhoods-mumbai-dharavi

Tacoli, C., McGranahan, G., & Satterthwaite, D. (2015). Urbanisation, rural–urban migration and urban poverty. International Institute for Environment and Development. Retrieved from http://www.jstor.org/stable/resrep01308

4

Research and Design Themes

Identifying the urban bias through
a set of research themes

Research: Urban Conditions
Policy Review: MMRDA 2016-2036

Sources

4.0. Research and Design themes.
Images by Author (2018)

4.1 Urban Conditions

Analysis of existing conditions based on design themes

Chapter Abstract

This chapter seeks to identify relevant issues in the Mumbai Metropolitan Region (MMR) based on research tangents from the overview of rural migration in region [Chapter 2]. In this section, the MMR is read as an "urban system" with urban (and typically non-urban) conditions in the region linked to possible spatial impact. Echanove and Srivastava (2014) define an urban system as "a network of habitats of various kinds including rural, urban, tribal, industrial, agrarian or a combination thereof, defined through a movement of goods and services. In current Indian urban discourse, the urban and rural are seen as distinct entities. But deriving on Anthony Leed's Cities, Classes and Social Order (1994), they argue that "farming is an urban activity, farmers are urbanites linked to urban power centers" (Echanove & Srivastava, 2014). Convention urban design and research themes in India focus on affordable housing, urban landscape, affordable amenities, sustainable mobility and urban aesthetics [i]. But the literature review [Chapter 3] reveals additional factors that urban development models tend to neglect. New design and research themes are proposed based on a combination of both issues.

Notes

[i] Lecture on urban development in Mumbai by P. K. Das, describing city making that ensures human development and quality of life. TU Delft Global Housing Studio in 2018.

Sources

4.1. Present urban development themes by P.K. Das (2018). Illustrated by Author (2018).

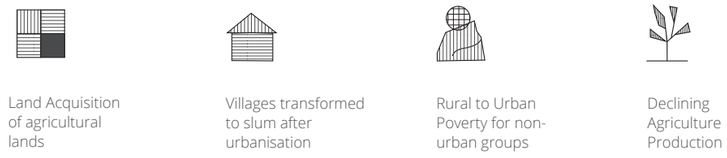
4.2. Conclusions of the Literature Review [Chapter 3]. Illustrations by Author (2017).

4.3. Research and Design themes. Images by Author (2018)

Conventional Research and Design Themes

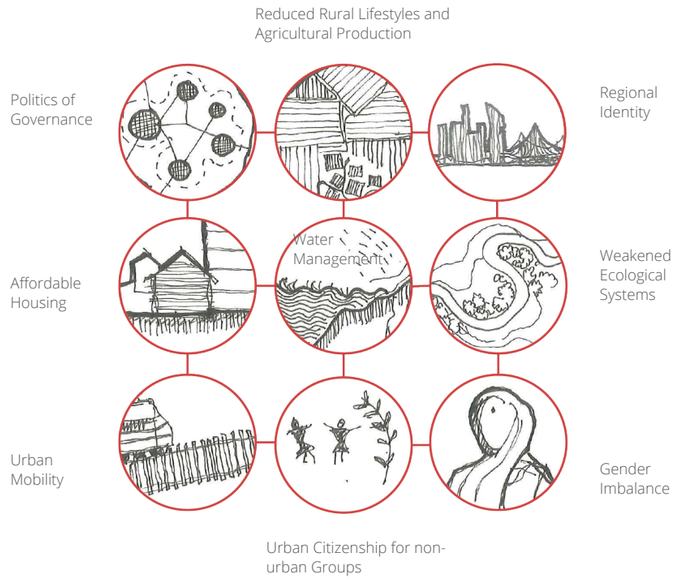
4.1

Literature Review Conclusions



4.2

Research and Design Themes for *Beyond Urban*



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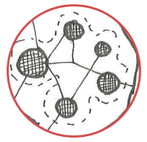


The Politics (and Conflicts) of Urban Governance

Governance in Mumbai is a complex myriad of four hierarchical governing bodies - central, state, regional and local legislation. India is a federal nation with both central, state and local civic institutions making rules for cities. ULBs (Urban Local Bodies) in cities and townships are corporations, municipalities or nagar panchayats (civic bodies for rural areas in transition to urban) (London School of Economics and Political Science, Cities Programme, Urban Age Project, Alfred Herrhausen Gesellschaft für Internationalen Dialog, & Urban Age India Conference, 2007) [Figure 5.1]. In 1992, with the advent of new era of neo-liberal economic policies, the government set out a process of decentralization. This lead to the 74TH Amendment to the Constitution, local governments were empowered financially and politically to govern small towns, metros, etc., with necessary guidelines and without undue interference from the state and union governments. In a metropolitan region like the MMR, this has resulted in various governing bodies working side-by-side – with 8 municipalities, 9 townships (a total of 17 ULBs) and nearly some 1000 villages.

Despite this attempt at decentralisation of governing powers, there is an overbearing influence by the state government of Maharashtra in the MMR. For instance, the MMRDA[i] (Mumbai Metropolitan Regional Development Authority) was set up under the Mumbai Metropolitan Development Authority Act of 1974 as a local overall governing authority but is headed[ii] by the State Urban Development Minister (Shetty, 2015). Other state governance bodies like the MHADA (Maharashtra Housing and Area Development Authority), the SRA (Slum Rehabilitation Authority), the MSRDC (Maharashtra State Road Development Corporation) have vested interests in the MMR and the rest of Maharashtra. Furthermore, the union government also has jurisdiction in the region through the Port Trust, National Highway Authority, national Environmental Regulations and national projects like the MIDC (Mumbai-Delhi Industrial Development Corridor) project or national goals (Five-Year Plans). The union government also offers financial support in the form of the JNNURM (Jawaharlal Nehru National Urban Renewal Mission) based on stipulated conditions. This leaves large parts of the region out the realm of ULB control. It should be noted that the MMRDA is not only a overall governing body but also acts as a developer. Its role is not limited to planning and reviewing processes in the MMR but also financing and executing projects. This dual nature is potential in causing conflicts with ULBs (Pethe, Gandhi, & Tandel, 2011). The 74TH Amendment recommends a MPC (Metropolitan Planning Committee), as an overall independent governing authority with locally elected representatives from the various ULBs to mitigate issues of coordination. However, the state government is reluctant to relinquish its power over the region . Additionally, there is speculation that a MPC may undermine the decentralised powers of the ULBs as a larger governing body, as with MMRDA, has better resources to govern and develop the region (Pethe et al., 2011). But this could depend on how the MPC is structured with specific regulations and goals set to avoid such a scenario.

Local ULBs – Case of MCGM

To understand the power of ULBs, the following is one case. On paper, the MMR is structured as a poly-centric governance model and ideally composed of independently functioning ULBs. The Municipal Corporation of Greater Mumbai (MCGM) is the ULB that governs the city of Mumbai and its suburbs (known as Greater Mumbai). Greater Mumbai covers 10.7% of

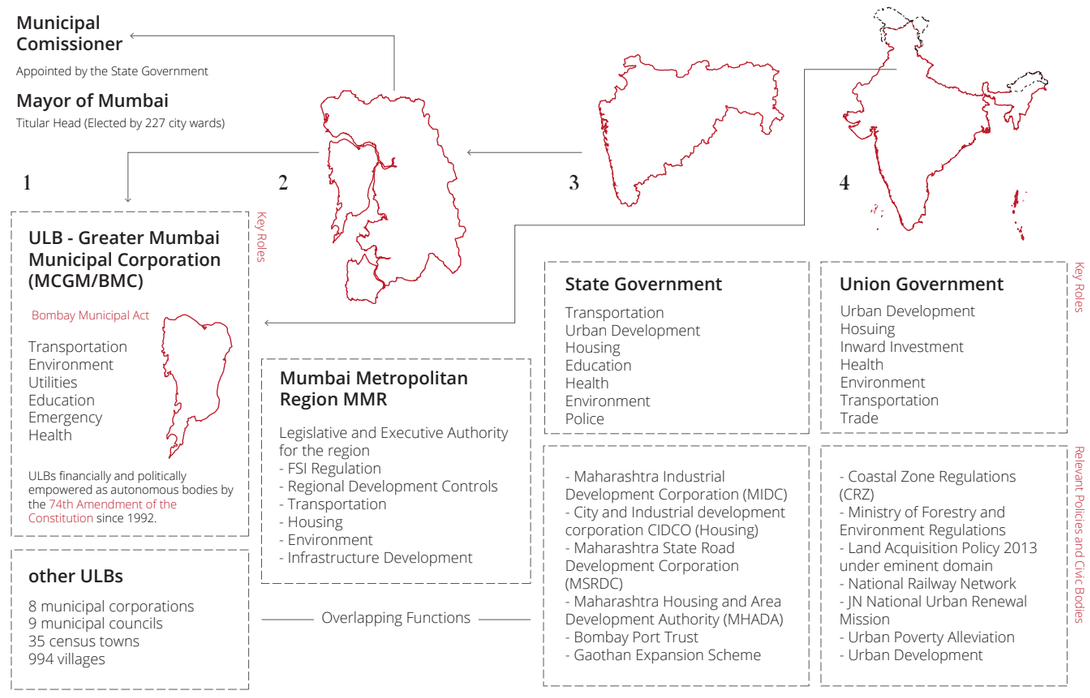
Notes

[i] "The organisational structure of MMRDA comprised three bodies – the authority, executive committee and office of the metropolitan commissioner. The authority is at the apex of the structure and has control over all activities of MMRDA. It is made up of 17 members including ministers from the state government, municipal commissioner of Mumbai, councillors from MCGM, MLAs and its chairman is the minister for urban development, Government of Maharashtra. The executive committee is in charge of providing technical guidance and supervising activities of MMRDA and consists of members from the Government of Maharashtra, experts in urban planning and development and has the chief secretary to the Government of Maharashtra as its chairman. The metropolitan commissioner is a bureaucrat appointed by the Government of Maharashtra to head the office of MMRDA which comprises different divisions such as planning division, town and country division, engineering division and others." (Pethe, Gandhi, & Tandel, 2011)

[ii] The MMRDA website indicates that the State Chief Minister is the chairman of the MMRDA.

Image Sources

4.4. Hierarchy of urban governance in the Mumbai Metropolitan Regions depicting four different levels. Source – Author (2018)



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the MMR but houses 67% of the region's population. Understandably, the MCGM also plays a big role in the capital expenditure and revenue generation in the entire region (Pethe et al., 2011). Till 2003, the Municipal Corporation of Greater Mumbai (MCGM) functioned independently of the MMRDA. But conflicts between different political ruling parties at different hierarchies led to the amendment of the MMRDA Act to award jurisdiction of Greater Mumbai to the MMRDA. Amendment to the Act, gave the authority powers to make amendments in the regional plan and undertake revisions to plan and make modifications in the city. The city of Mumbai has an elected Mayor whose powers are titular, with real executive powers held by the Municipal Commissioner who is a bureaucrat (Indian civil services) appointed by the State (Shetty, 2015). A major causality of this is accountability.

The MCGM and the MMRDA are two separate autonomous bodies but with a great level of interdependency in processes. For instance, the MMRDA is dependent on the MCGM for undertaking projects in Greater Mumbai and the MCGM is dependent on amicable relations with the MMRDA to access finances reserved for the Metropolitan Region. Further, conflicts arise when there are different political parties at local and state government levels. As the MMRDA is not an elected body, it abruptly and unabashedly hands over infrastructure projects to MCGM without following due process knowing that repercussions from citizens is limited. The duplicitous nature of functions of both organisation allows them to shirk responsibility while ideally it should instil competition between both to provide better services [Fig. 4.6]. Incidents of media, NGO and citizens group involvement has helped to keep the MMRDA in check but is still a limited influence (Pethe et al., 2011). For instance, the MMRDA issued a draft of the regional plan in October of 2016 which received 63,000 objections citizens predominantly by those living in the peri-urban regions of the MMR. It was also criticised by activists, urban planners and environmentalists for opening green zones to urbanisation and failure in the mapping of 2000 structures in the MMR. The plan also proposes industrial and urban growth on green fields and river banks. Pressure from citizen groups and media coverage has required the planning commission to review and make changes to regional plan. On January 2018, it was reported by the Hindustan Times [Fig. 4.5.] that the MPC had "passed the plan with a few minor changes" (Venkatraman, 2018).

4.7

Regional Identity

Mumbai, as with many cities has a complex urban Identity. But it can be described as a city of extremes. It is home to some of the richest people in India and also some of the poorest. It is a city of staggering contrasts. Kidambi (2013) writes, "a vast majority of the population lives and works in abysmal conditions [...] making a precarious living in the [...] informal sector. On the other hand, its affluent elites pursue lifestyles of calculated extravagance, fit to rival their counterparts in London or New York" (Kidambi, 2013).

This is spatially visible through a mix of slums and sky-scrapers all across Greater Mumbai. It has an old city charm but is racing to become a 'world-class' city (Jha et al., 2015). It is harsh to those seeking urban citizenship but do conform to urban elitism; but this does not stop people viewing the city as the place where one be "made and remade" (Kidambi, 2013).

The MMRDA Plan (2016), notes that the boundaries of the MMR is not common knowledge. The MMRDA and its political boundaries were conceived in 1974 which partially coincide with two state districts, Raigad and Thane. Hence, the regional identity is undefined but with the establishment of the metropolitan regional plan; the immediate countryside and the edge cities are being replicated with Greater Mumbai archetypes.

4.7

Notes

4.7. Mumbai's urban idenity as a set of contrasts between old and new; rich and poor.

Sources

4.5. Screenshot of Hindustan Times article reporting on the status of MMRDA hearings of the 2016-2036 regional plan. Source (Venkatraman, 2018). Retrieved by Author (2018).

4.6. Screenshot of DNA article reporting on lack of accountability due to multiple actors involved. Source - (Bhujbal, 2017). Retrieved by Author (2018).

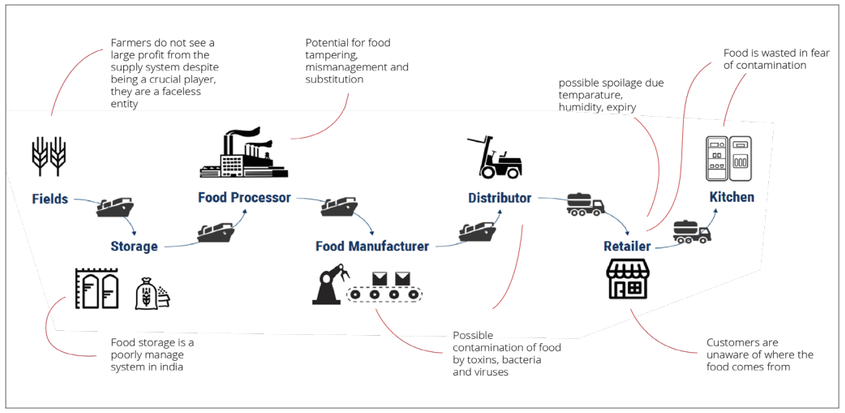
4.7. Mumbai's urban identity. Collage by Author (2018).

4.1

Reduced Rural Lifestyles and Agricultural Production

A large part of India is predominantly rural, but India is undergoing a rapid de-agrarianisation with unplanned (or poorly planned) transformation of the rural areas. And while the urban-rural lines are shifting, it will still retain its rural characteristics for another three to four decades (Echanove & Srivastava, 2014). This is due to a variety of reasons, partly because of expanding urban centres (as discussed in Chapter 3) and urban/industrial oriented legislation. But other reasons include inability of farmers and farm-owners to compete in global markets [Fig.5.5.]. Low prices and debt accumulation has led to a high rate of suicide amongst many farmers across the nation. Additionally, farmers are dependent on middlemen for selling their produce and do not always have easy access to the right markets because of the perishable quality of food products. This is further aggravated by poor storage and logistic systems. Furthermore, agriculture is extremely susceptible to climate changes. Hence, agriculture is increasingly being associated with rural poverty, leading the national trend for an urban economic policy. This has resulted India's increasingly reliance on trade for food imports based on trade relations (for example, with BRIC countries) for supply.

Additionally, traditionally land inheritance in India divides land equally between the male sons [Fig. 5.6.]. This practice has reduced the size of farm lands, making it economically unsustainable for farmers to create a livelihood from farming alone (Sathe, 2017). This makes selling land to real-estate developers and planning authorities as a more feasible solution than pursuing farming as an occupation. Additonally, there has been a decline in the favourability for farming as a lifestyle. Globally, the average age of the farmer is 60 and the figure is rising (Thomas, n.d.).



4.8

A land holding in 18th Century Maharashtra
44 acres

Excessive sub-division and fragmentation of farm lands

A 20th century Maharastrian farm holding - **5-10 acres** (optimum **10-15 acres**)

4.9

Notes

4.8 The problems of the complex global food supply chain.

4.9. Hereditary transfer of property. The dissection of farmland ownership has resulted in reduced profitability of farming.

4.10. Policies focussed on urbnisation and De-agrarianisation - debt and inability to compete in global food supply chain systems has resulted in farmer suicides.

Sources

4.8. The complex global food supply chain with Author comments on the problems farmers and consumers face. Original graphic - (CB Insights, 2018). Edited with comment by Author (2018).

4.9. Hereditary transfer of property. Data source - (Sathe, 2017). Graphic by Author (2018).

4.10. Screenshot of BBC news article that describes the farmer's protest and negotiations with the government in Mumbai in March 2018. Source (Rowlatt, 2018). Retrieved by Author (2018)

4.11. Farmer suicide in India. Source (Kedia, 2017). Graphic redrawn by Author (2018).

4.12. 'No more self-reliant'. Source - (Union Ministry of Agriculture and Farmers Welfare & Directorate General of Commercial Intelligence and Statistics, 2017)

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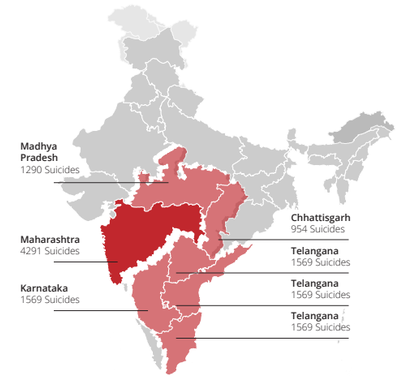

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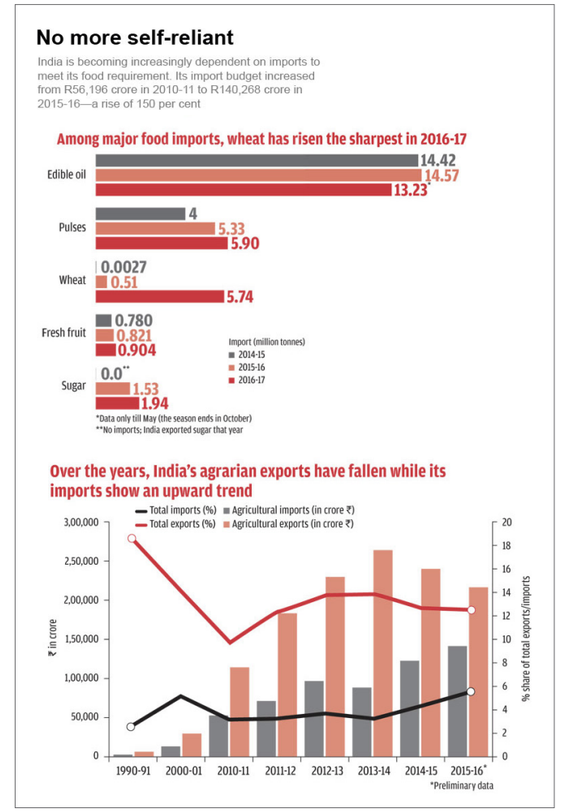

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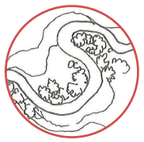

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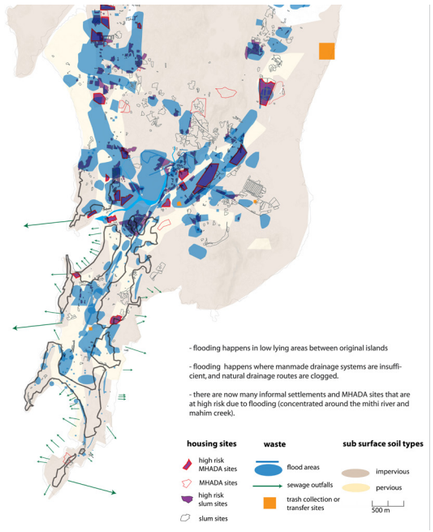


4.14

Notes

4.14. Flood diagram in Greater Mumbai. Mapping and analysis showing areas flooding on an annual basis during the monsoons. Outlined in red are government housing sites; over half these site flood annually. Informal settlements are at high risk due to flooding, particularly the settlements concentrated around the Mithi river and Mahim creek.

Sources

4.13. Mangrove forest cover in Greater Mumbai. Graphic by Author (2017).

4.14. Flood diagram in Greater Mumbai. Source (Perkins, 2008)

4.15. Screenshot of Scroll.in article describing change in wetlands nortification from the union government. Source - Jayaraman (2017). Retrieved by Author (2018).

4.16. Manicured landscapes replacing bio-diverse environments.

4.17. Sand-dredging. Graphic by Author (2018).

4.18. Image of Top Soil Damage in Bangladesh, similar conditions in peri-urban regions of MMR. Image Source - (Roy, 2016). Graphic edited by Author (2018).

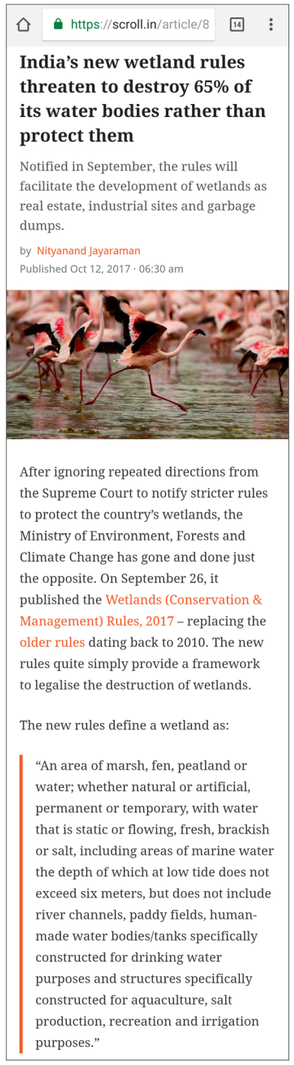
Weakened Urban Ecological Systems

Ecologies of the City

The city has a history of land reclamation from colonnial era continued in post-independence era till 1974 when regulations were set to reduce reclamation from the sea. With an overcrowded city and rapid urbanisation within the geographical constraints of the Mumbai peninsula has forced urban limits pushing back against ecologically sensitive areas. Lack of strick regulations leads to illegal land-filling, dumping of garbage and construction rubble in ecologically sensitive area. Ecological illiteracy at various levels - citizens, builders, decision makers.

Ecologies of the Peripheries

Peripheries seen to serve the city, there is a limited perception of the hinterland by builders, developers, planners, architects and politicians. At best, they are seen as areas for tourism or recreational activities. Recreational and religious tourism has led the natural environment to be redefined from public to private; from highly bio-diverse environments to manicured landscape gardens. The peripheries are also seen as an opportunity to relocate polluting industries from the urban areas. Additionally, they are seen as a means to serve urban activities for resources – water, sand-dredging and brick kilns; often for the booming real-estate industry .



https://scroll.in/article/8

India's new wetland rules threaten to destroy 65% of its water bodies rather than protect them

Notified in September, the rules will facilitate the development of wetlands as real estate, industrial sites and garbage dumps.

by Nityanand Jayaraman
Published Oct 12, 2017 · 06:30 am

After ignoring repeated directions from the Supreme Court to notify stricter rules to protect the country's wetlands, the Ministry of Environment, Forests and Climate Change has gone and done just the opposite. On September 26, it published the Wetlands (Conservation & Management) Rules, 2017 – replacing the older rules dating back to 2010. The new rules quite simply provide a framework to legalise the destruction of wetlands.

The new rules define a wetland as:

> "An area of marsh, fen, peatland or water; whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters, but does not include river channels, paddy fields, human-made water bodies/tanks specifically constructed for drinking water purposes and structures specifically constructed for aquaculture, salt production, recreation and irrigation purposes."

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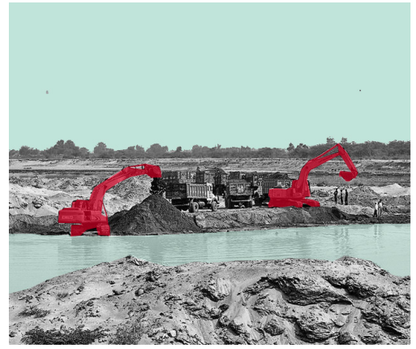
Manicured Landscape

Recreational and religious tourism has led the natural environment to be redefined from public to private; from highly bio-diverse environments to manicured landscape gardens.



4.17

Sand dredging

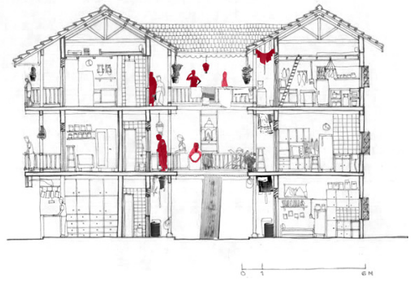
River banks exploited for sand dredging, while the government has called for a ban on mechanised sand dredging to protect river banks, the demand from the construction industry has made for the sand mafia that continues dredging illegally.

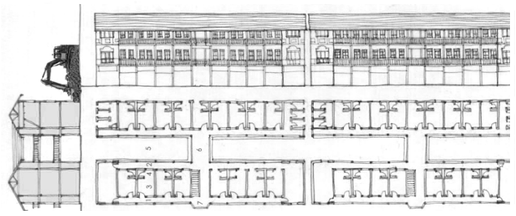
4.18

Burnt Farmlands

Farm lands are being used for brick kilns. This is an increase in demand from the construction industry. The lands are used till it is "burnt" and can no longer be cultivated.

4.1





4.19

4.20

Affordable Housing

For First and Second Generation Migrants

Missing support system for new labour migrants from areas in search for urban lifestyles. Compromised livelihood with less clean water, temporary shelter and limited access to ammenities (like schools and PHCs). Historically migrants found accommodation through gaothans, urban villages in the city. Villagers rent out an extra to generate extra money to compensate losses in farming. However, urban policy has made these gaothans favourable for development, making property prices too high for poor migrants. Another favourable option for rural migrants are chawls, these are historic dorm houses from the colonial era; a typology used to house migrant workers from rural areas looking for work in the Mumbai mills. The chawls today are poorly maintained and in dilapidated conditions, the municipality has invited external developers to demolish the chawls and create mass affordable housing with additional FSI (The Free Press Journal, n.d.). This is questionable, as informality can be crucial condition of favourability for climate-driven migrants.

For Third and Fourth Generation Migrants

Housing shortages in the region is a big focus for planning in the region. A large part of the population are living in slums, many houses are in a dilapidated condition, unauthorised squatting and homeless families living on the pavements put housing in the forefront (MMRDA, 2016). Nearly, 60 percent of the population lives in slums that take up 6% of the city's surface area. Slums are a solution to the lack of affordable housing stock in the city. Rural migrants squat on open unused spaces in the city or are an extension of exiting villages (described in the literature review).

State Housing and Private Speculative Housing

A total of 72,936 houses were added to the housing stock in the period 1991-01 and another 289,605 houses in 2001-11 are vacant. While a substantial amount of housing stock is being generated the MMRDA postulates that a strong speculative market is investing in real-estate but there are disincentives to prevent them from being realized as active housing. New housing stock in the MMR from post-Independence (1947) to Neo-liberal Economic Policy Era (1991) housing was predominantly provided by the government. Industrial and commercial establishments were given incentives to provide housing for their employees but were unreliable and predominantly creating stock for higher income groups. The role of providing for affordable housing with subsidized rates was in the hands of the government.

Since 1992, the redevelopment of slums has been incentivized through market interventions by providing private builders additional development rights (like extra FSI) to create free affordable housing.
The scheme idealistically boasts reduced mortgages (as the delivery is as free houses), offers secured property rights to the slum developers, reduced displacement (in-situ development) and the development of "slum-encumbered" land. But the MMRDA policy is also self-critical, the scheme favours third and fourth generation dwellers, maintenance failures, lack of consent from slum dwellers for rehabilitation, delivery of stock less than expected, poor living environment have plagued the scheme. Similarly affordable rentable housing has been a failure Coupled with pro-ownership policies and stringent first generation rent control schemes in the city of Mumbai, has led to the decline of the most affordable housing market – rental housing. First generation rent control does not allow incrementation based on inflation but based on a fixed rate. Formal rental housing only makes up 5% of the housing stock in Mumbai. However, since 2007 the MMRDA has launched a rental housing scheme as an affordable housing option, with rents ranging from . Private developers were offered additional FSI to provide self-contained dwelling units of 15/30 sqm.
However, in 2014 the Rental Housing Scheme was modified into the affordable housing scheme due to several units remaining unoccupied. The failure can attributed to the location of the projects, many located several hours away from the city. Additionally, such a rental housing requires access to livelihoods, social and physical infrastructure which were inadequate or absent (Deb, 2016).

4.21

4.22

Speculative Housing

Screenshot from Times Of India reporting 130,000 locked flats in the MMR in 2017.

Notes

Problems with affordable housing in the metropolitan region.

Sources

4.19. Example of Chawl Housing Typology in Mumbai. Source - (Adarkar, Imprint One, & Rupali, 2011). Edited by Author (2018)

4.20. Example of Chawl Housing Typology in Mumbai. Edited by Author (2018)

4.21. Speculative Vacant Housing. Graphic by Author (2018).

4.22. Screenshot of Times Of India article reporting on vacant speculative housing. Bharucha (2017). Retrieved by Author (2018).

4.1

Urban Citizenship for Non-urban groups

Indigenous tribal communities (Adivasis)

The urbanisation of agricultural land often impacts tribal indigenous communities, collectively known as Adivasis. There are various tribal groups in the MMR – the Katkaris, the Warlis, the Kokna and the Dubla to name a few. Before the city was established, the region was home to dense forest land. These forest lands have sheltered a large part of the Adivasis. For example, 3% of the sub-district of Thane in the MMR houses 20% of the state's tribal population. With the advent of the city and British colonial policy, the Adivasi tribal communities were marginalized with criminalisation of traditional tribal activities (traditional forest grazing, harvesting of forest crops, rolling bindis or Indian cigarettes). British legislation ensured that only forest technocrats were eligible for management of forest pushing the Adivasis out of their settlements. This was convenient for the development of the British economy (logging revenues), for the growth of the Indian Railways and the city of Mumbai. Over a century, between colonial legislation and the post-Republic Indian government, the Adivasis have been marginalised as a forest protection measure . However, this is in the financial interest of creating a larger taxable peasantry base; Adivasi have been to working as farm-hands on agricultural lands which increases revenue the production of taxable cash crops (Edelblutte & Gunnell, 2014). They have since been working on dali lands given by the British to resettle them. But urbanisation has resulted in increasing land conversion and less agriculture venues forcing them to seek alternative work. They are largely engaged in brick-kiln work and agricultural work based on seasonal demand (Krishnankutty, 2018).

Fishing Communities (Kolis)

The Kolis are also an indigenous group but are categorized differently as they maintain an intrinsic relationship with water. These include fishermen, but in some cases also bamboo cutters or water carries. Like the Adivasis, the Kolis have been displaced by the expansion of the city of Mumbai. Traditional Koli settlemtents, called koliwadas have been reduced to slum like condition to meet the demands of the city's housing needs (discussed in Chapter 9). Further, the Kolis have been adversely affected by union laws, namely the amendment of the Coastal Zone Regulations (CRZs). The Ministry of Environments and Forests (MOEF) regulates development activities on coastal stretches within 500m of the high tide line land inward based on four levels. Theoretically, the CRZs are formulated to promote healthy eco systems and protect coastal livelihoods. However, poor implementation and rampant violation of the rules have put these at risk.

Agrarian Communities

The Mumbai Metropolitan Region comprises of 994 villages. Some of these villages are tucked away within the dense urban fabric of the city – called gaothans (former villages) and koliwadis (fishing community settlements). Mumbai's urban village are often mislabeled as 'slums' owing to heavy densification, leading to slum-like conditions. But unlike a slum, urban villages are not squatting settlements on public land and hence require different rules and considerations. But despite this, these villages have controversially been demarcated as slums by the SRA cell of the MMRDA. However, recently the SRA has reverted on the status of 'slum' for gaothans, but is yet to develop a development policy for urban villages. These villages initially fell under a rehabilitation scheme called the Gaothan Expansion Scheme (GES), that allotted 10% for the villagers from whom the land was acquired, with provisions for non-landowners. A part of the allotted land would be reserved for appropriate social and physical infrastructure. However, the scheme has been poorly implemented citing problems insufficient records, problems establishing inheritance rights, encroachment by other existing gaothan and other project affected persons (PAP) (Babu, 2015).

Sources

4.23. 'Photograph of a Warli Painting'. Original Art by - (Dombre, 2017). Photograph – Unknown. Retrieved from – mojarto.com.

4.24. Climate migrants from Latur in temporary camps. Source - (Waghmare, 2016b)

4.25. Example of Fishing Communities in the Metropolitan Region. Source - (Unknown, n.d.-a) Edited by Author (2018).

4.26. Agrarian Villages swallowed by expanding cities. Original Photograph by Author (2018) Modified by Author (2018.)

4.23

Photograph of a Warli Painting
Warlis are an indigenous tribe who are found in parts of Maharashtra and parts of Mumbai with a distinctive painting style that portray hunting, fishing and farming, festivals and dances, trees and animals, etc.,

4.24

***Kolis* (Fishing Communities)**
Kolis are also an indigenous group but are categorized differently as they maintain an intrinsic relationship with water. They have been displaced by urban expansion (like densification due to housing demand and increasing number of resorts on the coast.

4.25

Rural-Urban Migrants
Graph indicating land-holding rights of women across the top ten states in India with Maharashtra (highlighted) with 14.1%

4.26

Rural-Urban Migrants
Graph indicating land-holding rights of women across the top ten states in India with Maharashtra (highlighted) with 14.1%

4.1

Gender Imbalance

There is an obvious imbalance of women represented in public spaces in India. In Mumbai, this is partly due to a large number of rural migrants being predominantly male. While this figure is changing over time, Mumbai's gender ratio is an abysmal 862 females (for every 1000 males). This is well below the national and state averages of 933 and 922 respectively (MMRDA, 2016). This is also due to a cultural preference for sons, which has distorted the national ratio with high rates of infanticide of sex-selective foeticide. Further, women are not encouraged to join the workforce due to culturally regressive mindsets amongst many; coupled with poor rates of female literacy. Based on an IMF report an article in the Guardian reports that the country has "one of the lowest rates of female participation in the labour force among emerging markets and developing countries, only around two-thirds of women are literate" (S. Das, Jain-Chandra, Kochhar, & Kumar, 2015; Graham-Harrison, 2015). This results in less women in public spaces making the gender balance very perceivable. This also makes public spaces unsafe for women, with many cases of sexual harassment reported in cities like Mumbai and Delhi. The government attempts to resolve this by reserving train carriages for women, but it is a quick-fix solution to a systemic problem (Graham-Harrison, 2015). The fact that only two carriages are reserved in fourteen or sixteen carriage trains reflects the limited participation of women in public and work life in Indian societies [Image]. From a legislative perspective, India's Constitution [Sources?] promises equal rights regardless of caste, gender, religion, class, or ethnicity. But discriminative practices are deep-rooted and manifest themselves in many ways.

For instance, it affects access to affordable housing. Single women in the city of Mumbai, despites its cosmopolitan image, struggle to find rentable accommodation due to their marital status. This also reflects in limited rights (cultural, not constitutional) for women to own property. The skewed gender ratio also leads to trafficking of women in the country and prominent red-light districts in cities like Mumbai and New Delhi. Mumbai is also uniquely and famously home to the Dabbawallas (translates literally tiffin-men) who deliver lunch boxes to work places from homes using Mumbai's vast train network. They are branded with the heartening promise of hot lunches from mothers and wives (Percot, 2005). While the Dabbawallas are celebrated by many as a unique blend of formality and informality (Mehrotra, 2007), it is but an example of the societal perception of women's roles – providing hot lunches.

This is also reflected in land-ownership rights for women. On average, 12.9% of Indian women are owners of land-holdings, compared to 17% in China. This is critical for the country because it is a crucial step towards achieving sustainable goals to end poverty, ensuring food security, gender balance and improved human development indices. With the decline in agriculture, men in rural households move to non-farming related professions or migrate to cities as labour migrant. Women take on more farm responsibilities due to this shift. However, the lack of land titles deprive them from being recognised as legitimate farmers and are denied credit or government benefits (Tripathi, 2018). While the national government has a policy for joint land titles from the 6TH Five Year Plan (1980-5), it has fared poorly in implementation. This policy was further reinforced in the 9TH Five Year Plan (1998-2002) but women are unaware of their rights or fear retribution from local land owners (Dubochet, 2013). Policies to address the decline of agriculture need to include women's land rights for policies to succeed.

Notes

4.27. Two carriages reserved for women as a solution for women safety. The graphic with the train carriag-es is representative of the amount of women participating in the Indian labour-force.

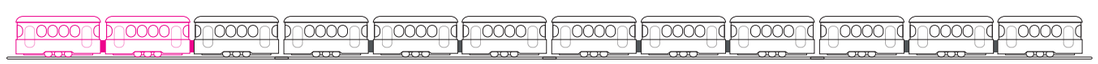
Sources

4.27. Image by Author (2018).

4.28. 'A 'ladies special' train'. Original Image (Chitrakar, 2015). Edited by Author (2018)

4.29. 'Gender Imbalance and Red-light districts'. Original Image – Getty Images/CC. Edited by Author (2018)

4.30. 'Women land holding rights.' Data source and original graph - (Tripathi, 2018). Graphic Redrawn by Author (2018).



4.27

4.28

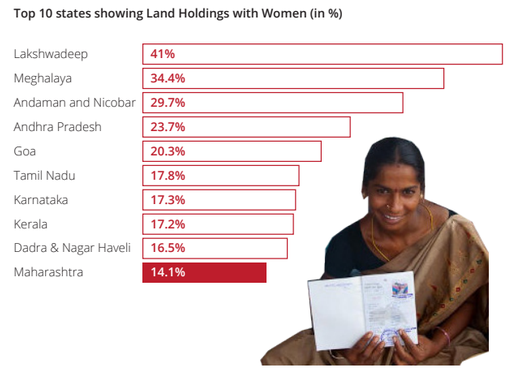
Gender Imbalance in the Indian labour force

Creation of segregated "safe spaces" for women in train carriages. But does not guarantee safety for women outside this bubble.

4.29

Gender Imbalance and red-light districts

Trafficking of women from rural areas to fill the imbalance and resulting in red-light districts.



4.30

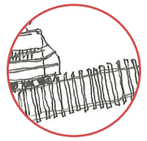
Women Land Holding Rights

Graph indicating land-holding rights of women across the top ten states in India with Maharashtra (highlighted) with 14.1%

Notes

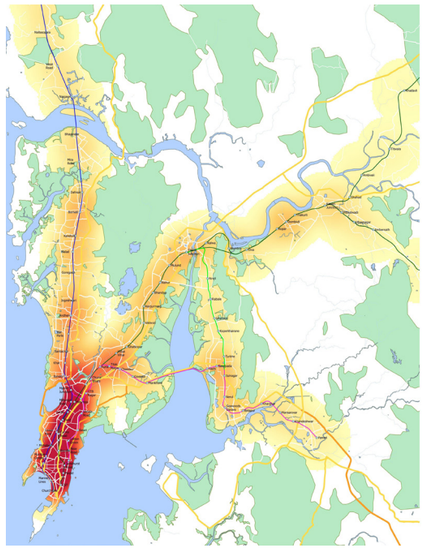
Images showing gender imbalance accross different categories with spatial implications.

4.1



Urban Mobility and Form

4.31



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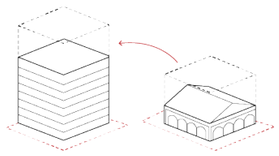


4.32

FSI and TDR

The creation of Urban form in the Mumbai Metropolitan regions is primarily driven by FSI and TDR Norms. This has led to haphazard urban expansion and high real-estate values in the MMR. Less space for expansion within the city forces the city to increase the FSI to promote growth. The typical FSI for the island city of Mumbai is 1.33, which compared to cities like Hong Kong is not very high. But the MMR allows for TDR or Transfer of Development Rights, which allows developers to transfer land rights from one area to another. These transfer rights are limited within municipalities in the MMR. Mass-market housing projects, which are often speculative investments coupled with extremely high real-estate value. For example, agricultural land or historic buildings can transfer their unused land rights to any other place that requires urban growth and infrastructure. It is based on the theory that all cities have a certain amount of development potential. However, in Greater Mumbai it has resulted in unequal development due to the island city receiving the most amount of TDR despite it being better developed than other parts of the municipality (Nallathiga, 2005). There are set limitations for the island city to accept TDR but the MCGM (also known as BMC) has made exceptions that have led to this unequal development (Bharucha, n.d.).

The municipality also allows developers additional FSI northward of the island city as a slum-rehabilitation politcy. Additionally, a real-estate developer can buy TDR from the municipality to a certain extent and is dependent on the market rates for additional rights (Nallathiga, 2005). This has resulted in high unaffordable realt-estate prices forcing a dispersed mobility pattern.

Urban Mobility

The Greater Mumbai Region features the fourth most dense urban area in the world with an estimation of 30000 people living per sqkm (Cox, 2012). Furthermore, nearly 50% of the population live in slums which occupies only 8% of the city's surface (P. K. Das, 2015). Mumbai has been an attractive home for migrants from colonial times when it was attractive commercial centre. Overtime its popularity as the financial capital with a booming service industry has drawn labour migrants from the rural hinterland seeking jobs. This increase in concentrated density is also partially due to Mumbai's physically geography, the island city and the immediate suburban area (known as greater Mumbai) does not offer much room for expansion. While expansion towns have been created (Navi Mumbai) and transportation links to nearby towns have been established to reduce the pressure on the core city, the service jobs have retained monopoly within the island. This has led to large parts of the metropolitan region travelling to the centre seeking jobs [Fig. 4.33].

Additionally, the peripheral towns of the metropolitan region have poor infrastructure. While there are development projects in these areas, there is uneven growth in different sectors. One example is Kasara, which houses multiple tourist complexes but lacks a hospital for its residents. Or Khopoli, a small industrial town that is seemingly full of job opportunities but still has many residents travelling to the city (2 hours and 30 minutes away) for work. This is partly because many industries are keen to employ migrants from poorer countries who work more hours for less pay and accept minimal job security. Khopoli also houses a Tata Power Plan, a hydroelectric project that powers Mumbai and Pune (next closest metropolitan city) is ironically subjected to load-shedding timetables (Fernandez, 2011). Such conditions are common in various peripheral towns in the region, and forces residents to make long daily commutes for work to access better livelihoods.

Notes

Spatial Impact: Heatmap of Mumbai: Local Train & Station Density taking into account the proximity of stations and the frequency of trains. Density Scale: Dark Red (highest) to Light Yellow (lowest). South Mumbai has the highest density (dark red) as it is serviced by 3 railway lines (Western, Central & Harbour) in a narrow land area. Away from the South Mumbai, one can see densities decreasing to yellow-orange – the neighbourhoods within the city limits and those beyond it are serviced by only one railway line. Frequency reduces drastically in remote suburbs beyond Kalyan (light yellow zone).

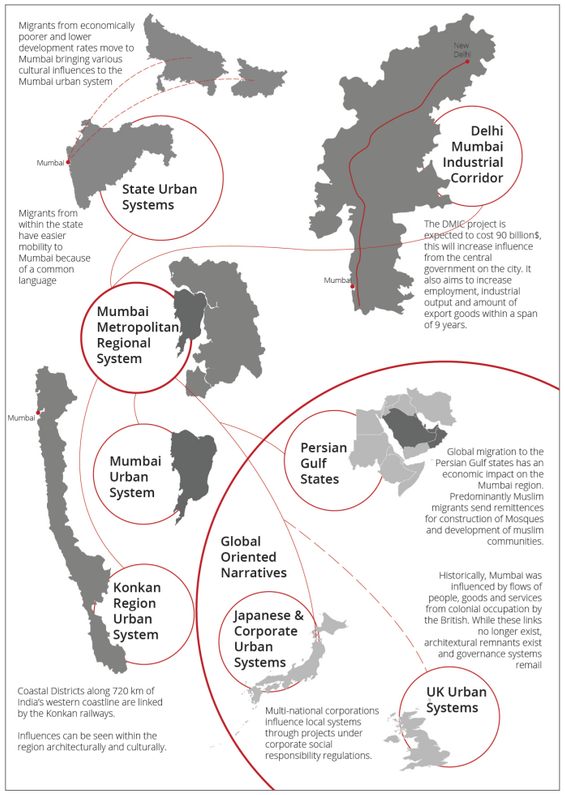
Sources

4.31. Additional FSI for Real-estate Developers. Original Image - (Unknown, n.d.-b). Edited by Author (2018)

4.32. TDR for Heritage Buildings. Original Image (Unkown). Redrawn by (Author, 2018)

4.33. Urban Heat Map from OpenStreetMap data. (CC, 2015)

4.1



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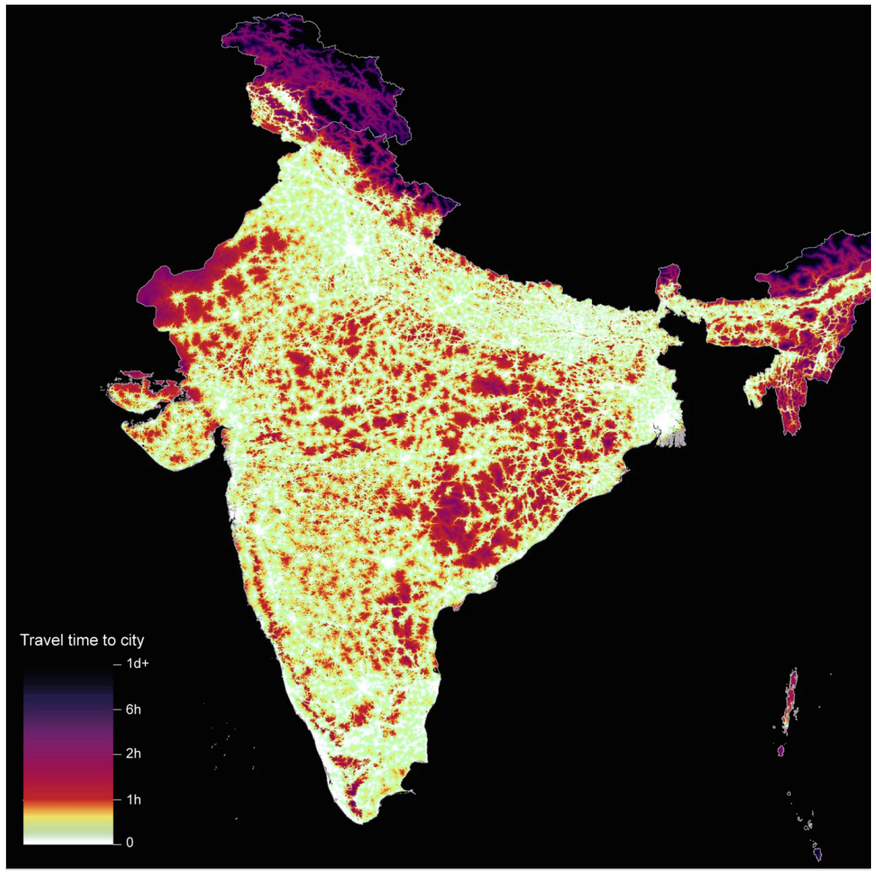


4.35

External Urban Influences

While studying Mumbai as a metropolitan region it becomes apparent that the political boundaries of the city only show a partial image of the city. Echanove and Srivastava (2014) in a research on the circulatory lives of rural-urban migrants along the Konkan region of India invoke the concept of "metopolis". The metoplis imagines the city form as a function beyond political boundaries and urban densities. The metopolis is determined by transportation networks and communication infrastructure. It implies globally oriented narratives that transcend political and fiscal boundaries. In the European context, where infrastructure comes at a high operating cost, reducing mobility options for those who cannot afford transport or communication modes. In India, travel fares and mobile communication charges are one of the most affordable in the world. While the train networks lack speed and capacity, the cheap rates ensure that anyone can afford a ticket, promising mobility for even the poorest. For instance, a sleeper-class train ticket for a journey of around a thousand kilometers will cost a little over 5 EUR (Echanove & Srivastava, 2014) [Image 1].

This ensures that Mumbai is an urban system of a complex interaction of various urban networks and nodes. The city of Mumbai is an extension of the immediate metropolitan region, the Konkan region, Maharashtra state, the Mumbai-Delhi Industrial corridor and global systems like the Gulf states, multinational corporations and various other urban systems that contribute the Mumbai Metopolis. For example, the nation Mumbai-Delhi Industrial corridor is an infrastructure project, but it opens the metropolitan region to influences from additional industries and migration from this belt. •

Image Sources

4.34. External Influences on the MMR Urban System. Source - Author (2018)

4.35. Travel distance by train in India. While the train networks lack speed and capacity, they make up in cheap fares making mobility extremely affordable. Source - (Kalia, 2018; Weiss et al., 2018)

Section References

Bharucha, N. (2017, March 26). BMC allows builder to use TDR in island city - Times of India. The Times of India. Retrieved from https://timesofindia.indiatimes.com/city/mumbai/bmc-allows-builder-to-use-tdr-in-island-city/articleshow/57832539.cms

Cox, W. (2012, May 3). World Urban Areas Population and Density: A 2012 Update | Newgeography.com. Retrieved 12 March 2018, from http://www.newgeography.com/content/002808-world-urban-areas-population-and-density-a-2012-update

Das, P. K. (2015, October 19). Claiming Participation in Urban Planning and Design as a Right. Retrieved 12 March 2018, from https://www.thenatureofcities.com/2015/10/19/claiming-participation-in-urban-planning-and-design-as-a-right/

Das, S., Jain-Chandra, S., Kochhar, K., & Kumar, N. (2015). Women Workers in India: Why So Few Among So Many? (Working Paper No. WP/15/55). Asia and the Pacific: Internation Monetrary Fun.

Deb, A. (2016). MMRDA Rental Housing Scheme: A Case of Affordable Housing. Shelter - HUDCO - HSMI Publication, 17(1).

Echanove, M., & Srivastava, R. (2014). Mumbai's Circulatory Urbanism. Mumbai/Goa: Institute of Urbanology.

Edelblutte, É., & Gunnell, Y. (2014). The tribal populations of Sanjay Gandhi National Park, Mumbai (India): A Brief Political Ecology. EG Espace géographique, 43(1), 1–70.

Fernandez, N. (2011). End of the Line. In Mumbai Reader '10. Urban Design Research Institute.

Graham-Harrison, E. (2015, August 26). Women-only carriages around the world: do they work? | World news | The Guardian. The Guardian. Retrieved from https://www.theguardian.com/world/2015/aug/26/women-only-train-carriages-around-the-world-jeremy-corbyn

Kidambi, P. (2013). Mumbai Modern: Colonial Pasts and Postcolonial Predicaments. Journal of Urban History, 39(5), 1003–1011. https://doi.org/10.1177/0096144213479326

Krishnankutty, M. (2018). Fragmentary Planning and Spaces of Opportunity in Peri-urban Mumbai. Economic and Political Weekly, 53(12). Retrieved from http://www.epw.in/journal/2018/12/review-urban-affairs/fragmentary-planning-and-spaces-opportunity-peri-urban-mumbai

London School of Economics and Political Science, Cities Programme, Urban Age Project, Alfred Herrhausen Gesellschaft für Internationalen Dialog, & Urban Age India Conference (Eds.). (2007). Urban india: understanding the maximum city. London; Berlin: Cities Programme, the London School of Economics and Political Science ; Alfred Herrhausen Society.

Mehrotra, R. (2007). The Static And The Kinetic. Retrieved from https://lsecities.net/media/objects/articles/the-static-and-the-kinetic/en-gb

MMRDA. (2016). Draft Mumbai Metropolitan Regional Plan (Draft). Mumbai: Mumbai Metropolitan Region Development Authority.

Nallathiga, R. (2005). Regulatory Impacts on Land and Housing Markets in Mumbai (SSRN Scholarly Paper No. ID 987479). Rochester, NY: Social Science Research Network. Retrieved from https://papers.ssrn.com/abstract=987479

Percot, M. (2005). Dabbawalas, Tiffin Carriers of Mumbai:Answering a Need for Specific Catering. Retrieved from https://halshs.archives-ouvertes.fr/halshs-00004513/document

Pethe, A., Gandhi, S., & Tandel, V. (2011). Assessing the Mumbai Metropolitan Region: A Governance Perspective. Economic & Political Weekly, xlvi(26 & 27).

The Free Press Journal. (n.d.). Mumbai: BDD chawl project gets three bids | Free Press Journal. Retrieved from c

Sanvitale, P. (2014, August 7). Dabbawalla, Food Express Delivery Service Made in India. Retrieved 18 April 2018, from https://www.finedininglovers.com/stories/dabbawalla-food-delivery-mumbai/

Sathe, D. (2017). The political economy of land acquisition in India: how a village stops being one. Singapore: Palgrave McMillan.

Shetty, P. (2015, March 5). The new face of Metropolitan Governance in Mumbai. Retrieved 10 January 2018, from https://aesopyoungacademics.wordpress.com/2015/03/05/the-new-face-of-metropolitan-governance-in-mumbai/

Thomas, E. (n.d.). I Won't Farm! Retrieved from http://www.bbc.co.uk/programmes/w3csvsc3

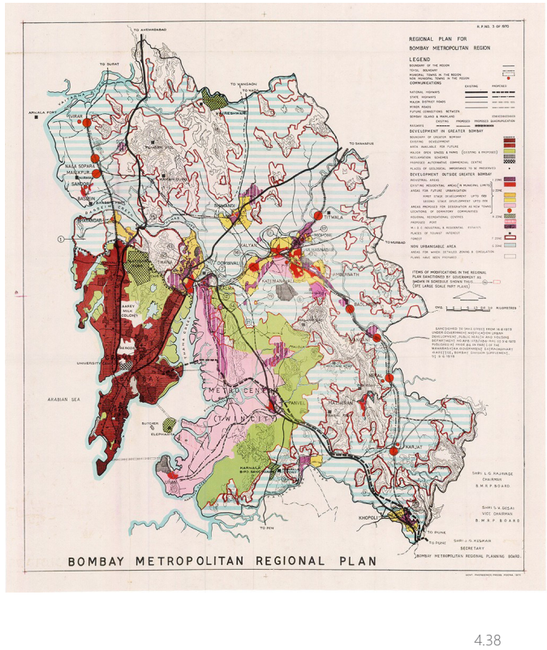
Venkatraman, T. (2018, January 6). CM Fadnavis, planning committee pass regional plan for Mumbai Metropolitan Region. Hindustan Times. Retrieved from https://www.hindustantimes.com/mumbai-news/cm-fadnavis-planning-committee-pass-regional-plan-for-mumbai-metropolitan-region/story-HT2TVhtlukVHCgb5GNphIK.html

4.2

Policy Review

MMR Regional Plan 2016-2036

As discussed in the previous chapter (11.b), the metropolitan region of Mumbai is governed under a polycentric governance model, albeit a poorly functioning one (Pethe, Gandhi, & Tandel, 2011). The region is planned under a statutory plan prepared by the MMRDA and revised every 20 years (1971-95, 1995-2015 and 2016-2036) [Fig. 4.38-39.]. The 17 ULBs under the region are taken into consideration in the preparation of the plan with 7 areas planned [Image 3] under Special Planning Authorities (SPAs). Ideally, the MMRDA's regional plan demarcates and regulates urbanisation of the peri-urban areas. However, Krishnakutty (2018) in a reflection of the planning in peri-urban areas in the Mumbai Metropolitan Region, writes that sovereign planning interventions made after a regional plan (SEZ Act of 2005) do not consider the MMRDA regional plans in force. Instead, they usually run in parallel to the spatial plans in place and the changes are incorporated into the subsequent plan. Various infrastructure projects, like a second international airport [Fig. 4.37.] were never a part of the regional plan before they were conceived (Krishnankutty, 2018). It can be conjectured from this that the MMRDA does not revise the regional plan at intermittent periods to take into consideration changes in state and union legislation. The current regional plan (2016-2036) is pending approval from the state government as published by newspaper reports from January 2018 (Venkatraman, 2018). The following is an overview and critique of the said document based on the 9 criteria set in chapter 4.1.



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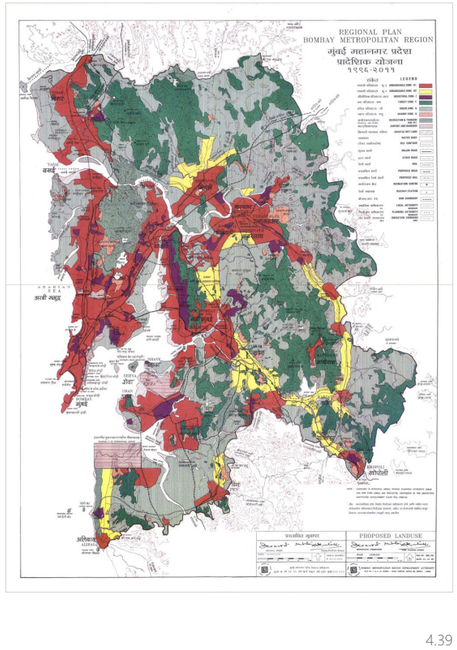

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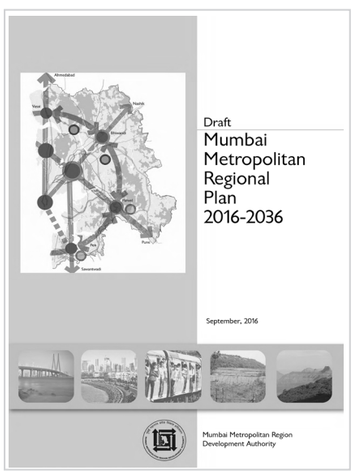

4.36

4.37

New International Airport
Example of large consequential indfrastructure projects planned independently of the regional plan. The proposed second international airport in Panvel was not a part of the MMRDA plan in its conception (Krishnakutty, 2018).

Overview

The MMRDA bases its regional plan document [Fig. 4.36] (138 pages not including 42 maps) on an analysis of the state of the existing region, supported by statistical date, spatial growth trends, etc., with respect to population growth, physical infrastructure, housing needs and environmental needs amongst various other issues. Based on existing conditions it speculates relevant issues that require planning intervention; for which, it proposes goals, objectives and strategies based on future needs and projections. This is followed by a detailed proposal for 2036 with regional structure, land-use zoning, development control regulations (for areas not planned under ULBs), expansion of transportation networks, affordable housing, infrastructure and the environment.

It concludes with a chapter on strategies for implementation and monitoring.

Goals for the region is to facilitate balanced growth in the region, promote economic growth through secondary sector development, improve mobility, integrate the metropolitan region and develop location specific strategies for individual cities, earmark and enhance conservation areas, future urbanisation supported by institutional framework for governance, and an integrated regional network of open spaces and infrastructure. Strategies for these goals have been elaborated in the table adjacent.

Image Sources

4.36. Cover of the draft of the MMRDA Regional Plan 2016-2036. This is the third regional plan issued by the MMRDA since its conception. Source - MMRDA (2016)

4.37. Original Image source - (AFP/Stringer/Getty Images, CC). Modified by Author (2018)

4.38-4.39. MMRDA Plans from 1971 and 1996. Source – MMRDA (1974) and MMRDA (1996).

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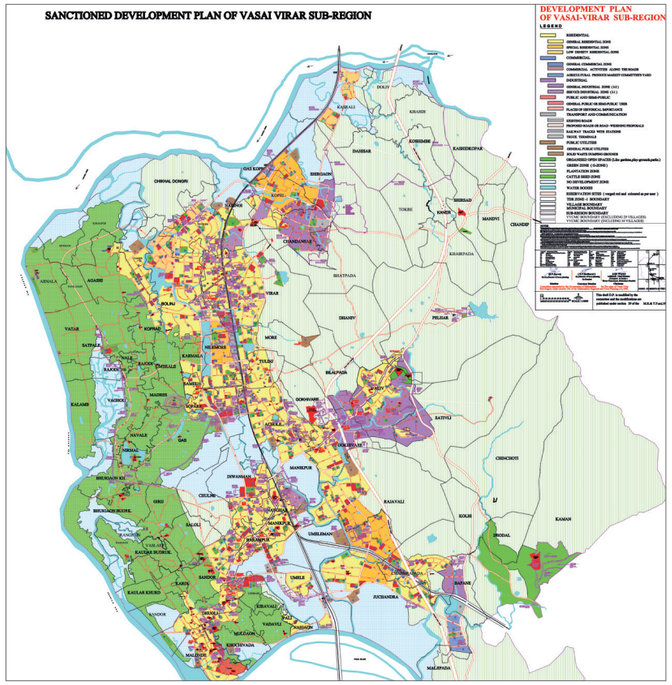

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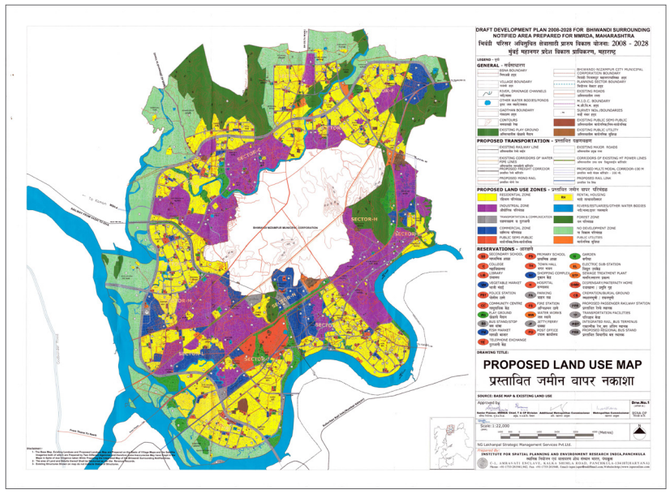

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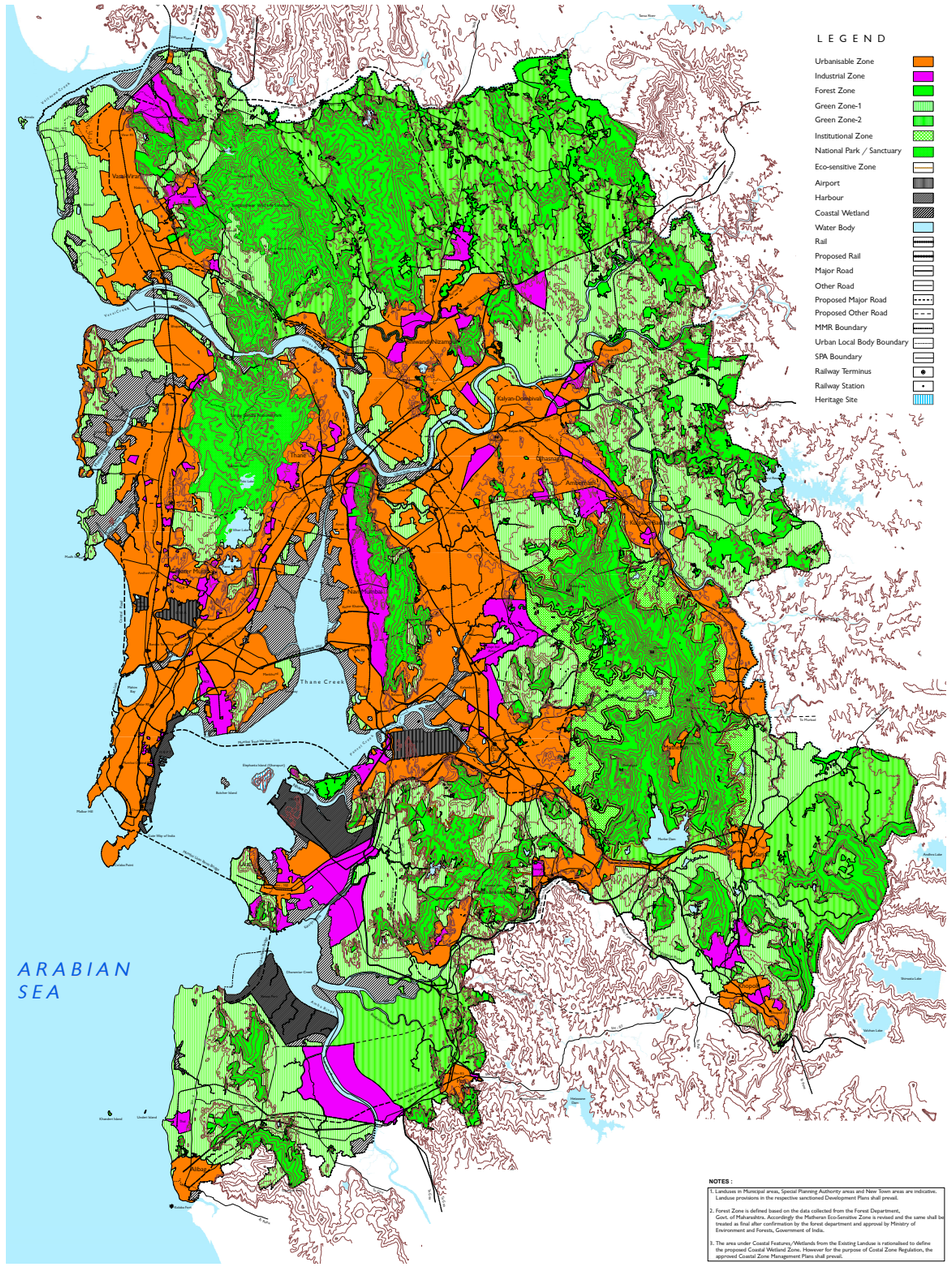


4.42

Image Sources

4.40. Vasai-Virar City Municipal Corporation Plan by CIDCO

4.41. Bhiwandi Special Planning Area Plan

4.42. Regional Plan for the MMR 2036. Source (MMRDA, 2016)

4.2

MMRDA's Current Goals and Strategies

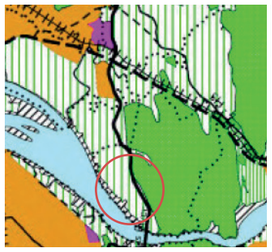
1 Balanced Regional Growth

1) Local Development Centres (LDCs) – that would serve as local market centres, enable development in tune with local skillsets, rectify deficiencies in amenities, skill upgradation centres, realisation of government schemes.
2) Encourage Tourism
3) Ecourage Primary Sectors

2 Encourage Manufacturing in the Region

Encourage Small & Medium Enterprises (SMEs)

Industrial Zones - Earmarked Industrial Zones but also allows industrial activitiy in parcels of land in the Urbanisable Zone and the Green Zone-1 (one-fourth of the MMR).



Industrial Centres
Large scale industrial centres allocated in the master plan.

Flexible Green Zone
Agriculture lands fall under the greenzone, but the master plan is flexible on the definition of greenzone - which allows some industrial activities.

Spatial Consequences
This results in areas marked as green zone, but a closer look of the satellite imagery shows that there are large industrial warehouses in these areas.

3 Governance

1) Extend government framework to peri-urban areas
2) Decentralised sub-region offices

The MMRDDA expanding its realm of control through special planning authorities (SPAs).

4 Open Space Network

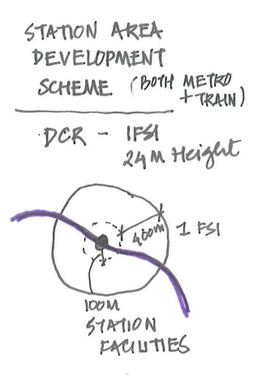
1) Connect heritage sites and tourist sites
2) Multi-modal corridor with a dedicated green corridor
3) Buffer around rivers, forests and water bodies

5 Mobility

1) Extend Sub-urban Railway with additional sub-urban stations
2) Multi Modal Corridor
3) Transport-oriented development - areas 500 metres from suburban stations and metro railway stations will be treated under the Station Development Scheme (FSI 1).

Suburban Railway
Existing Railway network

Metro Railway
Proposed parallel secondary transport system



6 Encourage Manufacturing in the Region

7 Regional Infrastructure

8 Simplified Zoning and DCRs

9 Regional Information Systems (RIS)

Notes

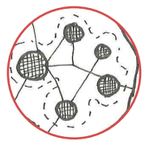
4.43. Summary of goals and strategies of the MMRDA Regional Plan 2016-36.

Sources

4.43. Compiled by Author (2018). Data and information sourced from MMRDA (2016).

4.2

Discussion of Policy with Research Themes



The Politics and Conflicts of Urban Governance

Throughout the document the MMRDA occasionally mention a decentralised model for the region. They also propose the introduction MMRDA offices in sub-regions decentralized from the main office. But despite claims of decentralisation the MMRDA does extend a large influence over the region. 17 towns are planned based on sanctioned plans of the ULB, but there are 7 Special Planning Authorities that fall under the MMRDA (SPAs) managing various sub-regions [Fig. 4.40-.41] in the MMR. The MMRDA regulates the rest of the region through Local Development Controls. The extent of the LDCs have been reducing overtime as the SPAs issue sanctioned development plans to control the region [Fig. 4.44.]. The existence of these SPAs allows the MMRDA to expand the urban limits in the region.

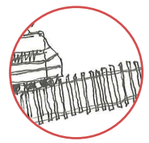
The hatched areas are planned under the ULBs (urban local bodies) or SPAs authorised by the MMRDA, unhatched area governed under blanket rules called local development controls or LDCs.

Urban Identity

The MMRDA Plan (2016), notes that there is a lack of regional identity as the boundary of the MMR is not common knowledge. The MMRDA and its political boundaries were conceived in 1974 which partially coincide with two state districts, Raigad and Thane. But it does not propose any proposals to address the need for a cohesive regional image.

Real Estate driven Urban Form

The document does not delve into FSI regulations for the ULBs and the SPAs. These are presumably detailed out in the respective sanctioned local plans. But it needs to be questioned if useful FSI regulations can be illustrated to help local bodies to better plan for their regions. The document does propose regulations for areas not under sanctioned plans under Local Development Control Regulations. It features special FSI zones in LDC area – TOD (transport oriented development) – additional FSI for 500 m around stations. The GES (Gaothan Expansion scheme) – additional FSI for 200 m around existing villages (or gaothans).
TDR – like with FSI, the document does not delve into issues with TDR as this would fall under the respective sanctioned plans. But housing is an important issue that document prioritises, and issues such as TDR and FSI do affect markets and how affordable housing is delivered to relevant markets.



Urban Mobility

Various transportation networks are proposed across the MMR.
- no time schedules and makes it difficult for a read to estimate and visualize the changes and the feasibility comes to question; even in the next 20 years.
- there is a priority list for most relevant transit projects but information of relevant body to complete the project is missing. Additionally, one can speculate that decentralization of the region should allow local bodies to execute and develop these projects as per needs of the sub-region.
- missing impact of large projects of peri-urban areas. For example, the first project on the priority list is the multi-nodal corridor between the southern most town of Alibag and the northern most town of Virar (in the MMR). The project spans a 129 km stretch of Virar – Alibag and is labeled as multi-nodal transit project. But, the draft plan does not plan or give proposals to mitigate any negative impacts on the peri-urban areas [Fig. 4.45.] .
- New roads are planned through notified forest areas without any impact assessment of the project on the integrity of the forest bio-diversity.
- While the entire document does talk of lack of mobility access to some villages in the region, but the transport section only talks of large scale infrastructure projects and does not emphasize the need to connect these villages.

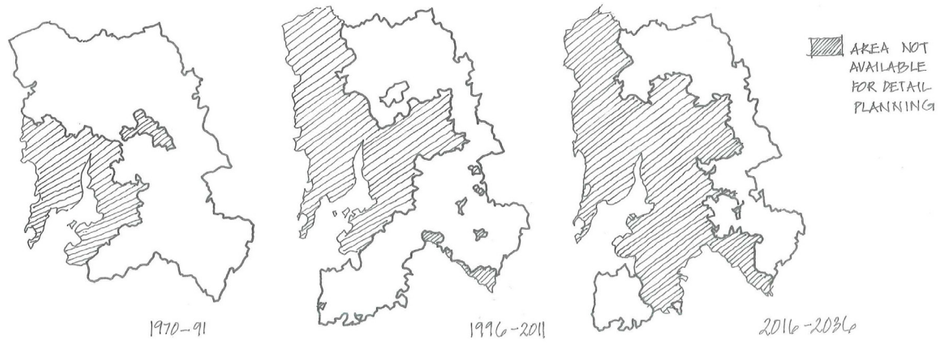
Notes

4.44. Area under Development Control Regulations reducing with more areas planned with detail master plan.

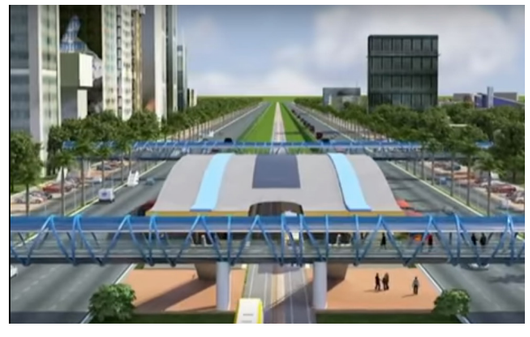
Image Sources

4.44. Original Image Source - MMRDA (2016).

4.45. Screenshot from MMRDA advertisement of the Virar-Alibag multi-nodal corridor with potential to "open the hinterland for sustained development". (MMRDA, 2014) Retrieved by Author (2018).



4.44

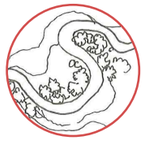


4.45

4.2

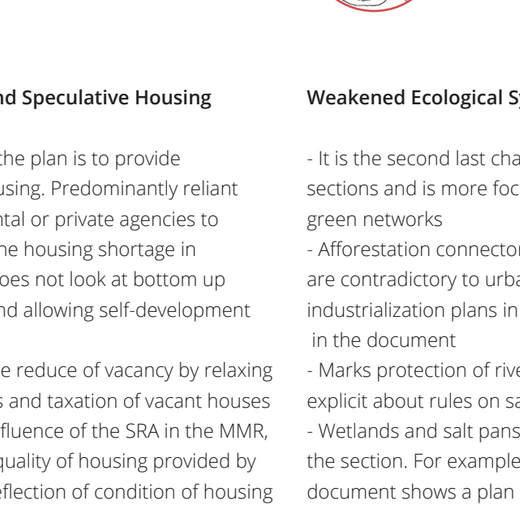
Affordable and Speculative Housing

- key focus of the plan is to provide affordable housing. Predominantly reliant on governmental or private agencies to compensate the housing shortage in the regions. Does not look at bottom up approaches and allowing self-development projects.
- Does propose reduce of vacancy by relaxing rental controls and taxation of vacant houses
- Expanding influence of the SRA in the MMR, despite poor quality of housing provided by the SRA. No reflection of condition of housing provided by the SRA.
- Proposal of an additional body to provide Low-income group (LIG) and Economically Weaker Section (EWS) houses. (Another body?) Might be better to provide tools to allow ULBs to manage housing shortage locally
- Lack of awareness of rural lifestyles and social structure (as with slums) and instead propagates the same mass-produced housing stock.



Weakened Ecological Systems

- It is the second last chapter of the proposal sections and is more focused on tourism and green networks
- Afforestation connector projects are contradictory to urbanization and industrialization plans in previous chapters in the document
- Marks protection of rivers but needs to be explicit about rules on sand-dredging, etc
- Wetlands and salt pans not mentioned in the section. For example, the beginning of the document shows a plan with salt-pans in the region under threat, but the plan proposing future urbanisation marks a few salt pans as local urban development centres
- Forest, heritage site, coastal wetlands and water bodies notified on the plan does not look into encroachment of these areas. Or is depicted after encroachments (the wetlands are marked based on the land-use in 2008 and not as geological depiction.
- Many heritage sites excluded in the notification
- Vague wording (as with many parts of the plan) – For example “urban creeks have a major role in the health of rivers and need to be appropriately addressed within the cities through appropriate technologies. Watercourses like [...] need focused attention.”



4.46

Image Sources

4.46. ‘Horizontal Slums to Vertical Slums. Affordable Housing as a result of MMRDA Policy. Sketches by Author (2018).

4.47. Screenshot from MMRDA Regional Plan 2016-2036 (MMRDA, 2016). Retrieved by Author (2018).

Reduced Rural Lifestyles and Agricultural Production

-one of the goals is to encourage primary sector livelihood opportunities towards a “balanced regional development”. But the plan is unclear on how this goal will be implemented. Urban villages that fall under the DCR zone have been specified under the Gaothan Expansion Scheme (GES). While the research section. However, the Development Control Regulations do propose the Gaothan Expansion Scheme

Water Management

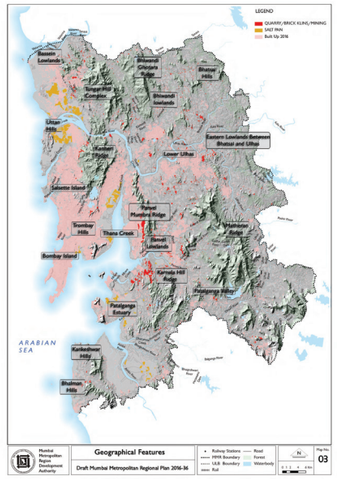
- The document does describe water management policies to address the severe water shortages in the region.

Urban Citizenship for Non-Urban Groups in the MMR

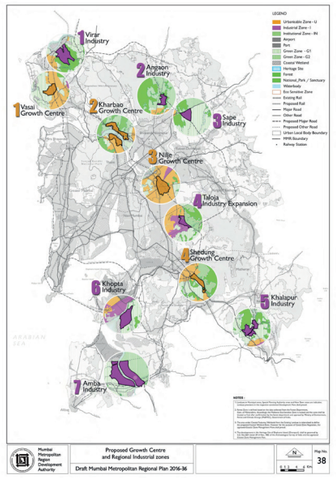
– remarks on existence of tribal populations in the region but does not account for them in the proposals.

Gender Imbalance

The MMRDA acknowledges that the sex ratio in the MMR is 862 (less than the national average of 933 and state average of 922). This is apparent in the skewed representation of women in public spaces, but there seems to be no policy changes to address this imbalance. The assumption is that this is a cultural and national issue that has to be addressed on a larger level,



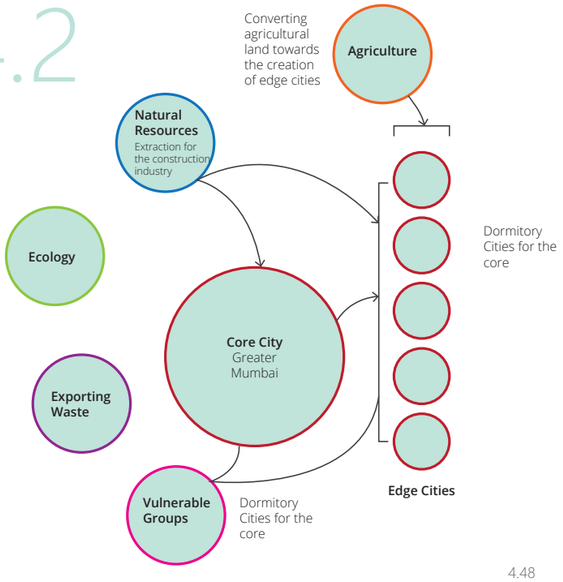
4.47.1 While the report discusses key geographical features under threat from urbanisation in the research section.



4.47.2. It allots heavy industrial activity and urban development centres on these same regions.

4.47.3. More focused on tourism and green networks. Afforestation connector projects contradictory to urbanization and industrialization plans in previous chapters

4.2



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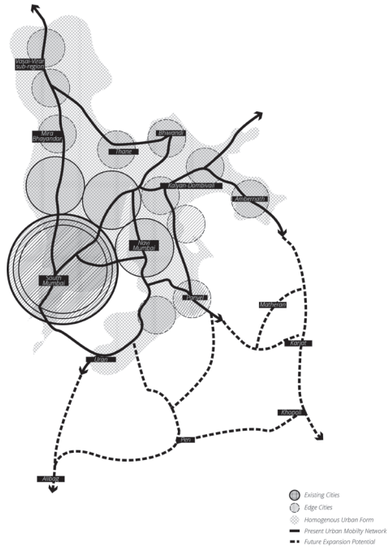


4.49

Conclusions

a) The Regional Plan is not without its merits. The road to hell is paved with good intentions. The research undertaken is thorough, the goals and strategies are admirably derived from existing conditions and future projections. However, the proposals and policies for the 2016-2036 plan fail to thoroughly follow up on the goals and strategies set out in the beginning. Furthermore, there is no credible vision for the metropolitan region apart from declarations for economic growth. Considering critical issues like over-population, flooding, pollutions, etc., there is no comprehensive vision to make this region resilient to the extreme conditions that prevail.

b) Environmental concerns and the issue of declining food sufficiency are discussed early on, but the research does follow through to design and policy solutions.

c) The MMRDA plan is multi-scalar. They appoint Special Planning Authorities (SPAs) to plan areas as expansion zones for the city of Mumbai, but at the expense of existing Urban Local Bodies (ULBs) in the region. The MMRDA justifies this citing that smaller government bodies (like village *panchayats* or village leaders) lack the resources to "handle issues related to urbanisation" (MMRDA, 2016). But by expanding its overreach in the region, it neglects smaller less powerful stakeholders involved. The MMRDA rules and guidelines have to be accessible to various groups of people in order affect effective public participation in urban design processes. For example, an NGO called Namita from Tamil Nadu graphically re-represents CRZ (Coastal Regulation Zone) Rules with the local language to make it more accessible to various groups not skilled in reading legal and scientific terms.

d) Inconsistency in different chapters, afforestation plans in one chapter overlapping with urbanisable or industrial zoning in another. Or new roads proposed in notified forest areas.

e) The problem of a centralised core - the present governance focus is often directly or indirectly in service to the core city. The edge cities are a place where the industries, or airport infrastructure are moved out from the Greater Mumbai to the peripheries to help the core city. •

Notes

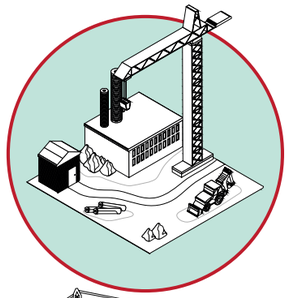
Illustrations showing the urban bias in the metropolitan region of Mumbai.

4.48. The peripheries are aligned to serve the core city.

4.49. Administration of the MMR is organised as an extension of the core city of Mumbai making the peripheries and the edge cities an urban blob of Mumbai.

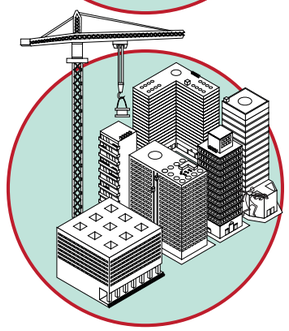
Sources

4.48-4.50. Illustrations by Author (2018).



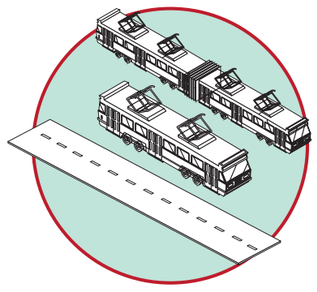
Industrial Development

Intensification of manufacturing and industrial growth to move the working population away from agrarian jobs and opening agriculture land to industry intensive SEZs



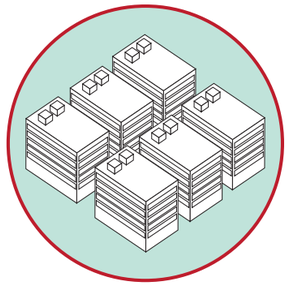
Urban Development

Large scale urban and infrastructure development to make Mumbai a 'world-class city'.



Mobility

Intensification of regional networks. Suburban networks with additional secondary transport network (metro) to take pressure of the primary transportation mode.



Housing

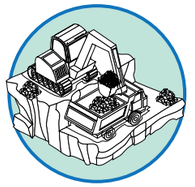
Focus on mass-produced housing that is rushed poorly executed and are a short-sighted approach and inefficient approach to address Mumbai's housing crisis

Ecology

Ecologically sensitive areas like mangroves and wetlands are in threat of encroach-ment by urbanisation and real-estate development

Agriculture

Agriculture is seen as a primary activity to be replaced with industri-al activities. And farming

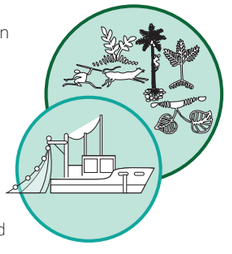


Resources

Natural resources in the peri urban region are in service to the construction industry. Variety of brick kilns, quarries, sand dredging are produced.

Exporting Waste

Peri-urban lands being used to accommodate landfills from Greater Mumbai. Regional landfills are being planned as short term solutions to the regions waste accumulation.



Indigenous Groups

Adivasi groups lose out on their land to develop-ers and work as construction workers. Fishing communities also give up their space drying their equipment to influx of migrants

Migrant Workers

Natural resources in the peri urban region are in service to the construction industry. Variety of brick kilns, quarries, sand dredg-ing are produced.

4.50. Summary of Policy: Urban Expansion is focussed on hyper urban-development, industrialisation, mass housing and transport infrastructure at the expense of the peripheries.

5
Physical Analysis

Assessing the physical characteristics of the MMR and VVSR

Physical Analysis - Mumbai Metropolitan Region
Physical Analysis - Vasai-Virar sub-region

Image Sources

5:0. Satellite Image of the MMR. Source ESRI (2017). Edited by Author (2018).

5.1 Analysis of the Region

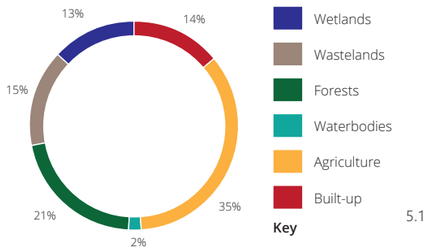
Mumbai Metropolitan Region: Introduction

Statistics

The Mumbai Metropolitan Region extends 4355 sqkm and is governed under various hierarchical bodies. The region includes Greater Mumbai and parts of two Maharashtrian districts. Greater Mumbai houses a population of 12.7 million persons persons and the remaining region accommodates 9 million persons, adding to a total of 21.7 million (TERI, 2014). The metropolitan region is not only a function of its urban form but includes a variety of other land-uses as described below (MMRDA, 2016).

Land Use

The landuse in the region is only 13% urban with a lare part agricultural. The MMRDA looks to reduce the areas dependent on agriculture and focus on skill development to encourage industrial development in the region. Another key landuse in the region is forest cover - some of these are protected lands but are under threat from urban expansion. These forest lands are also home to adivasi (or indigenous tribal groups).



5.1

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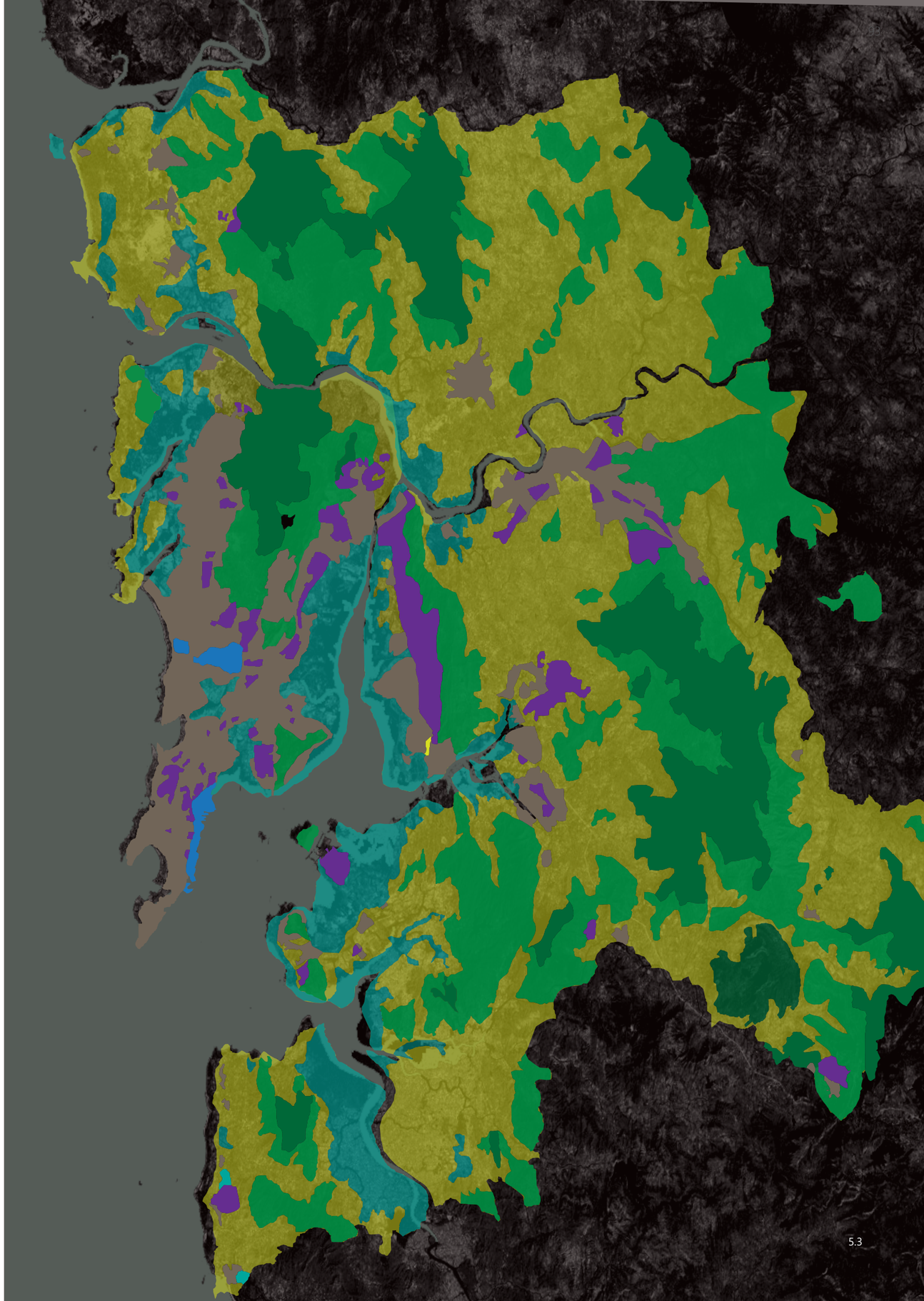


5.3

Image Sources

5.1. Land-use data. Source - (TERI, 2014). Pie-chart by Author (2018).

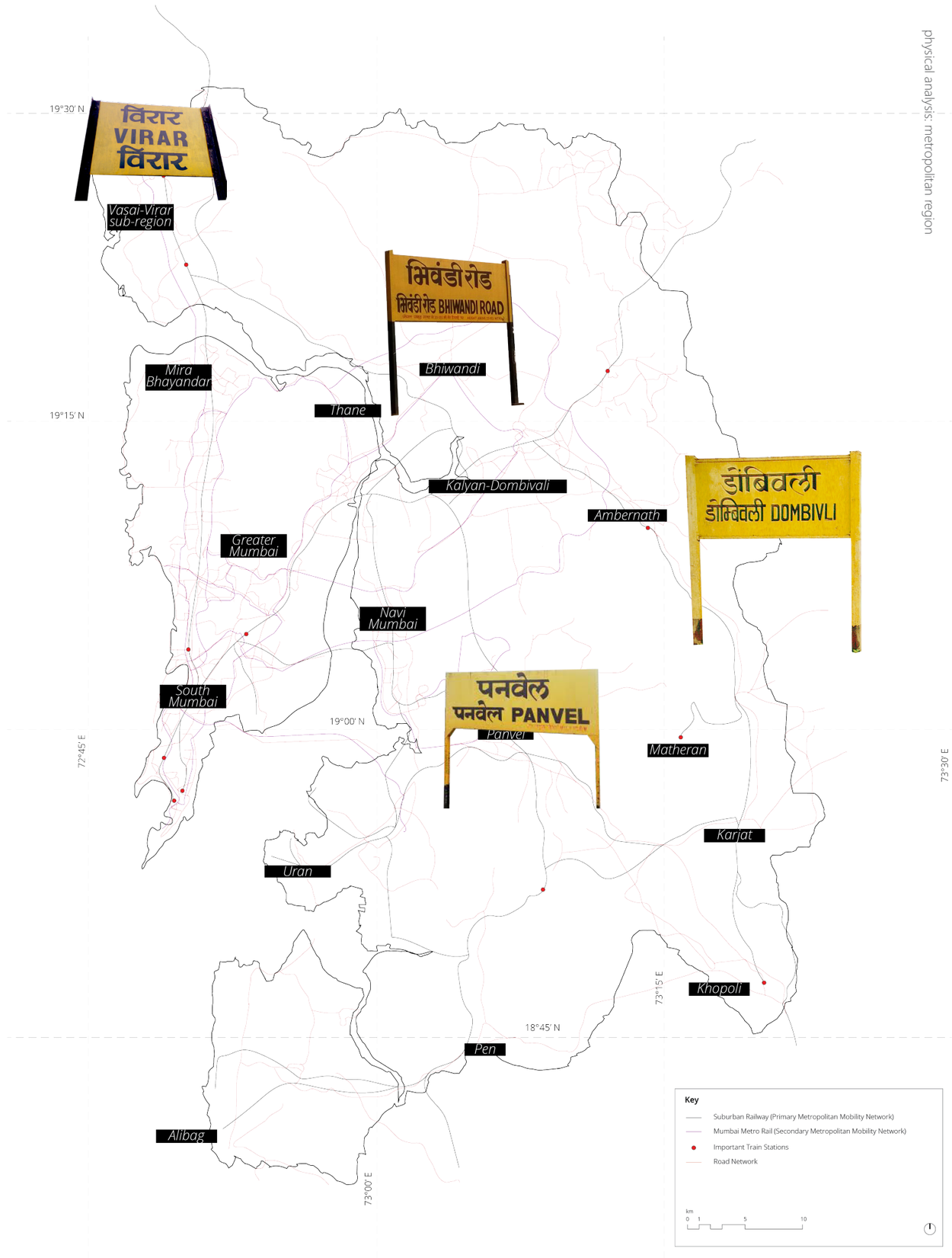
5.2. Historic Topography of Mumbai and its Environs. Image in the public domain.

5.3. Land-use map of the MMR. Source - (TERI, 2014). Map by Author (2018)

Urban Mobility

Mumbai is extremely reliant on the suburban railway (black) with many residents from the periphery traveling to the centre. It is spread over 465km with 2342 train services and carries over 7.24 million commuters per day. A secondary transport line (metro) is planned in parallel to take the load from the rail network. This is the mass rapid transit system of the Mumbai metro rail which spans over 146km. But it is potentially socially divisive - the metro air-conditioned - will ferry more the more well to do middle class, with the poorer communities traveling by the rail system which would be cheaper (TERI 2014).

Vehicular population has increased over time and various sea-links, flyovers and bridges have been planned to de-congest the roads. Public road transport is provided through buses, taxis and *auto-rickshaws.* Buses are provided by the state, Maharashtra State Road Transport Corporation (MSRTC) and the Brihanmumbai Electricity Supply and Transport (BEST) (TERI 2014).



5.5

Notes

Mobility and travel distances in the MMR.

5.4. Every minute, trains arriving at Chhatrapati Shivaji Terminus and Churchgate Station inject 2,000 people into the southern city core

Sources

5.4. Mumbai Churchgate station. Source - (Salgado, 1995)

5.5. Map of Metropolitan Mobility with travel distance by the suburban railway line. Map by Author (2018). Data source - Sources: Esri World Street Maps.

5.4

5.1

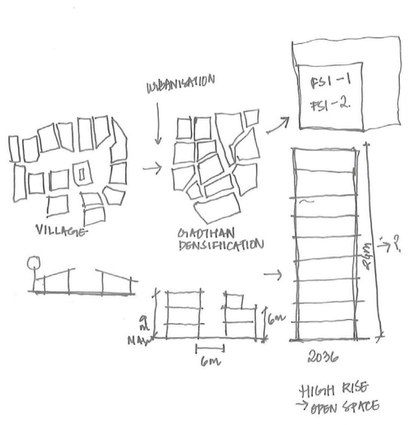
Urban Expansion

The MMRDA plans to expand the urban extents of the city by introducing special planning authority zones in unplanned areas. But in its MMRDA 2036 plan it fails to acknowledge other schemes that will result in urbanisation or rural areas. For example, the Gaothan (or Village) Expansion scheme that allows additional FSI within a 200m radius (seen as small pockets of urban growth), a legal loophole that will be attractive to small builders.

2003

2017

5.6



5.7

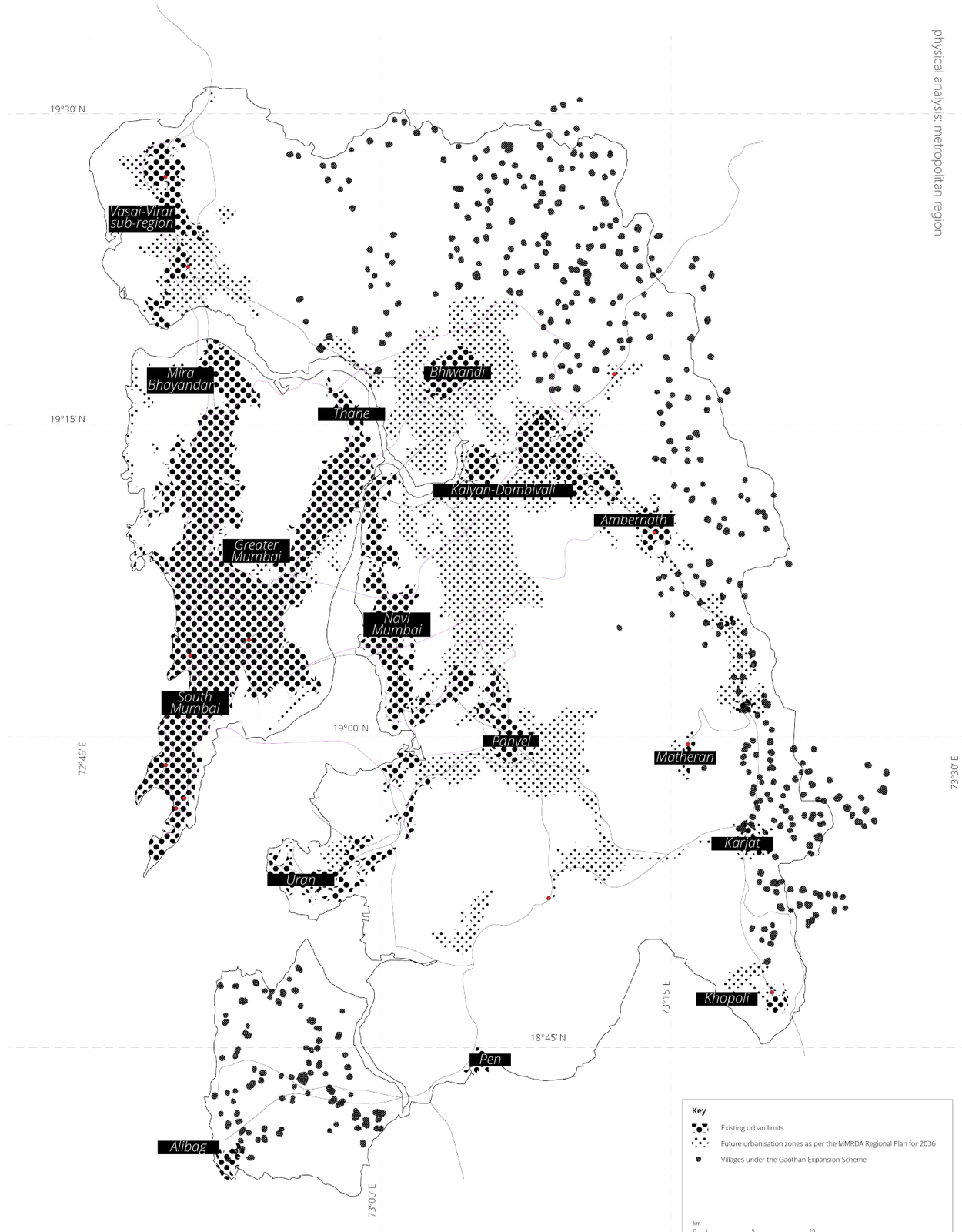
High FSI and reduced building regulations for Gaothans in Mumbai can resulted in highly denSified urban villages as seen here in Shenzhen. While it provides affordable housing for migrants, it comes at reduced livability and spatial quality.

Image Sources

5.6. Example of real-estate driven urban development. Source - Google Earth Satellite Imagery.

5.7. Urban villages in Mumbai are in danger of becoming highly dense similar to urban villages in Shenzen due to FSI based policy. Sketch by Author (2018). Photograph - (Luth, 2014)

5.8. Map of Urban Expansion as per the Mumbai regional plan of the MMRDA. Map by Author (2018). Data source - Sources: Esri World Street Maps, MMRDA (2016).



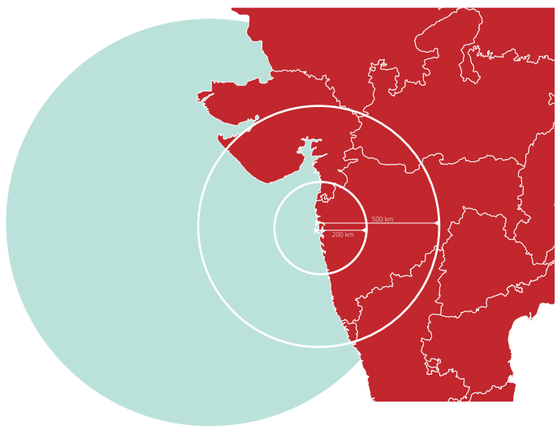
5.8

Urbanisation of the Peripheries

The MMRDA plans to expand the urban extents of the city by introducing special planning authority zones in unplanned areas. The lack of implementation of protection laws leads to the expansion into agricultural lands, wetlands, magroves, forestlands, etc.

The reduced importance of agriculture in the region has forced the city to expand its hinterland ranging from 200-500 km, making food produce all the more unsustainable (TERI, 2014).

Furthermore, heavy toxic industries are planned in the peripheries without understanding the full ramifications on the impact on the peripheral ecological systems of the region.

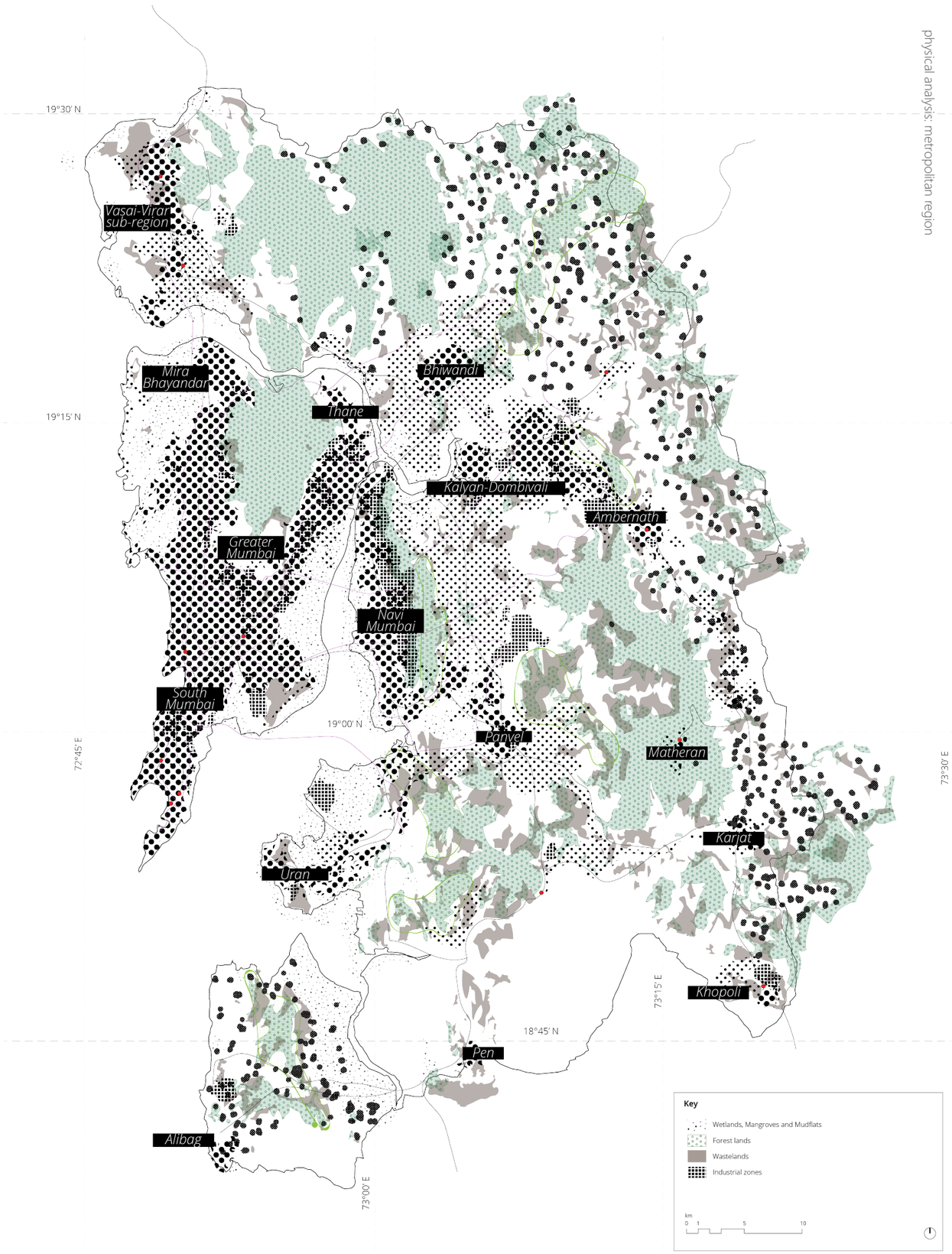


5.9

Image Sources

5.9. Dependency for Agricultural produce of the city extends towards the hinterland. Data Source - (TERI, 2014). Map by Author (2018).

5.10. Map of Urban Expansion as per the Mumbai regional plan of the MMRDA with ecologically sensitive areas. Map by Author (2018). Data source - Sources: Esri World Street Maps, MMRDA (2016).

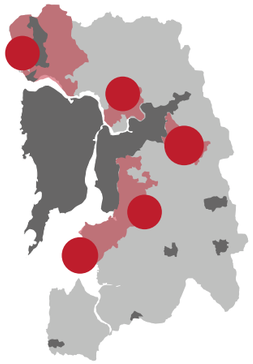


5.10

Relevant Sub-Region Scale

The MMR

The Existing Urban extents of the Mumbai Metropolitan Region.



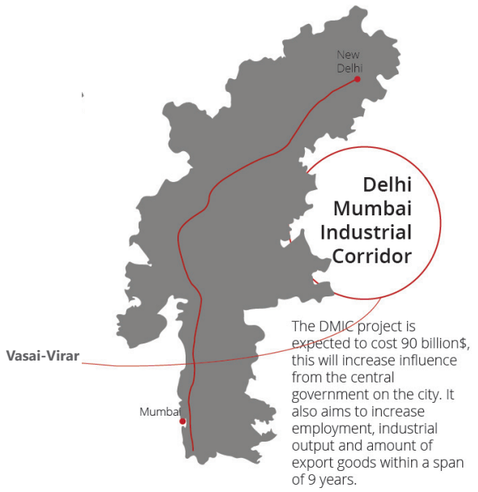
Edge City Expansion

The plan for Urban Expansion in the MMR with five main edge cities that will serve Greater Mumbai

Vasai-Virar sub-Region

The VVSR is an edge city that is a potential test case that represents similar conditions to other edge cities

The MMR is an extremely large region, with an expanding urban core. There are five edge cities planned under the special planning authorities (SPAs). The project will focus on one sub-region - that falls under the Vasai Virar City Municipal Corporation. The conditions of this edge city is similar to others in the MMR. It is also extremely relevant as it falls under a large national level infrastructure project - the Delhi Mumbai Industrial Corridor. Another project - the Virar-Alibag multi-modal transport project



5.11

Image Sources

5.11. Satellite Image of the Vasai-Virar sub-region. Source - Esri. Edited by Author (2018).

5.12. Edge city expansions in the MMR. Illustrations by Author (2018).

5.13. Relevance of the Vasai-Virar sub-region. Illustration by Author (2018).

5.2 Analysis of the Sub-region

Physical characteristics Vasai Virar Sub-region: Introduction

Bassein Fort

Modern day ruins of the 16-17th century Portuguese outpost.

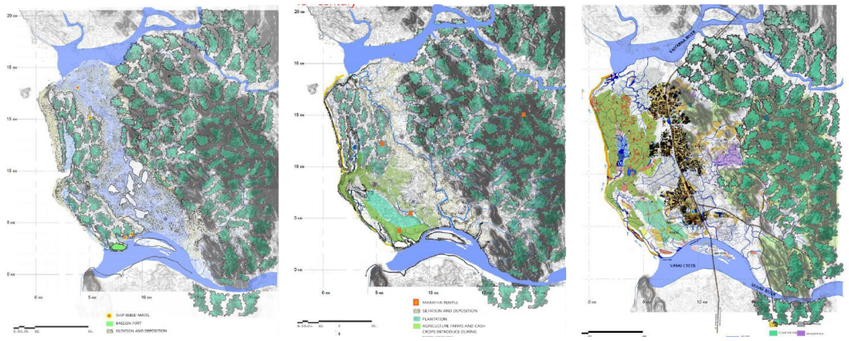
Statistics

The Vasai Virar sub-region consists of four municipalities – Vasai, Virar, Navghar Manikput and Nalla Sopara that accounts for roughly 11% of landuse area. The entire sub-region houses a population of 1,222,390 (Census, 2011). It covers an area of 380 sqkm and also includes 67 villages. It is partially planned for by a Special Planning Authority known as CIDCO (City and Industrial Development Corporation of Maharashtra) in accordance with the MMRDA (VVCMC, 2002).

History and Ecological Transformation

Historically, Nalla Sopara was an ancient trading port and the capital of an indigenous Middle India kingdom called the Gujarat Sultanate. Located between two estuaries, continuous flow of water permitted the movement of early ships. However, the dept of the creek reduced with gradual silting and with the advent of larger vessels, Sopara lost its significance in the region. Two islands – Sopara Agar and the Vasai Agar gradually merged with the mainland. The siltation was accentuated by the loss of dense forests due to agricultural farms required to support the settlements (Sawant, 2014). In the 16th century Vasco da Gama's discovery of a sea route to India opened to the region to Portuguese rule and eventually British colonialization. Under the Portuguese ruled from the Bassein Fort (now called Vasai). There were changes in the social structure, Hindus and Muslims were persecuted under Catholic propaganda. The region of Greater Mumbai (formerly the islets along the Salset, Thane and Mahim) was signed over to the Portuguese from the Gujarat Sultanate in the treaty of Bassein (MMRCHS & CRIT, 2005). The Portuguese ceded the region to the British East India Company in the 17th century. There was an overlap with the Martha kingdom rule during this period.

The establishment of the port in Mumbai eventually made the sub-region insignificant in trading routes. Eventually, the region regained significance with the introduction of the railway line; improving connectivity to Mumbai (Jacob & Aneerudha, 2017). But, it has predominantly remained as a region of dormitory towns serving the main city (VVCMC, 2002).



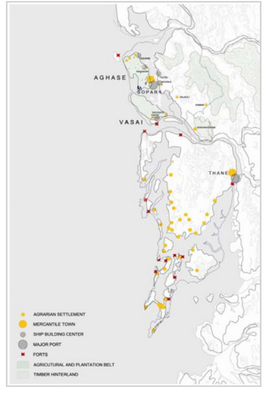
5.15

Image Sources

5.14. Photograph by (Author, 2018)

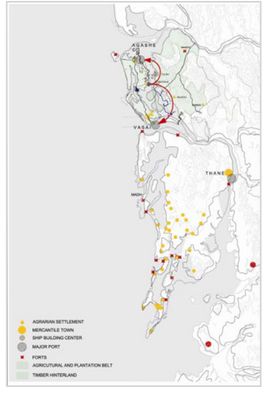
5.15. Topographic change over time.
Image Source - (Sawant, 2014)

5.16. Historic Evolution of the Vasai-Virar sub-region.
Images Source - (MMRCHS & CRIT, 2005). Image text source - (Jacob & Aneerudha, n.d.; MMRCHS & CRIT, 2005; Sawant, 2014)



> to Mid-16th Century

Nalla Sopara was a small mercantile and port town that served the surrounding agrarian & fishing settlements. Region ruled by indigenous rulers.

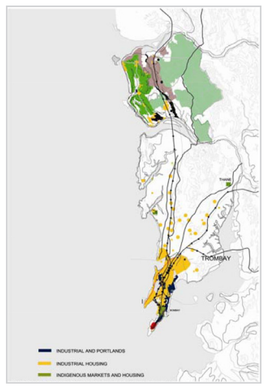


Late 16th - Late 17th Century

Portuguese colonialisation with trade establishment and spreading of Catholic propoganda. Bassein (now Vasai) was the Portuguese outpost. Region continued to feature agrarian, fishing and trade activities.

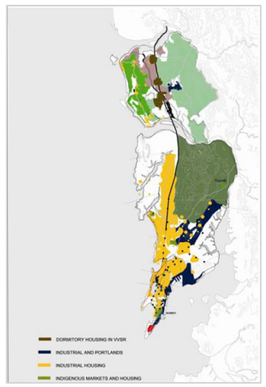
Late 17th - Mid 19th Century

Early British colonialisation overlapping with indigenous and Portuguese rulers. Trading activities move to Mumbai, agrarian and fishing activities remain. Salt production added to the local economy.



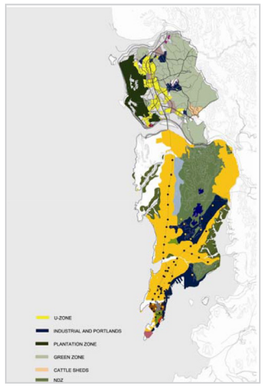
Late 19th - 1947

India formally falls under the British crown. Municipal services are introduced. Economy continues to be agrarian. The railway line connecting the sub-region to the city opens it up for urbanisation.



Post Independence - Mid 1992

Socialist Nation-state with agrarian/ manufacturing economies. Dormitory city for the main city. Agriculture flourishes in the national Green Revolution. Additional activities are marnufacturing industries.



1992 <

Post neo-liberalisation of the national economy, allowing foreign direct investment. Activities are agrarian, urban, dormitory city, tourism, salt making, cattle sheds and manufacturing.

5.16

5.2 Topographic and Geological Overview of the sub-region

The region is bound by two rivers to the north and south, the Tungareshwar forest and mountains to the east, and the Arabian sea to the west. It geologically falls under the Deccan Lava plateau with coastal deposits and majority of the region is a dissected basaltic plateau. The Deccan traps are dissected joints that allow ground water to flow from one place to another (Sawant, 2014).

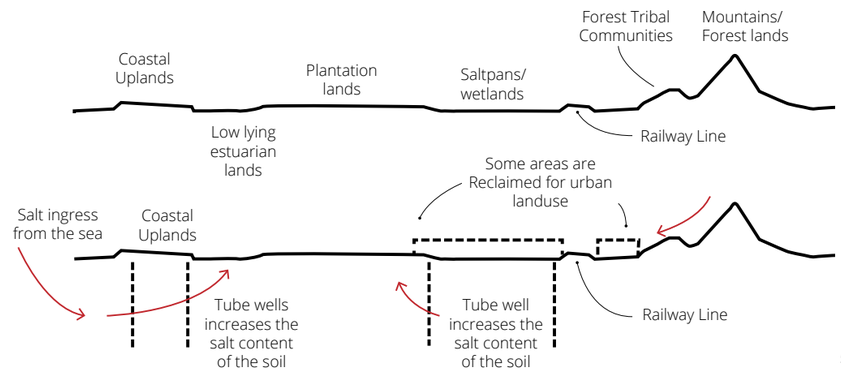
Topographically, the region is predominantly low lying, with a few parts reclaimed from the sea-bed. Some of these low-lying lands are extremely fertile, called khazan lands. The other low-lying lands, predominantly in the south and the centre that are marshy wetlands some of which are used for salt cultivation. The 5km western belt features coastal uplands, these have historically been created by natural sand accumulation by Arabian sea drift and short winds (Sawant, 2014). Older settlements were traditionally built on these uplands which are 1.5m to 2m above sea level. The topography is extremely varied with small local variations in the form of small hillocks and isolated peaks (Jacob & Aneerudha, 2017; VVCMC, 2002). It also features low height mangrove forests towards the south, the massive root system dissipates wave energy and the tidal influx. The rich topography with wetlands and mangroves attract many water birds (a total of 143 migratory birds species) (VVCMC, 2002).

The climate is hot and humid with small variations of humidity and temperature over the year. It has three seasons – summer, winter and monsoon (VVCMC, 2002).

5.18

Migratory Birds

The topography is favourable for many migratory birds.



5.19

F	M	A	M	J	J	A	S	O	N	D	J

Summer	Monsoon	Winter
Temp (max.) - 34 deg C	Temp (max.) - 30 deg C	Temp (max.) - 28 deg C
Temp (min.) - 26 deg C	Temp (min.) - 24 deg C	Temp (min.) - 16 deg C
Humidity - 77-85%	Humidity - 80-85%	Humidity - 77-85%
Wind - W or NW	Wind - E or NE	Wind - W or NW
W. Speed - 8 kmph	W. Speed - 13 kmph	W. Speed - 8 kmph

5.20

Image Sources

5.18. Photograph. CC

5.19. Section explaining regional topography.
Based on Sources - (Sawant, 2014; Jacob & Aneerudha, 2017).
Image by (Author, 2018)

5.20. Climate Data for the region.
Based on Data Source - (VVCMC, 2002)
Table by (Author, 2018)

Coast
Western coast along the Arabian sea.

Lowlands
Extremely fertile lands known as *khazan* lands

Coastal Uplands
Uplands that featured historical settlements and continue to have villages today

Saltpans
Marshy wetlands, some used for salt-cultivation

Lowlands
Marshy wetlands, some used for salt-cultivation

Mountains
Tungareshwar mountains featuring thick forests.

Notes

5.21. Topographic satellite map with road network and contours.

Sources

5.21. Source - (Author, 2018)

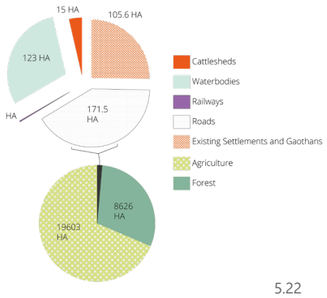
5.2 Landuse Analysis of the Vasai-Virar sub-region

Urban – The urban zone has predominantly been seen as dormitory towns for residents who work in Greater Mumbai. Changes in the MMRDA development guidelines has opened the region for additional urban development since the second regional plan. The 2016 plan has further expanded the urbanisable zone and opened the area earmarked as green zone for addition urban and industrial activities. The close proximity to city has increased the real-estate value, resulting in speculative housing (as seen with the rest of the metropolitan region) by private developers and government agencies. However, the physical infrastructure has not been able to keep pace. Increase in urban zones has resulted in many ecologically sensitive zones and plantation areas being used for dumping of waste (Rao, 2006).

Plantation zone – the coastal belt spans 5km of rich alluvial soil and is engaged multi-crop production. The produce comprises of grains, bananas, coconuts, flowers and vegetables. The produce is popular and highly price, Vasai-Virar features one of the more successful agrarian economies in the metropolitan region. Vegetables are grown in agricultural fields and farm-houses, they are cultivate by small farmers who sell to local markets directly and big farmers who transport it by suburban rail. They capitalize on the demand for organic produce in the city. Additionally, horticulture is profitable source of income (Jacob & Aneerudha, 2017).

Agriculture – agrarian activities takes place in the eastern parts of the region where the lands are very fertile due to rich fresh water sources from the mountain (Rao, 2006). While the plantation zone on the west is clearly demarcate, the agricultural lands on the east are under threat of urban expansion; illegal and legal.

Saltpans – the wetlands in the low-lying lands hold a number of saltpans. The surrounding communities are invested in salt production.



5.22

Land-use Graph

for Non-Urban Land-uses

5.23

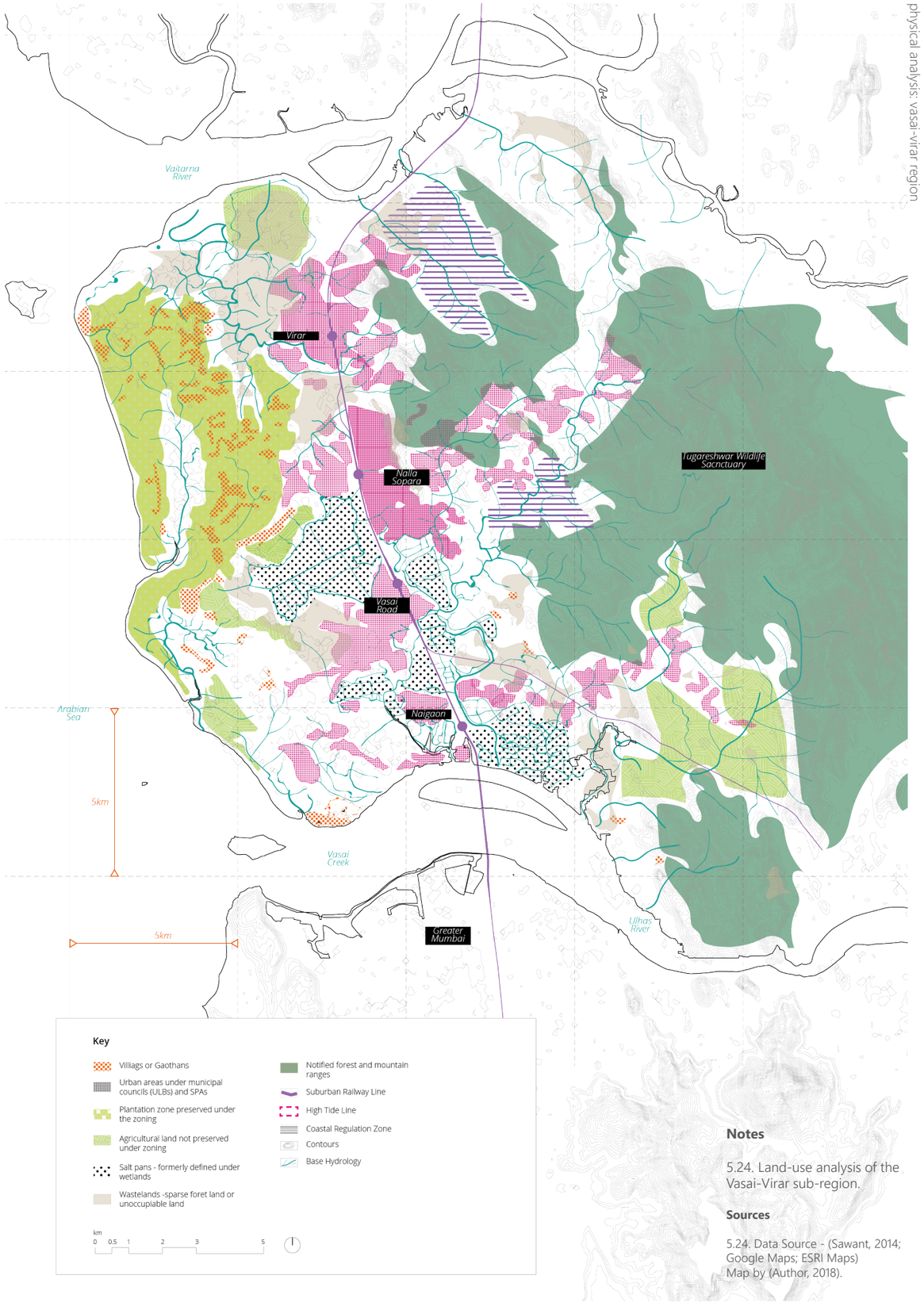
Saltpans

In the Mumbai metropolitan region under threat from being removed from wetland notifications.

Image Sources

5.22. Land-use graph. Based on Data Source - (VVCMC, 2002). Pie-chart by Author (2018).

5.23. Salt extraction. Photograph by (Kelly, 2014).



Notes

5.24. Land-use analysis of the Vasai-Virar sub-region.

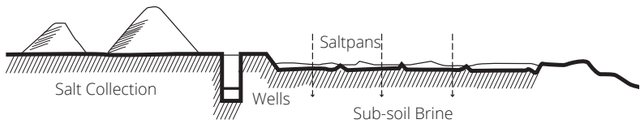
Sources

5.24. Data Source - (Sawant, 2014; Google Maps; ESRI Maps)
Map by (Author, 2018).

5.25

They are also a natural buffer to the rise in water level in the monsoon. However, the work is labour-intensive and the extraction is manually undertaken by migrant workers from neighbouring states.

Saltpan workers



5.26. Schematic section through a salt-pan.

Image Sources

5.25. Satelite map showing various non-urban landuses. Source - Esri.

5.26. Salt extraction. Source (Kelly, 2014). Image Re-drawn by Author (2018).

Cattle Sheds – The reduction of agricultural activities in Mumbai has pushed the cattle-sheds to the peripheries. In Vasai-Virar the cattle sheds are concentrated in Kaman only accessible by a single road from Bhiwandi. But the relocation of cattle shed has been profitable with a 100% expansion of the industry. Migrant workers from Northern parts of India work in the cattle shed. (Rao, 2006).

Fishing – There are three primary fishing centres – Naigaon, Vasai and Arnala. These are organised by fishing cooperatives based around traditional koli communities – Christian Kolis, Hindu Kolis and Koli Mangela. The fishing industry is divided by coastal fishing and inland fishing in brackish water. Coastal fishing villages have settlement areas with houses, drying yards and fishing infrastructure (boat repair, storage) owned by the co-op societies. Inland fishing does require a lot of maintenance but is extremely productive. It is controlled by local contractors and is based around artificial environments and is less dependent on climate conditions. Fishing communities have collective settlement ownership rights that are protected by laws preserving indigenous people (Jacob & Aneerudha, 2017).

Forest land – These are lands occupied by Adivasis who work as farm hands in the plantation and agricultural lands. The notified forest features a wildlife sanctuary.

Industrial Zone – there are two industrial zones in the sub-region.

Tourism – With the reduce in agricultural jobs, the tourism industry has grown with many coastal resorts and restaurants appearing on this landscape. It does have an adverse affect on the local ecologies, with many resorts maintaining exclusive swimming pools despite water shortages in the region. There are a few cases of agro-tourism as well.

5.27

Vasai-Virar Region
Agricultural and
Plantation lands

5.28

Brooklyn Park, Vasai-Virar Region
Real-estate development
in the region

5.29

Agashi Town
Traditional Village
settlement.

Image Sources

5.27. Screenshot of drone footage of the Vasai-Virar region. Source - (Surani, 2017).

5.28. Virar West real-estate project. Screenshot from promotional video by a real-estate developer. Source - (Housiey, 2017).

5.29. Agashi Town, a rural settlement in the Vasai-Virar region. Source - (MMRCHS & CRIT, 2005).

5.2 Mobility in the Vasai-Virar sub-region

While the sub-region is separated by a wide creek, it is well connected to Greater Mumbai through the suburban railway (direct Western Line) and state highway network. There are four railway stations in the sub-region – Virar, Nalla Sopara, Vasai Road and Naigaon – each roughly spanning a travel distance of five minutes by train. The railway stations are connected to the national highway on the east (NH8) and coastal villages on the west through local primary and secondary municipal road networks. The coastal villages on the west are also connected from a north-south primary municipal road connection. Virar Railway station also connects to Gujarat (northern neighbouring state to Maharashtra) bound shuttle trains (VVCMC, 2002).

Road Network: The existing local road networks are in poor condition, insufficient and are in need for maintenance. The responsible bodies are CIDCO (the SPA for VVSR) and the respective municipal corporations; neither have initiated attempts to repair the road network. The national highway is a four-lane carriageway and connects the sub-region to Mumbai in the south and Ahmedabad (Gujarat) in the north. State highways connect the city to the national highway (VVCMC, 2002).

Railway network: VVSR is connected to the city through the western railway that runs more than 150 commuter trains north-south in the MMR. The line is extremely over-crowded during peak hours and makes travel very unpleasant for commuters (VVCMC, 2002).

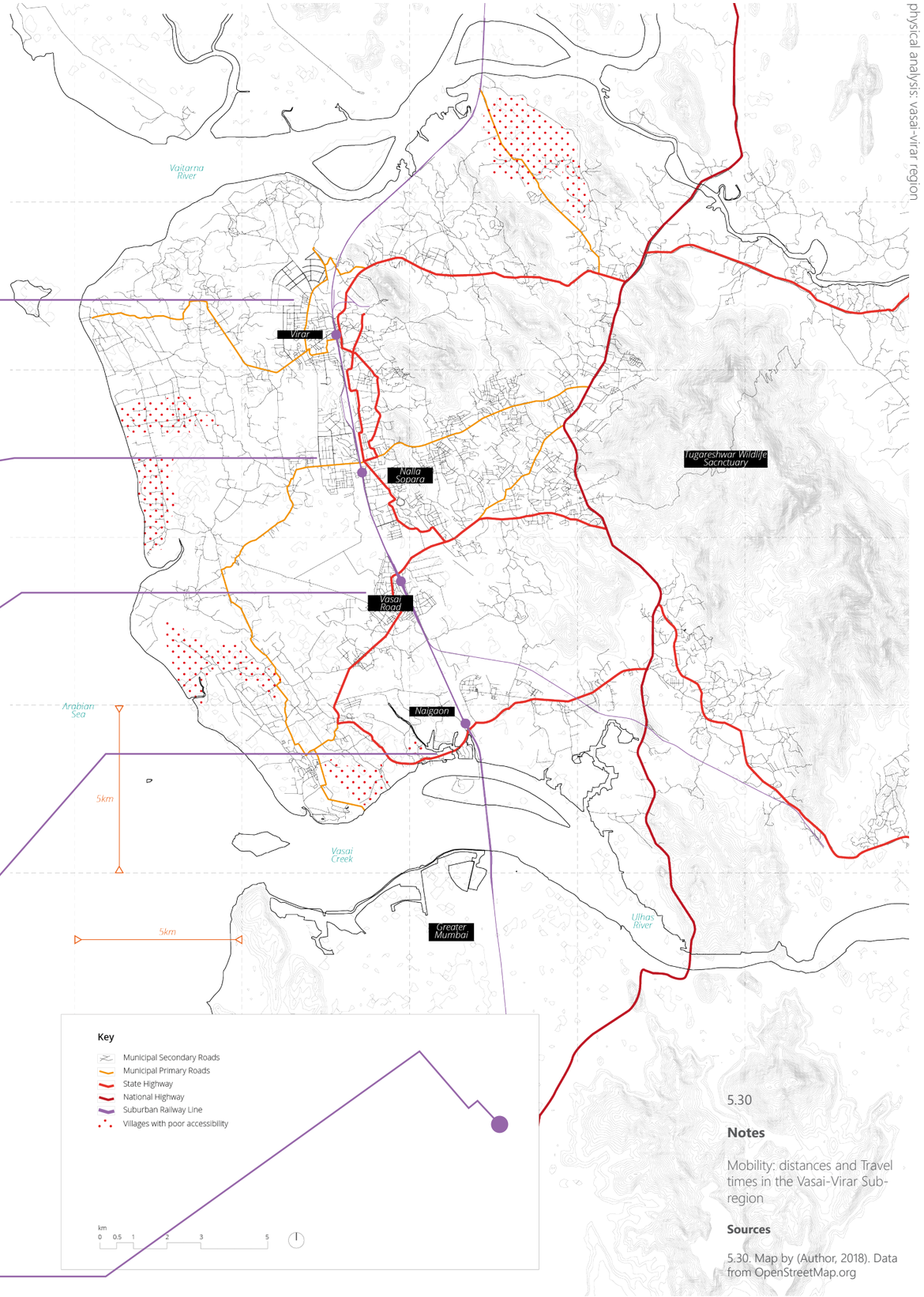
Buses: Additionally, there are intercity buses that are provided by the state transportation department (MSRTC). MSRTC buses run at a frequency of around 10 minutes to the railway stations (VVCMC, 2002).

5 minutes

5 minutes

5 minutes

Naigaon to the core city
59 minutes



5.30

Notes

Mobility: distances and Travel times in the Vasai-Virar Sub-region

Sources

5.30. Map by (Author, 2018). Data from OpenStreetMap.org

Image Sources

5.30. Collage of travel times between railway stations.
Data from m-indicator travel Android app. Extracted by (Author, 2018)
Collage by (Author, 2018)

5.2

Hydrologycal Analysis of the Vasai-Virar sub region

As described previously in this chapter, the sub-region is framed by two rivers – Vaitarna and Ulhas on the north and south with the Arabian sea on the east. The following are key issues regarding water supply and management.

Problem of water supply - with the fast pace of real-estate development, the water supply management has not been developed with the same pace. This impacts both the rural and urban parts of the sub-region. There are severe water shortages and the water has a very high salt content (Fernandez, 2011). Only a portion of the population is served by municipal water, and the rest are dependent on private water suppliers, wells or borewells and free resources (Angueletou, 2006).

Saltwater content is high in the region due to an imbalance in the mixing of salt water from the estuaries and fresh water the Tungareshwar range. This is due to blockage by the railway line, reclamation of land in some parts and embankments that result in the sweet water leaving the system before reaching the western lowlands; this leads to water stagnation (Sawant, 2014). Additonally, unregulated tube wells make lead to an ingress of salt water due to close proximity to the sea (Jacob & Aneerudha, 2017).

Traditional water systems are bhowkals and talavs. Bhowkals are shallow water wells that are rainfed aquifers and are created from tidal clay deposits. Water from these wells can serve 8 HAs of land and provide for 40 families. They are used to cultivate paddy in rainy season and water is stored for vegetable cultivation in the winter (MS Gopal, 2011; Sawant, 2014). Talavs on the other hand, are often associated with a temple, dargah or church. These are used by agrarian communities for agricultural and domestic purposes (Sawant, 2014).

5.31.

Bhowkals

Traditional shallow water wells that natural collect water. The are traditionally maintained by the women of the village. A bhowkal can provide water to upto 8HA of land and support 40 families. (Sawant, 2014; MS Gopal, 2011)

5.32

Water Stagnation

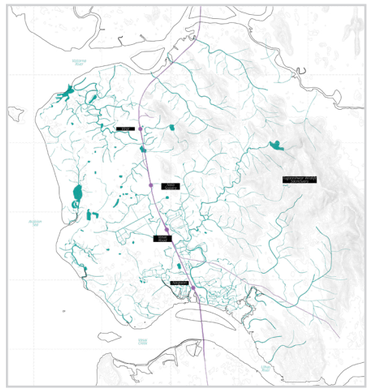
Due to inability for fresh water from the mountain range to enter the estuary and poor drainage in the low lying areas leads to water stagnation and salt deposits leading to the saltpans (Sawant, 2014).

Image Sources

5.31. A tradition bhowkal in Bhuigaon. A tradition bhowkal in Bhuigaon. (MS Gopal, 2011)

5.32. 'Water Stagnation'. Source - ESRI Satelite Imagery.

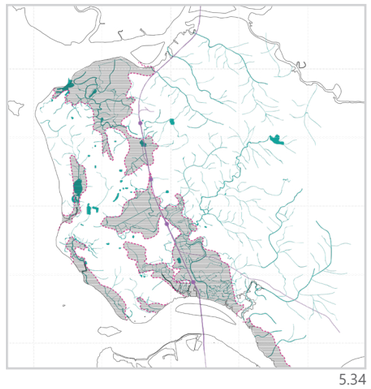
5.33-35. Key Observation from the hydrological analysis.
Data - (Sawant, 2014)
Map Source - Author (2018)



5.33

Hydrological Map

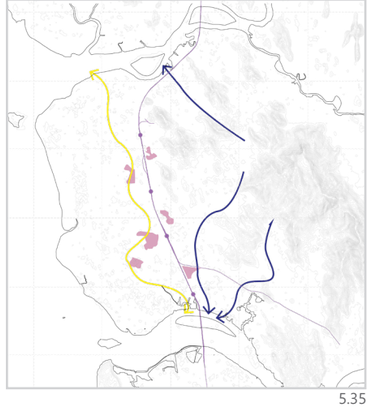
Showing various creeks, canals and lakes in the region.



5.34

Coastal Regulation Zone

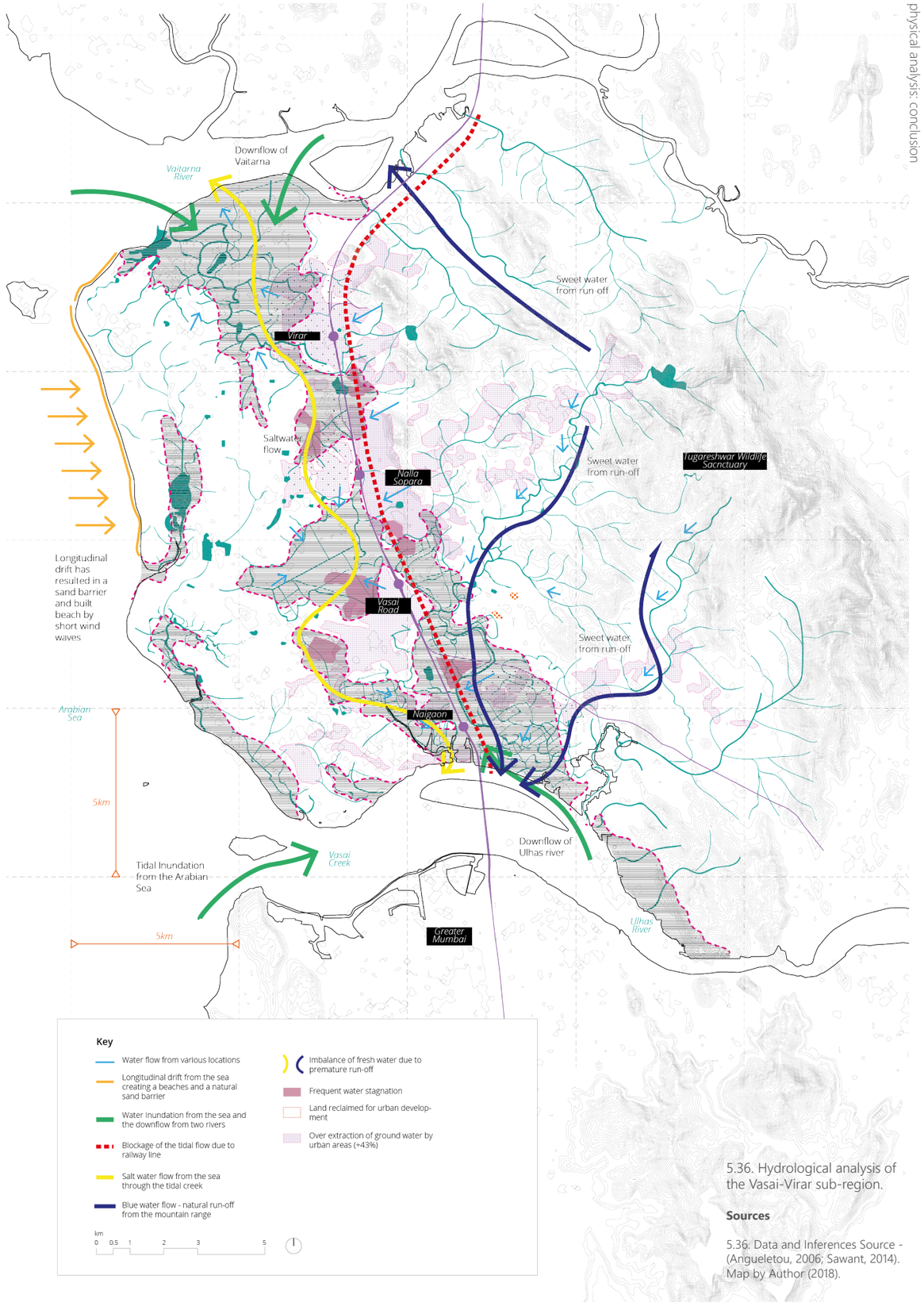
Earmarked for no development



5.35

Water Stagnation

Imbalance of fresh water due to separation of sweet water and sea water



5.36. Hydrological analysis of the Vasai-Virar sub-region.

Sources

5.36. Data and Inferences Source - (Angueletou, 2006; Sawant, 2014). Map by Author (2018).

5.2 Section References

Census. (2011). Vasai Virar City Population Census 2011 | Maharashtra. Retrieved 16 May 2018, from https://www.census2011.co.in/census/city/363-vasai-virar.html

Jacob, G., & Aneerudha, P. (2017). Landscapes of Resistacnce: Ecology and Economy in the VVSR.

MMRCHS, & CRIT. (2005). Heritage Policy and Regulations for the Vasai-Virar sub-region. Mumbai.

MMRDA. (2016). Draft Mumbai Metropolitan Regional Plan (Draft). Mumbai: Mumbai Metropolitan Region Development Authority.

MS Gopal. (2011). The wells of Bhuigaon [Photograph]. Retrieved from http://www.indiawaterportal.org/articles/between-city-and-salty-sea-wells-bhuigaon-thane-greater-mumbai-guest-post-ms-gopal

Sawant, S. (2014, September). Ecological Study of a Tidal Creek: An management of a progressively altered landscape (Masters Thesis in Landscape Architecture). Faculty of Architecture, CEPT University, Ahmedabad.

TERI. (2014). Environment Status Report of Mumbai Metropolitan Region (MMR) (No. 2012MC01). Mumbai: The Energy and Resources Institute (TERI).

VVCMC. (2013). Vasai Virar City Development Plan Report. Vasai-Virar City Municipal Corporation.

Recommendations

The following are recommendations derived from the analysis of the region

Metropolitan Regional Scale

1) Urgent need to decentralise planning and development focus from the core city to ensure more effective management.

2) To help marginalised groups like migrants, indigenous communities and women are considered during the planning process.

3) Involve agriculture as a part of urban development and help improve metropolitan food self-sufficiency

4) Strengthen preservation of ecologically sensitive areas. The MMR like other urban areas houses a huge population, and the consequences of ecological encroachment can result in more lives lost due to resultant disasters.

Sub-Regional Scale

The regional recommendations apply to the the regional scale with additional context specific conditions.

1) Change the narrative of the sub-region as a dormitory city to a self-sustaining region (with respect to job creation).

2) Address the future of salt-pans in the face of land-use notification change

3) Agricultural land is under threat to urban expansion and new infrastructure/industrial development projects and needs to be addressed

4) Change focus from conventional tourism to agro-based tourism

Scope for Project Intervention

Metropolitan Regional Scope

The current regional plan (as described in Chapter 12) proposes a detail land-use strategy for 2036, supported by detail mapping and special panning authorities to implement the changes. It looks at the region through various aspects – urbanisation, industrial growth, housing, water and waste management, infrastructure, tourism, etc. But based on shortcomings of the project and lack of attempts to govern the region in decentralized manner, the project proposes a regional strategy as opposed to a regional plan (as seen in the MMRDA Plan 2016-2036). This scope of this project is limited to the studying and designing for the region with respect to categories described in Chapter 11.

Sub-Region Scope

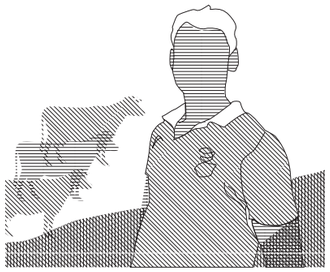
The Vasai-Virar is one five expansion zones for the city of Mumbai. The project attempts to address proposals of the regional strategy at a sub-regional scale based on the physical characteristics of the VVSR. The same limitations of scope at the regional scale apply to this sub-regional scale. It also details out two projects towards the realisation of the regional and sub-regional strategies.

6 Research Conclusions

Summary of the urban biases in the metropolitan planning processes

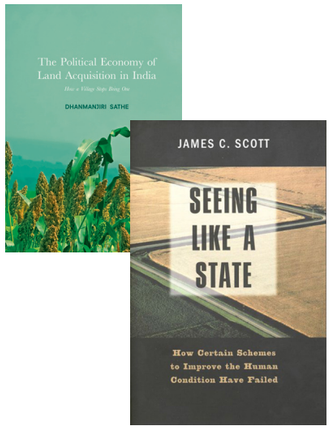
The "problem" of migration

Following the narratives of migration through personal stories, historical trends and its most visible impact - right to housing revealed that there is an inherent struggle for urban citizenship for non-urban groups. Additionally, it also revealed a trend of urbanisation that changes the rural landscape that triggers rural-urban migration. This led to a literature review to understand this phenomenon.



Literature Review - Transformation of the rural landscape in the shadow of urbanisation

James C. Scott's book ***Seeing like a State*** sets a narrative of how development models seeking to improve the human condition can have an adverse impact. Similarly, through supporting literature, it was apparent that urbanisation also transforms the rural landscape without being conscious of its impact. It affects landowners, who are handicapped by the change in land-notification, it affects the poorer non-landowners who take up unpleasant service jobs in cities, it has spatial implications for the traditional village form and it changes agricultural production.

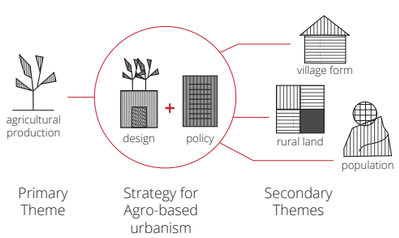


Land Acquisition of agricultural lands

Villages transformed to slum after urbanisation

Rural to Urban Poverty for non-urban groups

Declining Agriculture Production



Primary Theme

Strategy for Agro-based urbanism

Secondary Themes

Potential Strategy for the Project

Visiting the MMR

The visit to the region resulted in a few relevant conclusions that helped determine the scope of the project.

1) The relevance in the local professional and academic discourse was confirmed
2) Experience of the vast regional scale reinforced the need to decentralise the planning processes
3) Narrowing a suitable sub-region - Vasai-virar based on speaking to professionals and a visit to the sit.
4) Experience of a skewed gender ratio in public spaces reflected a major urban issue in the region.

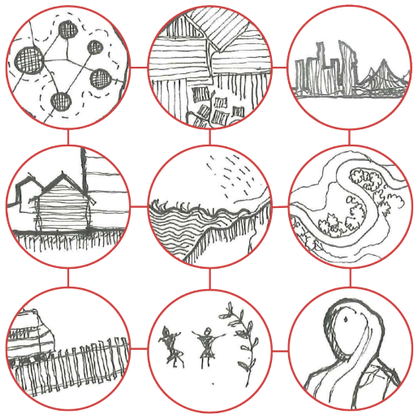
Vasai-Virar Sub Region

Unequal gender representation in public spaces

Analysis of Urban Issues

Compilation of relevant urban conditions, their driving factors and the potential spatial impact. These are the issues addressed in the analysis -

Conflicts of Urban Governance
Urban Identity
Real Estate driven Urban Form
Affordable and Speculative Housing
Weakened Ecological Systems
Reduced Rural Lifestyles and Agricultural Production
Water Management
Urban Citizenship for Non-Urban Groups
Gender Imbalance



Research and Design Themes

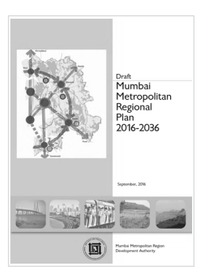
These themes a based on key issues linked to the problem statement to understand and counter the urban bias in planning processes in the MMR.

Policy review of the MMRDA

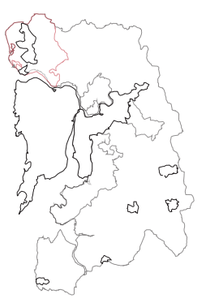
An evaluation of the goals and strategies of the MMRDA policy plan in the policies outlined. Additionally, these are evaluated against the issue detailed above.

Region and Sub-region Analysis

Evaluation of physical characteristics of the metropolitan region and the Vasai-Virar sub-region with recommendations that might be relevant to understanding the context before responding with design solutions.



MMRDA Regional Plan 2016-2036
Policy Review



Region Analysis
Physical characteristics of the MMR

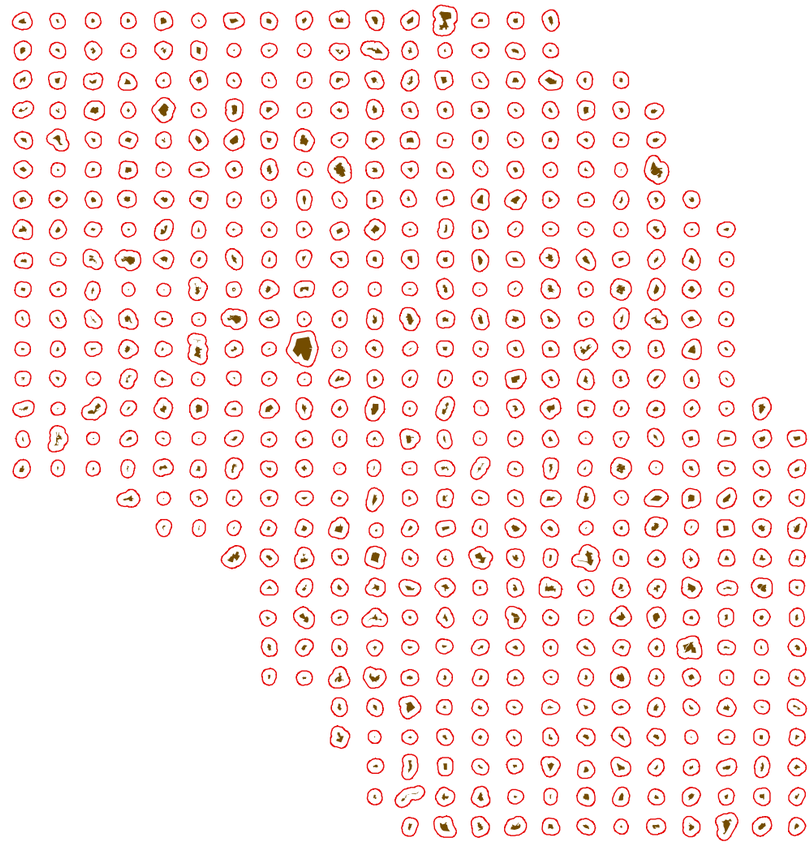
Sub-region Analysis
Physical characteristics of the VVSR

7

Strategy and Framework

Addressing the urban bias through policy and design

Project Goals - Urban and Rural Values for Balanced Growth
Regional Strategy - Agro-urbanism for the MMR
Policy and Design Framework - with A Quick guide to the Toolkits
Policy and Design Toolkits
Policy and Design Toolkits - Summary



Notes

7.0. 'Spatial implication of policy'. Graphic shows various villages under the broad development control regulations set by the MMRDA. 200m (red offset line) from the boundary of the villages are open to urbanisation through additional FSI.

Sources

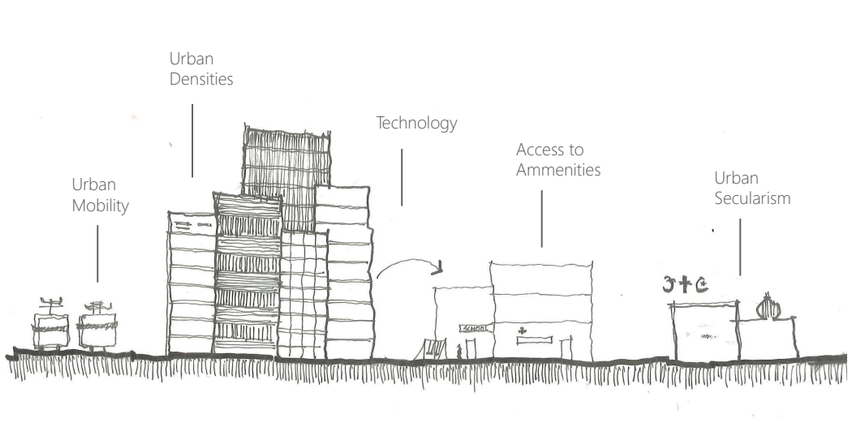
7.0. 'Spatial Implication of Policy'. Data source - MMRDA (2016) Retrieved and illustrated as a graphic by Author (2018)

7.1 Project Goals

Defining important values for the project and identifying core goals

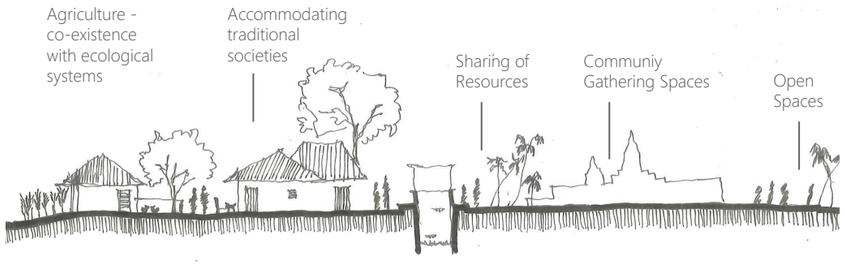
This project seeks to address the urban bias in the metropolitan regional planning system. The hypothesis is that by correcting this bias, the vision for a region with intersecting urban and rural values to create a more sustainable metropolis is possible. To realise this vision, it is important to acknowledge and define the values of urban and rural/non-urban constructs that are important to preserve.

Urban/Cosmopolitan Values



7.1

Non-urban/Rural Values



7.2

Notes

7.1. - 7.2. Visualisation of Rural and Urban Values that are relevant to promote balance urban development.

7.3. Illustration of core goals for the region.

Sources

7.1. - 7.2. Visualisation of Rural and Urban Values.
Sketch by Author (2018)
Inspiration from (Correa, 1999)

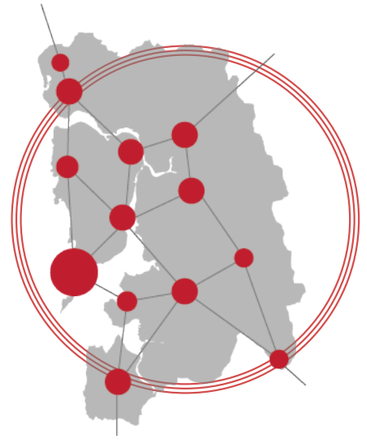
7.3. Illustration by Author (2018)

Core Goals

1

Decentralisation of Metropolitan Region

Refocussing planning priorities in the region by redistributing roles to and empowering smaller urban or rural groups and strengthening the impact of development projects.



Decentralising the planning system

2

Capacity Building

Empowering non-urban communities – agrarian, fishing, rural migrants and indigenous communities to be self-sufficient. This will counter the rural-urban flux that puts pressure on the core city. This will include providing social and physical infrastructure in non-urban areas with low growth as a priority.

creating meaningful employment for migrants and non-urban groups

3

Reducing Speculative Land Acquisition

By improving the capacity of non-urban regions in the metropolitan region (above goal) and countering unmoderated land acquisition in the region as a means to protect rural regions and their values

Enancing the role of agriculture

4

Protecting ecological sensitive areas

Promoting ecological identity for the region and protecting sensitive areas from further urbanisation.

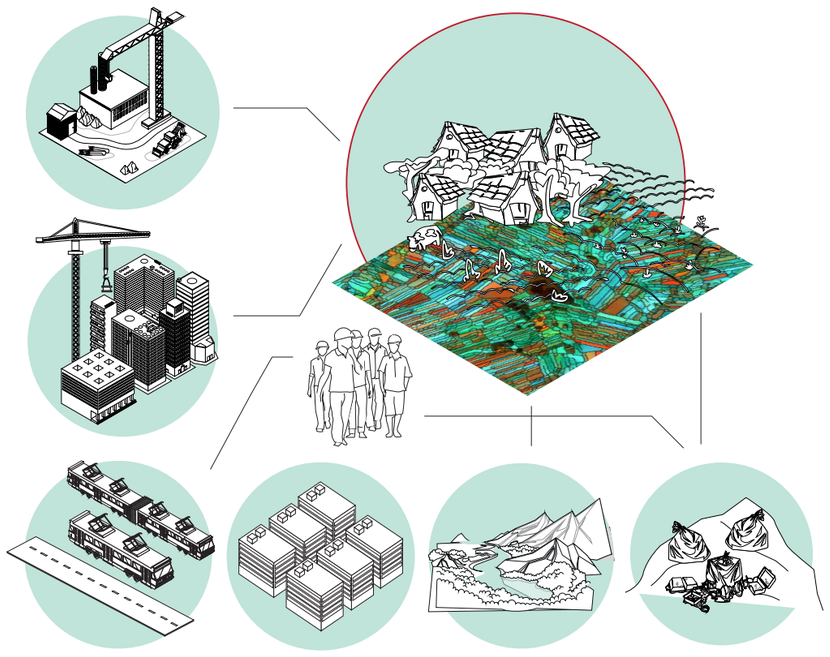
protecting ecologically sensitive areas

7.3

7.2 Regional Strategy

Agro-urbanism for the MMR

The sstrategy for the region to change the trajectory of real-estate driven urbanisation to one of agro-urbanism. Various design projects and policies will be developed that various sectors of the MMR can contribute to or be protected to promoting the agricultural economy.



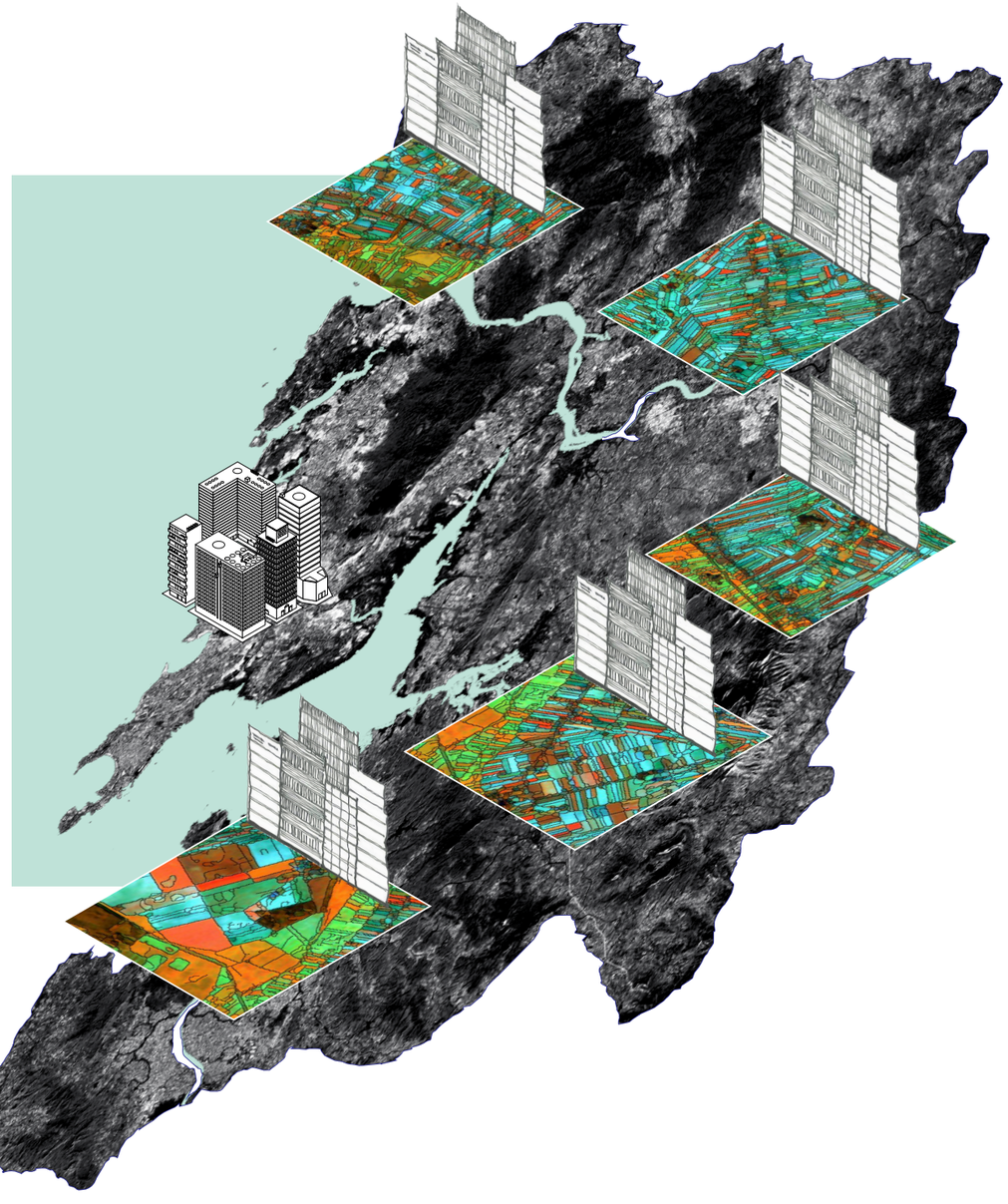


Image Sources

7.4. Strategy for Agro-urbanism where different urban systems work towards supporting the agriculture economy. Illustrations by Author (2018)

7.5. Strategy for Agro-urbanism is a pilot project for the edge cities. Illustrations by Author (2018)

7.3 Design Framework

A Guide to the Regional and sub-regional Design Strategies

Core Goals

New Roles

Regional Strategy - Defining Roles
For example, The MMRDA will coordinate policies at higher parastatal levels and set goals for the region.

Sub-regional Strategy
Sub Regional Strategies that can realise the goals and objectives at a regional scale, elaborated through nine themes

Detailed in test cases

Sub-Region Land-Use Definitions
Redefining the land-use definitions to realise the goals and strategies defined at the regional and sub-regional scales.

Local Level Project Implementation
Pilot projects that start the paradigm change and interventions that realise the land-use definitions.

Core Goals

Decentralisation of Governance

Reducing Speculative land acquisition

1 2 3 4

Capacity Building of non-urban areas

Protecting Ecologically Sensitive Areas

Research and Design Themes

Reduced Rural Lifestyles and Agricultural Production

Politics of Governance

Regional Identity

Water Management

Affordable Housing

Weakened Ecological Systems

Urban Mobility

Gender Imbalance

Urban Citizenship for non-urban Groups

Images

7.6. Design Framework for the project that consolidates the core goals, scales and the research/design themes.

7.7. A Quick Guide to the Design and Policy Toolkits

7.8. Policy Toolkit for Urban Governance

Sources

7.6.-7.8. Illustrations by Author (2018)

{Toolkit Title}

Primary goal addressed by the theme

Primary Goal Addressed

Research and Design Theme

Policy and Design Toolkit

A basic description of the policy and design proposal with case study examples if necessary

{Policies}

Regional Scale

1
2
3

Convincing image/sketch

Sub-regional Scale

1
2
3

More Convincing images/ sketches

{Projects}

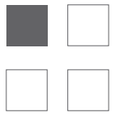
Sub-regional Scale

Projects that can be paired with the policy at different scales for execution. Could be a timeline for implementing a policy of a physical project that can kick-start institutional change to achieve the core goals

Physical project

Timeline for policy implementation

Urban Governance

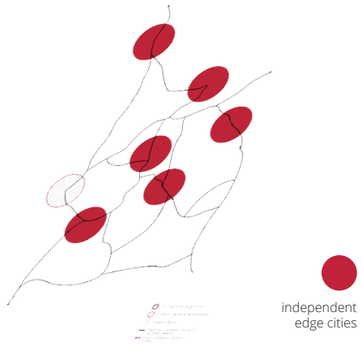


Decentralisation of Governance

Decentralisation of the planning powers of the MMRDA and refocusing its role as a coordinator for a sustainable vision for the region's growth. And by redefining the roles of smaller urban and rural entities, this will primarily address the first goal of empowering small development authorities for balanced development.

Description of Policy Toolkit

Decentralisation will refocus the planning strengths to edge-cities/sub-regional authorities and smaller urban/rural bodies. Defining their roles and strengthening their planning prowess will also ensure accountability of these planning authorities due to less overlap of roles. The MMRDA will redefine itself as a facilitator of decentralisation and focus on a regional vision for sustainable growth.



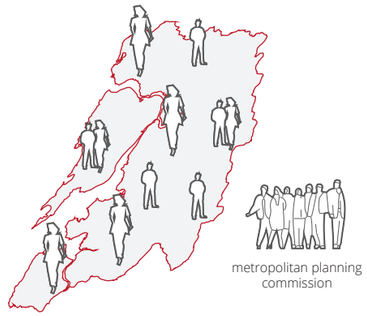
Policies

Regional Scale

1

Coordination of Different Authorities

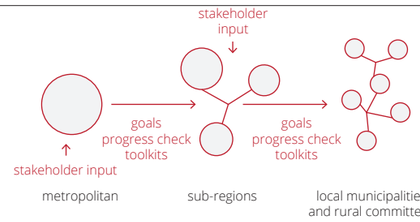
Creation of a new Metropolitan Planning Commission (MPC) that will account for various national, state and municipal interests. The MPC will facilitate coordination and implementation of regional level infrastructure projects. The MPC will meet alternatively at various sub-regions, to ensure equal emphasis of all representatives.

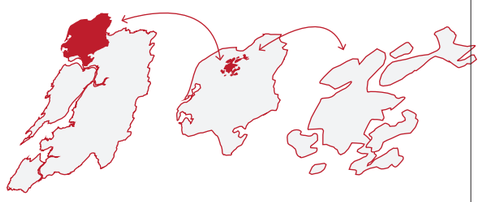


2

Defining Planning Roles at Different Scales

Ensuring specific planning roles at different scales - regional, sub-regional, municipal, village panchayats, etc. The higher planning authority will monitor and check progress of development projects and positioning them with respect to larger goals





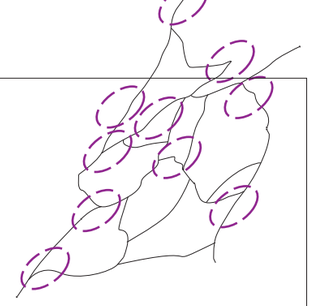
3

Decentralised Mobility Network

The secondary regional network system will not be a parallel system the suburban rail but sub-regional local rail networks that plug-in to the suburban rail network.

primary rail network

independent secondary rail network



4

Guidelines for sub-regions

Guidelines published for various sub-regions based on a variety of themes.

- goals to achieve regional vision
- guidelines on public participation
- design strategies for urban farming, gender empowerment, etc.,

sub-Regional Scale

1

Coordination of different authorities

Creation of a new Sub-Region Planning Commission (SRPC) that will account for various sub-regional interests - municipalities, towns and village panchayats.

2

Guidelines for municipalities

Guidelines published for various municipalities and panchayats based on a variety of themes.

3

Policy toolkit for affected communities

Creation of a manual to help minority communities to read policy and establish scenarios of how they will be affected.

Projects

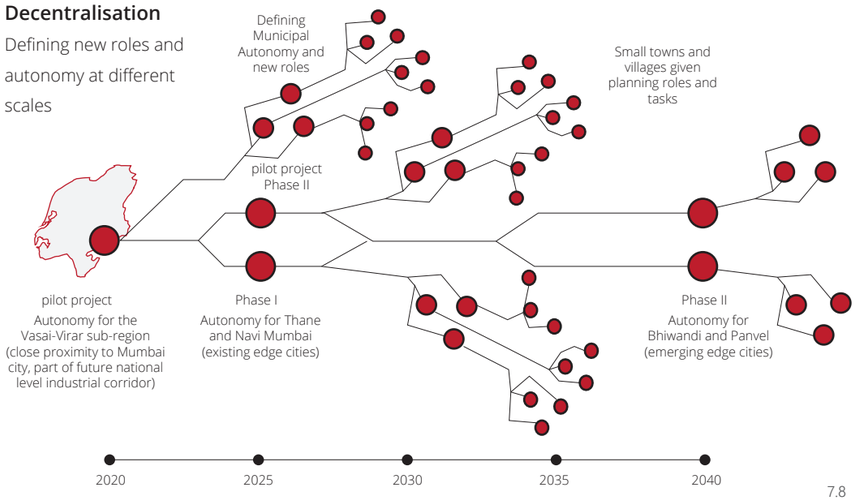
Regional Scale

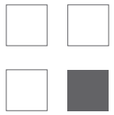
sub-Regional Scale

Land-use Definition

Time-line for Decentralisation

Defining new roles and autonomy at different scales





Strengthening eco-systems

Regional Identity

Regional Identity that sets a vision for the region. This would brand the identity of the development authority as ecologically conscious and setting the sustainable values (that combine positive rural and urban elements) for the region. This is a key step towards achieving the goal of protecting ecologically sensitive areas.

Strategy Description

Branding the metropolitan region with a regional strategy with goals to be sensitive to the needs of agro-urbanism and the protect areas of ecological value.

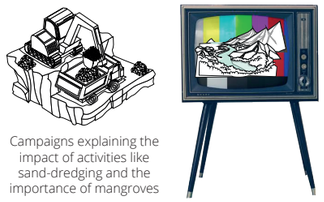
Policies

Regional Scale

1

PR Campaign

Public information project that informs various stakeholders of the consequences of urban projects areas of ecological value. For example, a campaign explaining the over extraction of sand will weaken sand beds, causing damage to bridges, increasing flooding. Or a campaign explaining the importance of mangroves to prevent flooding. All explaining the damage to livelihoods, property value, etc.

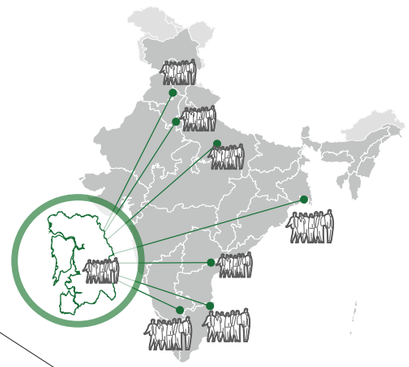


Campaigns explaining the impact of activities like sand-dredging and the importance of mangroves

2

Setting a benchmark for other MPCs

The MMRDA will work with other Metropolitan Planning Commissions to counter national policy that is counter-productive to or insufficient to protect densely population metropolitan areas. As the financial capital the metropolis will act as a role model through policy and design initiatives.



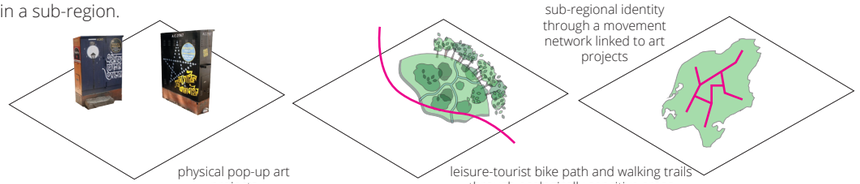
sub-Regional Scale

1

PR Campaign through Spatial Design

PR projects that use pop-up art, working with contemporary and traditional artists to spread information creating a network of graphic projects in a sub-region.

Local Level Project Implementation



physical pop-up art projects

sub-regional identity through a movement network linked to art projects

leisure-tourist bike path and walking trails through ecologically sensitive areas

7.9

CASE Example: Scott Pruit v. California

California setting the benchmark for auto emissions in the US and is leading the country in the protest against the pullback of regulations under Scott Pruit's EPA.

v

7.10

7.11

Notes

7.9. Policy Toolkit for Regional Identity

Image Sources

7.9. Policy Toolkit Illustration by Author (2018).

7.10. California vs. Scott Pruitt of the EPA. Source – Collage by Author (2018)

7.11. LA Downtown in 2002, cloaked with pollution, this forced the state government to enforce stricter emission laws. Source - (McNew, 2002).

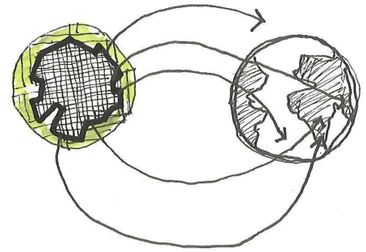
Capacity Building

Agricultural Production

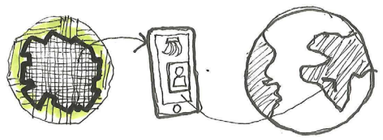
This policy toolkit helps authorities in developing policies and spatial design techniques that will enable the region to achieve its goal for improving the agricultural economy and building capacity for non-urban groups and region.

Strategy Description

As with many cities, there is a disconnect between the urban areas and food production. According to Carolyn Steel (2013), cities used have an intricate relationship with agriculture, with interlinked tax system, exchange of goods, visible markets. But now, the average urban consumer is separated from agriculture through an invisible gigantic food supply system (Steel, 2013). This disconnect adversely affects policy making and popularity for promoting the agricultural sector. To encourage and protect the food-based economies in the region, policy toolkit uses technology to reconnect agriculture to the city.



disconnect between cities and agriculture



bridging the gap through technology

Policies

Regional Scale

1

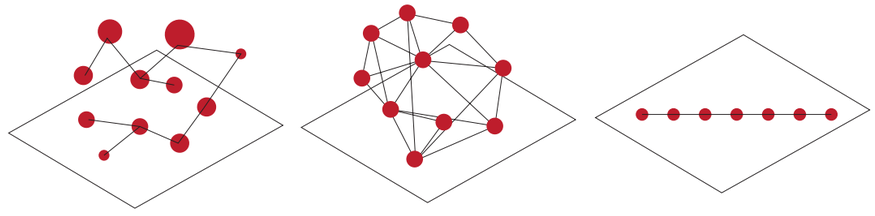
Setting a Regional Strategy for Agro-urbanism

Framing a regional strategy around agro-urbanism with supporting policy templates that deal with the protection of agricultural land for sub-regional authorities to follow.

2

Block-chain Technology (BCT) for Agro-urbanism

Inviting various IT companies to invest in R&D for BCT to support and improve the self-sufficiency for the agro-economy.

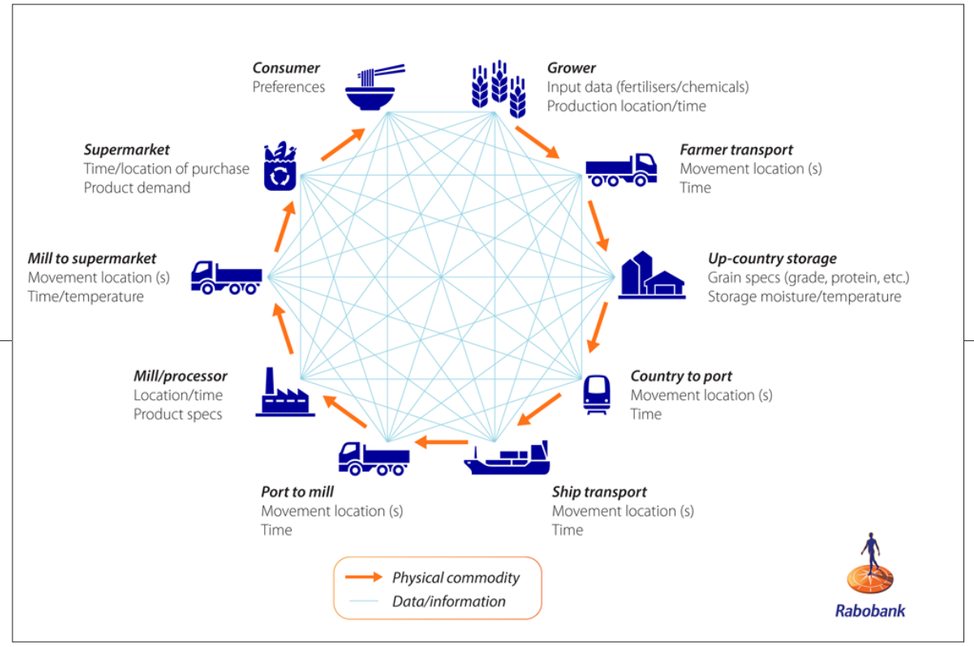


The typical inequalities of the food supply chain.

Food supply chain with BCT (explained in case study example of Rabobank proposal)

Equal participation of all members in the supply chain

7.12



7.13

CASE Example: Rabobank on BCT for the Food supply chain A schematic diagram showing physical connections in the standard blockchain - to be improved through access to data/ information by BCT

1. "The wonderful journey of the beef." 2. The steak's serial number and 64-digit alphanumeric code referring to the transaction. 3. The farm that raised the cow was indexed as 1556. 4. The section of the cow, where it was processed, and its package date. 5. The Simmental cow was three years old and fed a diet of corn, wheat, and straw. Na Qin was the vet that tended to it. 6. It was slaughtered on July 2, and packaged on July 5 in Tongliao city in Inner Mongolia. 7. It was put in the storage house on July 11. 8. The steak went through a series of tests to check whether it was contaminated with certain bacteria, and water content. (Quartz)

7.14

CASE Example: JD.com exploring block chain to change the food supply chain

By empowering food producers in Mongolia to track the production and delivery of frozen beef.

7.14

Image Sources

7.12. Policy toolkit for Agricultural production. Illustrations by Author (2018)

7.13. Physical Commodity Movement and potential sharing of data through blockchain. Source - (Rabobank & Lefroy, 2017)

7.14. JD.com and BCT for the food supply chain. Source - (Huang, 2017)

Policies

Regional Scale

3

PR Campaigns for Agro-based Urbanism

At a regional level the project will set a public information campaign to inform people about the region's strategy. This will inform various stakeholders how they can participate in contributing to the strategy. Opportunities will range from private to public to individual stakeholders.

Sub-Regional Scale

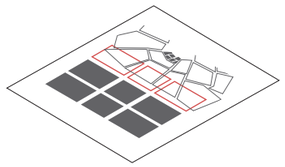
1

Land-use Definition

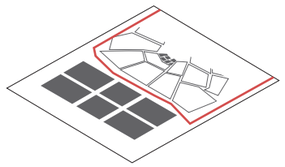
Local Level Project Implementation

Agricultural lands as a No Development Zones

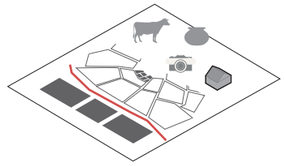
The sub-region authorities will define agricultural land as no development zones to protect them from real-estate driven urbanisation. Urban activities like small scale commercial activities, hotel and catering, agro-based tourism, cattle and dairy farming, pottery, etc.



Present model of urbanisation driven by real estate that overrides agricultural lands



Establishing protection of agricultural and plantation lands

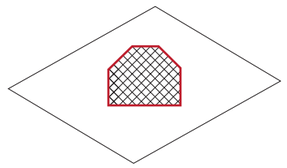


The notification will define activities that allows urban activities that support the agro-urbanism strategies

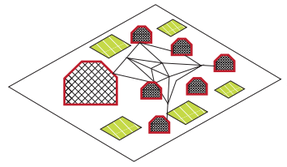
2

Agro-ICT Centres

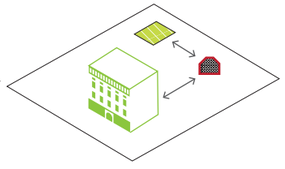
A network of Agro-ICT centres that are implemented as physical interventions to enable farmers to access block chain technology to improve the local agricultural economy.



Introducing Agro-ICT Centres that interface low-tech farms with high-tech IT technology



A network of Agro-ICT centres that link various farms in the region to compete more efficiently in the food supply chain

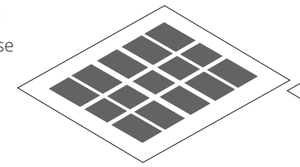


The Agro-ICT centres will also be a link between farms and agro research institutions to share real-time data and design soluions

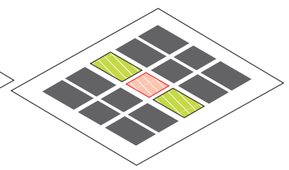
3

Spatial Visibility of Agriculture in Urban Areas

By relocation some parts of agricultural processes with visible proximity to dense urban areas, so that it gives more exposure to problems farmers face.



The agricultural economy is disconnected from the urban system



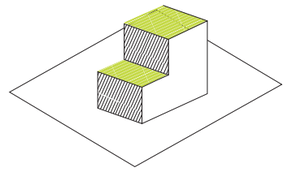
Making the agricultural economy visible in urban areas through spatial interventions

Sub-Regional Scale

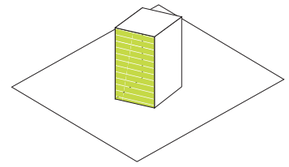
4

Urban Surfaces for Urban Farming

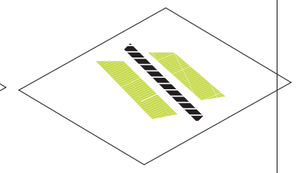
The sub-region authorities will start a campaign unused roof planes or vacant buildings for rooftop and vertical farming. This will also include unused railway yards or industrial lands.



Unused rooftops for urban farming

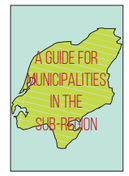


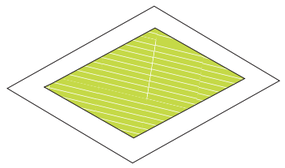
Using towers for vertical farming



Using unused yards from railways or other industries.

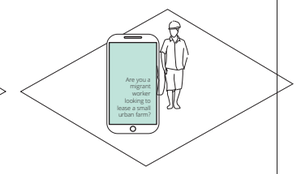
The sub-regional authorities will publish a manual for different public and private stakeholders on the process, the benefits to lease land as urban farms to help user groups adopt and implement this policy.





the municipality will collective record these potential urban farm space

Labour migrants looking for work can lease these farms as a means to add to their livelihoods.



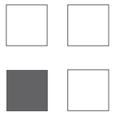
They can identify potential locations, financiala and infrastructure support through online portals

CASE Example: Urban Farms along the suburban train-line in Mumbai

A policy of the central railway ministry to use buffers along train lines as an added economic opportunity for urban farmers.

Sources

7.15. Railway line pocket farms for urban farming (Wildschut, 2013).



Reducing Speculative Acquisition

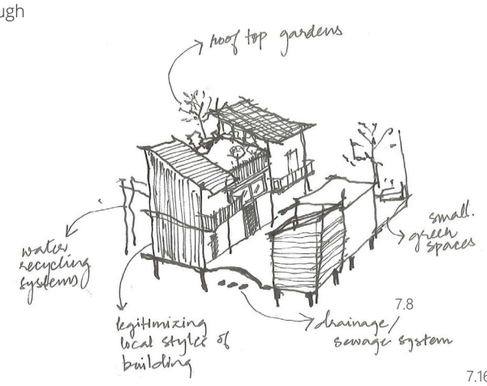
Affordable Housing

In the race to become a 'world-class city', slum dwellers are being relocated into mass produced housing that often resemble vertical slum and are in the periphery making forcing long daily commutes for work. This blueprint recognizes the organic development of this typology that is atypical in the design process of the planning profession. This is critical to agro-urbanism as a design strategy as it empowers the labour migrants and their families who often work as farmhands in peri-urban areas by granting them urban citizenship through housing.

Description

Affordable housing is a problem for the urban poor, 1st/2nd generation and 3rd/4th generation migrants. This blueprint enables this urban group to be legitimised by ensuring collective land ownership. Quality of life will be improved through infrastructure and design support from the planning authorities.

Slums are an urban archetype of rural livelihoods. It is important that they are recognised as a legitimate typology. They are home to experienced construction workers whose expertise can be capitalized to improve the quality of these forms with infrastructure support from the state.



7.8

7.16

CASE Example: Applewood mobile homes community in Midvale, Utah

For example, a mobile home community in Utah collectively bought land to prevent eviction through a co-op collective and the help of an NGO (Mars, 2018.).

7.17

Regional Scale

Policies

1

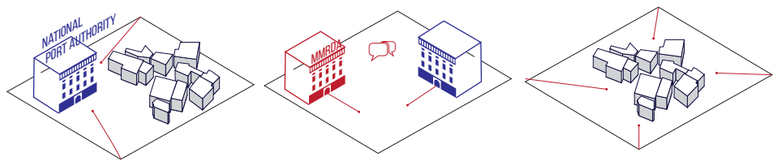
Legitimisation of 'Slums'

Providing legal validity to urban pockets defined as slums. Changing the terminology to "home-grown neighbourhoods" or "urban villages" in policy documents to validate this form of urban citizenship.

2

Facilitating land-ownership

Establishing systems where planning authorities at the regional level work with government (state & national) authorities and private land-owners and sub-regional planning authorities to negotiate transfer of land ownership.



State or private agencies that own the land that urban villages have expanded over

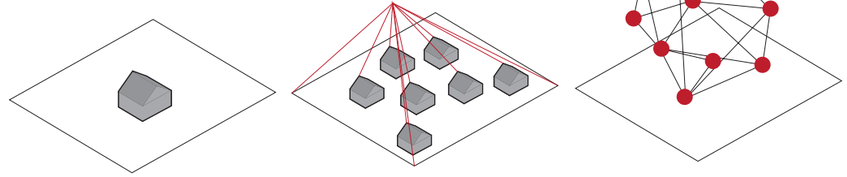
The MMRDA or other planning authorities will facilitate the negotiation of land transfer to the existing residents

Land Ownership will also ensure accountability of the residents to take charge of collective development

3

Promote ICT Industry

Promote ICT industry through incentives to encourage the development of technology that can be used across the region to facilitate and maintain land ownership.



A single household may not be able to gain land rights

A group of households with the support of the municipality can gain land rights to collective mortgages

This can be supported by BCT to ensure that decisions can be made by each household confirming changes in the land agreement

7.16

Image Sources

7.16. Policy toolkit for Affordable Housing. Illustrations by Author (2018).

Policies

Regional Scale

1

Legitimisation of 'Slums' through policy

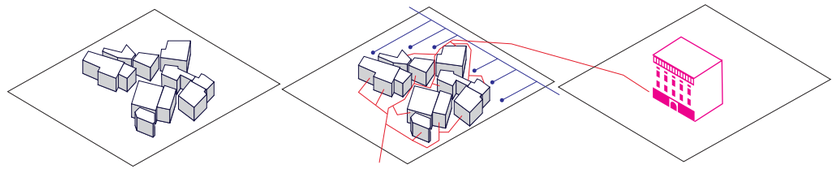
Providing legal validity to urban pockets defined as slums. Changing the terminology to "home-grown neighbourhoods" or "urban villages" in policy documents to validate this form of urban citizenship.

sub-Regional Scale

1

Legitimisation of 'Slums' through infrastructure and financial support

Sub-region and municipal authorities will implement physical and social infrastructure for these urban villages without discrimination



Urban villages legitimised through providing infrastructure and amenities

Municipalities and sub-regional authorities will invest in designing and implementing physical infrastructure for these urban villages

Ensuring social amenities - like schools etc, and incorporating these programs with the agro-urbanism strategy

2

Improving Housing Quality

MMRDA can change the architectural profession to enable them to be non-profit architects financially enabled through public-private partnerships. This can be made feasible by linking such projects to construction companies which use sustainable local material sand techniques to make it profitable. For example, making bricks from plastic waste. Working with locals create ideas and enable re-structuring homes.

The dilapidated condition of the houses in urban villages is a concern.

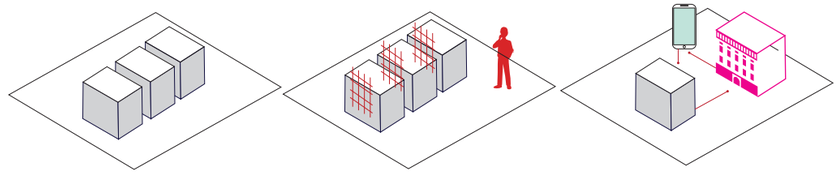
Architects supported by the state and by companies that produce sustainable materials and techniques can be invited to intervene

These architects will consult with a household on better use of space, better roof/wall construction to improve efficiency of small spaces.

3

Adapting the Chawl typology for climate migrants

The new MMRDA also proposes the adaptation of Mumbai's chawl typology for first generation migrants who are often climate refugees from drought affect rural India. But it is important that the chawls are supported by social and physical amenities



The dilapidated condition of the current chawls is a concern. With financial support construction labourers can improve the buildings as a self-build project

Architects supported by the state and by companies that produce sustainable materials and techniques can be invited to intervene

Residents of chawls will get help from the municipality through technology support to find more permanent housing and better employment

7.18

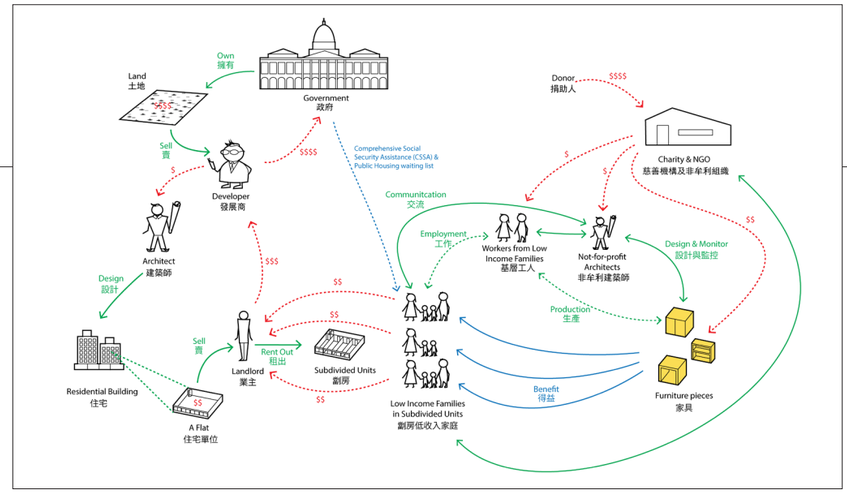
CASE Example: Urbz's Homegrown Cities Initiative

NGO working to improve local construction knowledge in the slums of Mumbai

7.19

CASE Example: DOMAT Limited's 'Society of Conscience'

Non-for architects working to help the livelihoods on low-income families through home modification by adaptable furniture



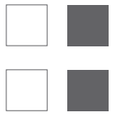
7.20

Image Sources

7.18. Policy toolkit for Affordable Housing - Part 2. Illustrations by Author (2018).

7.19. 'A House We Built'. A part of the Homegrown Cities Initiative. Source - (urbz, 2014). Screenshots retrieved by Author (2017).

7.20. Domat Limited's 'Society of Conscience' Source – (Kingsley & Ma, 2018)



Strengthening Eco-Systems and Capacity Building

Strengthening Ecological Systems

Protecting ecological systems resulted in the protection of urban and agricultural lands. The consequences of weakened ecological systems affects non-urban groups the most. Conservation efforts are also a meaningful employment opportunities and means of capacity building.

Description of Policy Toolkit

This policy uses conservation/ protection efforts of various ecological areas as a means to strengthen these systems and create employment for non-urban groups (like forest tribes and fishing communities). Their indigenous knowledge with the infrastructure support from authorities can lead to balanced conservation efforts.

Policies

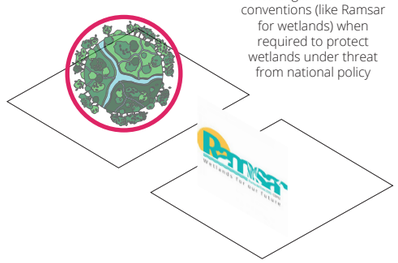
sub-Regional Scale

Local Scale

1

Protection of lands

Sub-region authorities will reinforce laws to protect the ecologically sensitive lands like wetlands, mangroves, coastal mudflats, coastal sand dunes, river beds and forest land. Additionally, this will also include the protection of agricultural lands to reach the goal of food self-sufficiency in the region.

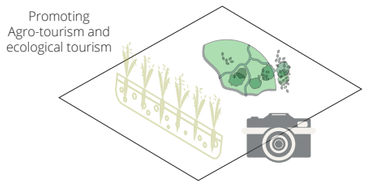


Invoking international conventions (like Ramsar for wetlands) when required to protect wetlands under threat from national policy

2

Capacity Building through Agro- and Eco-Tourism

Sub-regional policies to favour Agro-tourism and eco-tourism over regular tourism through tax incentives or loans for capacity building. Means to create local awareness and meaningful employment.

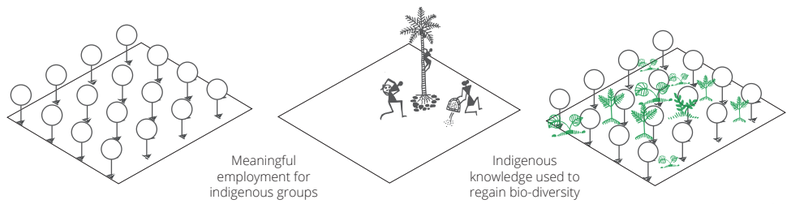


Promoting Agro-tourism and ecological tourism

2

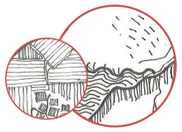
Including Indigenous communities for conservation

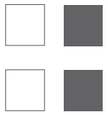
For example, sub-regional authorities will include forest communities in afforestation projects. This will help legitimising these indigenous communities and also restoring the bio diversity of these forests. Creating a knowledge bank to empower indigenous about their legal rights and gain indigenous knowledge about protecting sensitive ecologies that their livelihoods have been intertwined with.



Meaningful employment for indigenous groups

Indigenous knowledge used to regain bio-diversity





Capacity Building

Water Management

Agro-based urbanism requires efficient water management systems. Metropolitan regions are often given priority to cities when it comes to water supply. Real-estate developers use bore wells to increase the salinity, reducing agrarian water supply systems.

Description of Policy Toolkit

This policy toolkit reinforces the use of traditional water management practices. It seeks to potentialise on the high annual rainfall and regulate excessive underground bore wells. These are predominantly sub-regional/ local interventions.

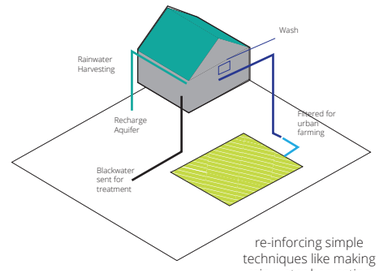
Policies

Local Scale

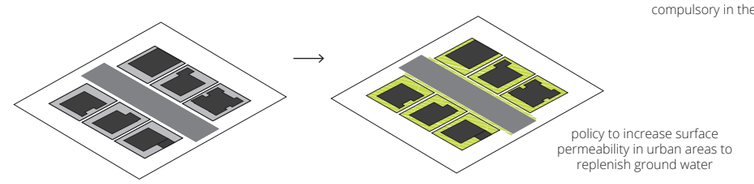
1

Urban Water Management

Municipalities and authorities offer Incentives to re-inforcing simple techniques like making rain-water harvesting compulsory in the region. The MMR is on the coast and receives high amounts of annual rainfall and should be conserved. Also, incentives to ensure semi-permeable surfaces in urban areas to ensure that ground water is replenished.



re-inforcing simple techniques like making rain-water harvesting compulsory in the region

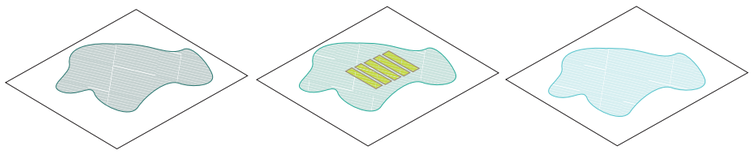


policy to increase surface permeability in urban areas to replenish ground water

2

Restoration of traditional water systems

Sub-regional authorities invest in talav and bhowkal restoration programme. Increasing cathment zones throughout the regiona will be a priority.



traditional water systems require conservation and modernisation

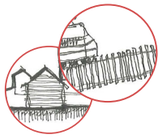
Organic hydroponic systems to restore water bodies

Restored water bodies can used for irrigation, etc,

3

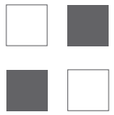
Regulation of bore wells

Strict regulations to prevent bore wells being dug, they reduce groundwater and increase salinity of the soil. All new urban projects will require municipal water approved by the authorities.



Urban Mobility

While agro-based urbanism and urban mobility is not obviously linked, the movement of people has an important role in the functioning of the metropolitan region. At present, edge cities are struggling to create jobs, forcing migrants to find service jobs in the core city, resulting in an overwhelmed transport infrastructure.



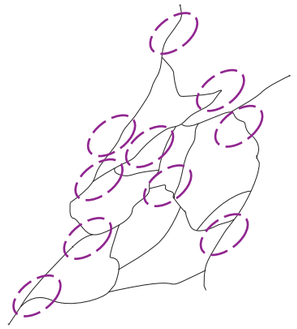
Capacity Building and Reducing Speculative Acquisition

Description of Policy Toolkit

The current policy is a centralised development of urban infrastructure with multiple state and city level transport authorities. Secondary transport system to support the primary network should be decentralised to ensure equal development of local mobility. Focus on current transport system will prioritise the connection of smaller villages and towns. This policy toolkit links housing policies to ensure core issues with urban mobility are addressed.

primary rail network

independent secondary rail network



Policies

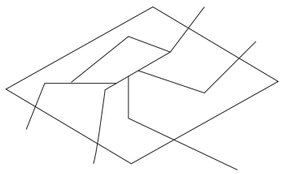
Regional Scale

sub-Regional Scale

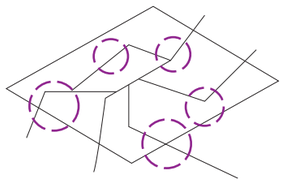
1

Decentralisation of mobility system

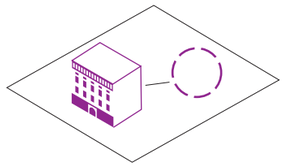
Regional transport network takes up same level of priority as connecting local roads, secondary networks through decentralisation.



The regional authorities will strengthen the existing primary (suburban) rail network



Sub-region authorities take responsibility for secondary transport networks that plug into the primary (suburban) rail network

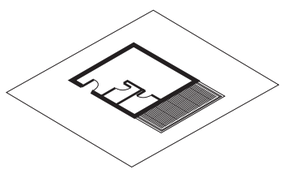


Establishing a regional fund for sub-regions and municipalities to access based on project proposals

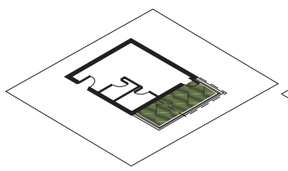
2

Improving local economies

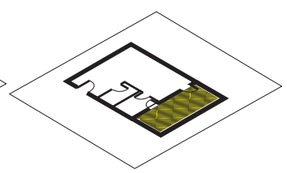
The sub-regional policy supports housing projects that have flexible layouts to encourage entrepreneurship and leisure activities.



Small apartments that are dynamic in function



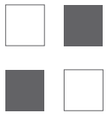
Expansion space for non-toxic workshop space encouraging entrepreneurship and home vegetable gardens.



Expansion space for a rentable room with access to a shared toilet for new migrants

Gender Balance

While agro-based urbanism and facilitating gender empowerment may not be obviously connected, research shows an increasing amount of women taking responsibility for agriculture jobs due to men in the household migrating to non-farming based jobs.



Capacity Building and Reducing Speculative Acquisition

Description of Policy Toolkit

The current policy does not look at gender empowerment policies at a metropolitan scale and are often national policies that are difficult to implement. This policy toolkit looks to decentralise this role to local level municipalities focused around land rights and mapping to achieve a regional strategy for agro-based urbanism.

Policies

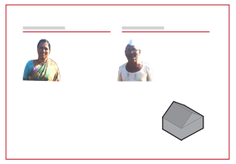
sub-Regional Scale

Local Scale

1

Dual household registration

Land-holdings to compulsorily be registered as dual household when applicable. There is qualitative and quantitative data that shows that there is a relation between women's land rights and "[...] bargaining power and decision-making on consumption, human capital investment, and intergenerational transfers" (Meinzen-Dick, Quisumbing, Doss, & Theis, 2017)



Land titles at registration will include a compulsory dual house-hold ownership with photographs to ensure rightful ownership

2

Empowering women self-help groups

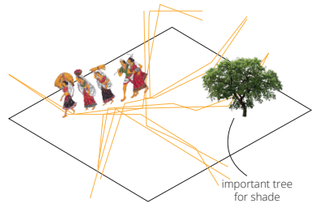
Creating information campaigns about women's land rights. Setting up loans accessible to women self-groups. Funding will be provided with jobs related to agro-urbanism and the protection of ecologically sensitive areas.

promoting women self-help groups to promote legal awareness and creating opportunities for entrepreneurship and employment

2

Including Women in GIS problem focused Mapping

Authorities will include local input while creating details maps and GIS data or non-urban areas in the periphery, it is important to ensure 50% participation of women from the local community. Men and women map different observations because they have different roles in agriculture (Meinzen-Dick et al., 2012). And both sides of information are critical to account for while planning and designing.



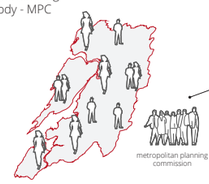
community based GIS mapping the values importance of both men and women's roles (traditional and contemporary) in agriculture

Urban Governance

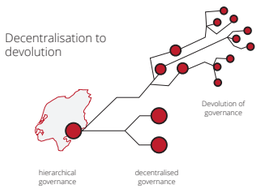
Decentralising the core city

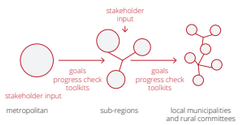
Building Capacity of the edge cities as independent entities

Coordinating body - MPC



Decentralisation to devolution





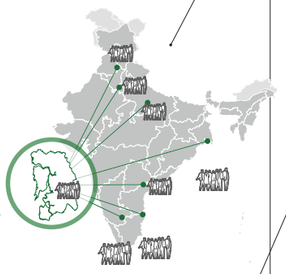
Building up civil society groups and enabling activists to effectively create and implement policy

Regional Identity

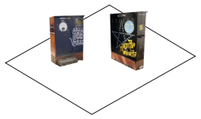
Decentralising the core city

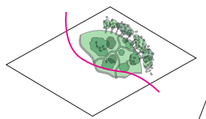
Campaigns explaining the impact of activities like sand-dredging and the importance of mangroves

Decentralising the core city



Decentralising the core city

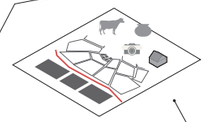




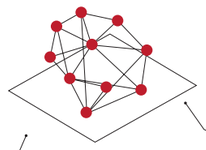
leisure-tourist bike path and walking trails through ecologically sensitive areas

Agricultural Production

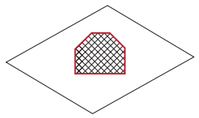
Improving the agricultural economy through policy and intervention with technology.



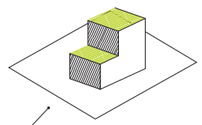
The notification will define activities that allows urban activities that support the agro-urbanism strategies



Food supply chain with BCT (explained in case study example of Rabobank proposal)

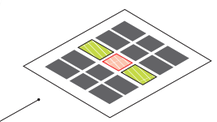


Introducing Agro-ICT Centres that interface low-tech farms with high-tech IT technology



Unused rooftops for urban farming

Labour migrants looking for work can lease these urban farms as a means to add to their livelihoods.

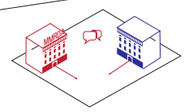


Making the agricultural economy visible in urban areas through spatial interventions

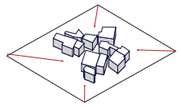
Revitalising the agricultural economy as a means of sustainable employment for migrants

Affordable Housing

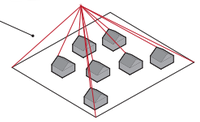
Legitimising urban villages and facilitating land transfer from private and public entities to collective land ownership to ensure housing for rural migrants



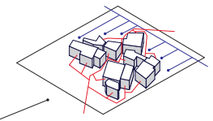
The MMRDA or other planning authorities will facilitate the negotiation of land transfer to the existing residents of informal settlements



Land Ownership will also ensure accountability of the residents to take charge of collective development



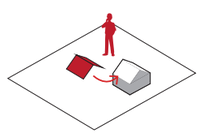
A group of households with the support of the municipality can gain land rights to collective mortgages using blockchain to manage collaborative decisions.



Municipalities and sub-regional authorities will invest in designing and implementing physical infrastructure for these urban villages

Improving the quality of urban villages through state sponsored architecture design solutions

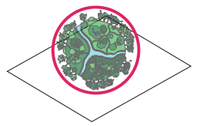
Architects supported by the state and by companies that produce sustainable materials and techniques can be invited to intervene



These architects will consult with a household on better use of space, better roof/wall construction to improve efficiency of small spaces.

Streghtening Ecological Systems

A stronger no development policy for the protection of ecologically sensitive areas in the metropolitan region

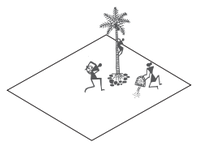


Invoking international conventions (like Ramsar for wetlands) when required to protect wetlands under threat from national policy

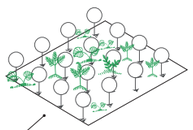
Legitimising urban villages and facilitating land transfer from private and public entities to collective land ownership

Promoting Agro-tourism and ecological tourism

Legitimising urban villages and facilitating land transfer from private and public entities to collective land ownership



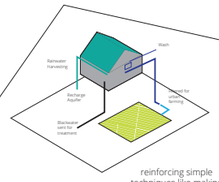
Meaningful employment for indigenous groups



Indigenous knowledge used to regain bio-diversity

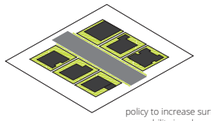
Water Management

Enforcing better water management strategies to reduce pressure on rural areas



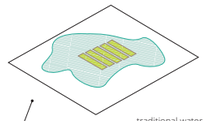
reinforcing simple techniques like making rain-water harvesting compulsory in the region

Improving the semi-permeability of urban surfaces to improve groundwater levels



policy to increase surface permeability in urban areas to replenish ground water

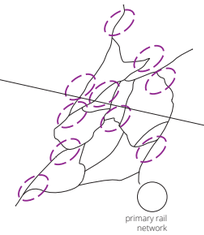
Legitimising urban villages and facilitating land transfer from private and public entities to collective land ownership



traditional water systems require conservation and modernisation

Mobility

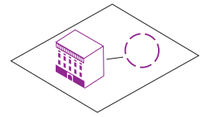
Enforcing better water management strategies to reduce pressure on rural areas



primary rail network

independent secondary rail network

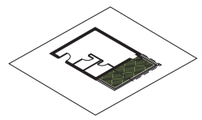
Sub-region authorities take responsibility for secondary transport networks that plug into the primary (suburban) rail network



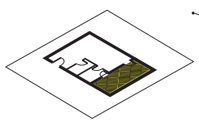
Establishing a regional fund for sub-regions and municipalities to access based on project proposals

Ensuring that housing compensation includes spaces for expansion or workshop spaces to encourage entrepreneurship and self sufficiency

This will reduce dependency on the core city for service jobs.



Expansion space for non-toxic workshop space encouraging entrepreneurship and home vegetable gardens.



Expansion space for a rentable room with access to a shared toilet for new migrants

Encouraging entrepreneurial activities for labour migrants

Gender Balance

Enabling women to access equal land rights to protect agricultural land from land acquisition for speculative urbanisation

Land titles at registration will include a compulsory dual house-hold ownership with photographs to ensure rightful ownership

promoting women self-help groups to promote legal awareness and creating opportunities for entrepreneurship and employment

community based GIS mapping the values importance of both men and women's roles (traditional and contemporary) in agriculture

Empowering women with land ownership and enabling protection from speculative land acquisition.

Section Refrences

Belinda, B., & Keil, R. (2017). Decentralizing the Global City Region: Suburban Identities in Frankfurt and Toronto. MONU - Magazine on Urbanism, 26(Spring).

Chew, W. C. (2018, January 30). Perfecting Food Safety: How China does it with IoT and Blockchain. Retrieved 19 May 2018, from https://hackernoon.com/perfecting-food-safety-how-china-does-it-with-iot-and-blockchain-9948ceb7ce9c

Davenport, C., & Tabuchi, H. (2018, April 5). E.P.A. Prepares to Roll Back Rules Requiring Cars to Be Cleaner and More Efficient. The New York Times. Retrieved from https://www.nytimes.com/2018/03/29/climate/epa-cafe-auto-pollution-rollback.html

Ge, L., Brewster, C., Spek, J., Smeenk, A., Top, J., Diepen, F. van, … Ruyter de Wildt, M. de. (2017). Blockchain for agriculture and food: findings from the pilot study. Retrieved from https://doi.org/10.18174/426747

Hammerich, T. (2018, January 24). How Blockchain Helps Smallholder Farmers in Developing Countries. Retrieved 19 May 2018, from https://futureofag.com/how-blockchain-helps-smallholder-farmers-in-developing-countries-64bf6f13c049

Jayaraman, N. (2017). India's new wetland rules threaten to destroy 65% of its water bodies rather than protect them [Text]. Retrieved 19 May 2018, from https://scroll.in/article/853515/indias-new-wetland-rules-threaten-to-destroy-rather-than-protect-65-of-its-water-bodies

Kingsley, M., & Ma, M. (2018). Affording Hong Kong: the struggle of low-income families in sub-divided homes. Atlantis: Magazine for Urbanism and Landscape Architecture, 28(3).

Mars, R. (n.d.). Immobile Homes. Retrieved from https://99percentinvisible.org/episode/immobile-homes/

Meinzen-Dick, R., Koppen, B. van, Behrman, J., Karelina, Z., Hope, L., Akamandisa, V. M., & Wielgosz, B. (2012). Putting gender on the map: Methods for mapping gendered farm management systems in Sub-Saharan Africa (Discussion Paper No. IFPRI 01153). Internation Food Policy Research Institute: Environment and Production Technology Division. Retrieved from https://www.researchgate.net/publication/237052843_Putting_gender_on_the_map_Methods_for_mapping_gendered_farm_management_systems_in_Sub-Saharan_AfricaLink

Meinzen-Dick, R., Quisumbing, A., Doss, C., & Theis, S. (2017). Women's land rights as a pathway to poverty reduction: Framework and review of available evidence. Agricultural Systems. https://doi.org/10.1016/j.agsy.2017.10.009

Namati. (2014). CRZ pocket reference: India's Coastal Zone Regulations Made Clear. Namati – Centre for Policy Research. Retrieved from https://namati.org/news/indias-crz-made-clear/

Paul, A. (2016). Learning from Informality. KRVIA: Reflections 2016 - The Production Fo Home.

Srivastava, R., & Echanove, M. (2014, November 28). 'Slum' is a loaded term. They are homegrown neighbourhoods. The Guardian. Retrieved from http://www.theguardian.com/cities/2014/nov/28/slum-loaded-term-homegrown-neighbourhoods-mumbai-dharavi

Steel, C. (2013). Hungry city: how food shapes our lives. London: Vintage.

Sources

7.21. Policy toolkit for Forest Management. Table and illustrations by Author (2018).

7.22. Policy toolkit for Water Management. Table and illustrations by Author (2018).

7.23. Policy toolkit for Mobility. Table and illustrations by Author (2018).

7.24. Policy toolkit for Gender Balance. Table and illustrations by Author (2018).

7.25. Linking the policy toolkits. Table and illustrations by Author (2018).

8

Design Proposals

Application of the strategy at various scales

8.0. Urban Villages have historically existed withing the urban fabric of Indian cities. Planning processes need to legitimise and design for their coexistence with the city scape.

Image Source

8.0. 'Urban Villages and the Indian City.' Sketch by Author (2018).

8.1 When a Village Stops Being

Local - An agro-urban village in the Vasai Virar Sub region

This section identifies and describes a fictional village in the Vasai-Virar sub-region with diverse ecological systems and non-urban agricultural economy.

Migrant workers often live in urban villages as affordable housing

Plantation Lands Protected as no development zones - but are under threat from high salt content in soil due to uncontrolled urbanisation

Non urban groups - fishing communities, tribal groups and farmers

Agricultural lands under threat from urbanisation

Mangroves

Salt Pans under threat from urbanisation

Real-estate projects that seek to change traditional urban fabric

Sources

8.1. Abstract Map identifying elements of a semi-fictional village settlement. Illustrations by Author (2018).

8.1

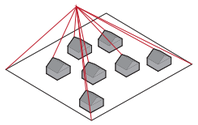
This village located in the Vasai-Virar sub-region that is under threat from real-estate driven urbanisation.

Non-urban groups are forced out further toward peripheral regions because they do not always fit the urbanisaton model.

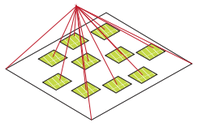
Potential expansion of real-estate into agricultural and ecologically sensitive lands.

Sources

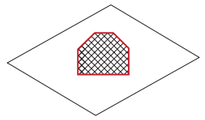
8.2. Abstract Map identifying threat of urbanisation to the semi-fictional village settlement.
Illustrations by Author (2018).



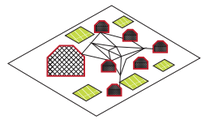
Collective house ownership with BCT to ensure that decisions can be made by each household confirming changes in the land agreement



Collective farm land ownership with BCT to ensure that decisions can be made by each household confirming changes in the land agreement



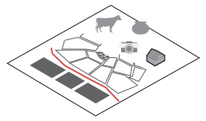
Introducing Agro-ICT Centres that interface low-tech farms with high-tech IT technology



A network of Agro-ICT centres that link various farms in the region to compete more efficiently in the food supply chain

The Agro-ICT centres will also be a link between farms and agro research institutions to share real-time data and design soluions

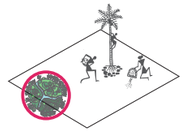
With the new design proposal the village will be be able to embrace both urban and agricultural values.



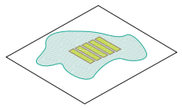
The notification will define activities that allows urban activities that support the agro-urbanism strategies

Land titles at registration will include a compulsory dual house-hold ownership with photographs to ensure rightful ownership

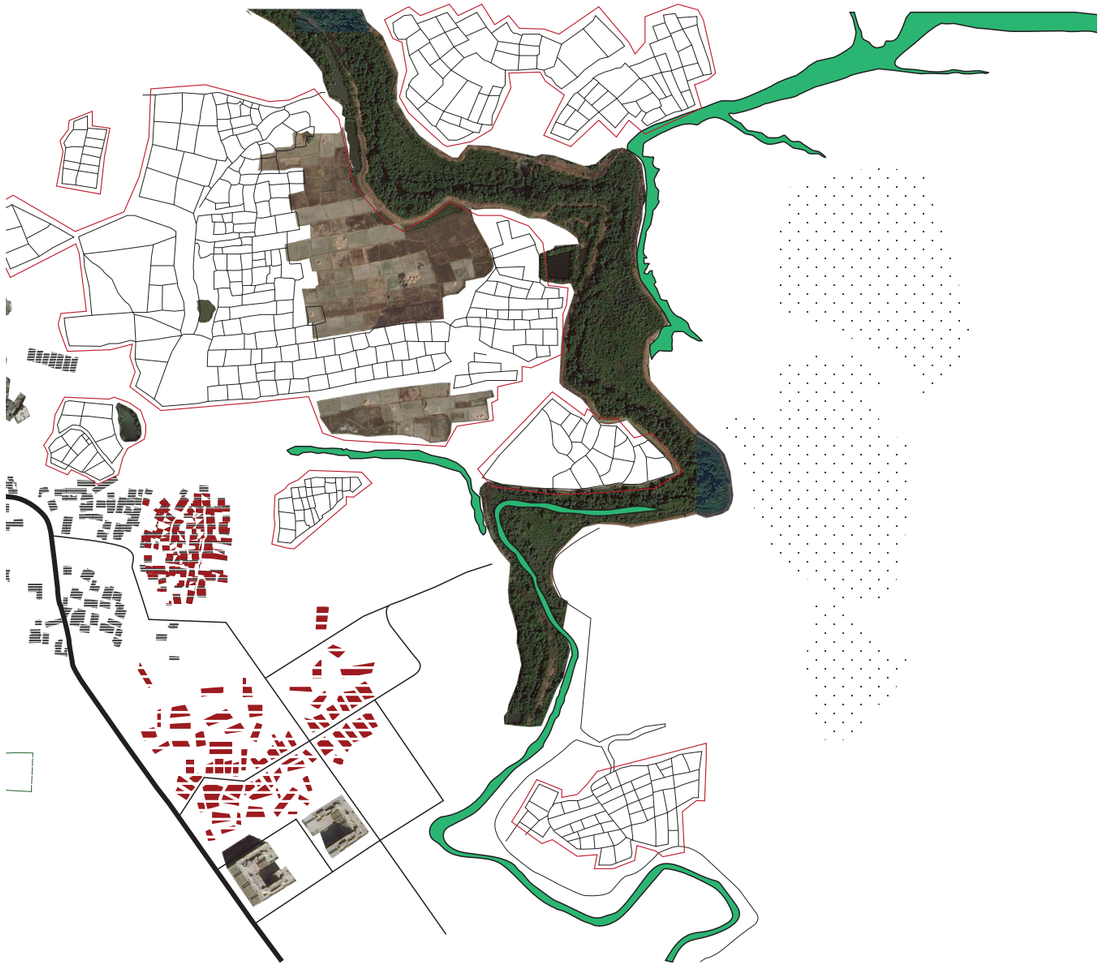
promoting women self-help groups to promote legal awareness and creating opportunities for entrepreneurship and employment



Engaging indigenous people and non-urban groups in conservation efforts as a meaningful option for employment.



investment in talav and bhowkal restoration programme. organic hydroponic systems to restore water bodies



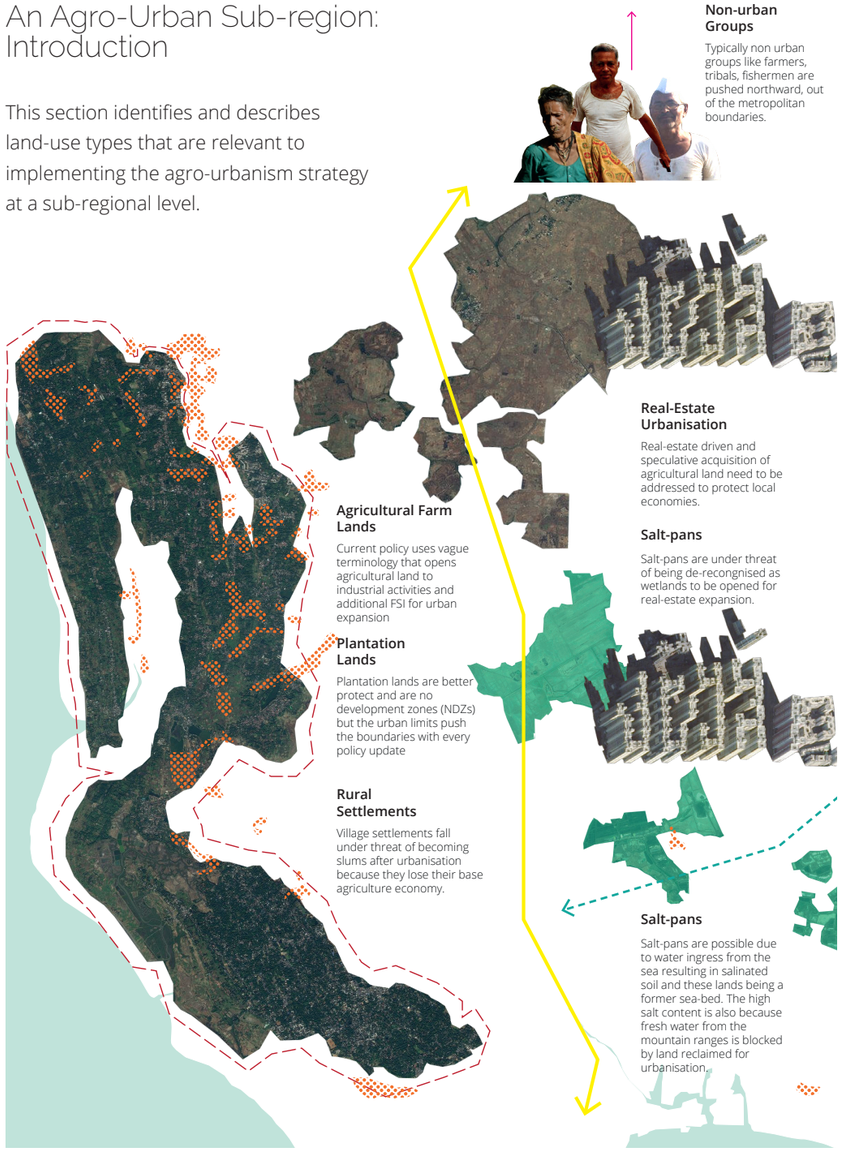
Sources

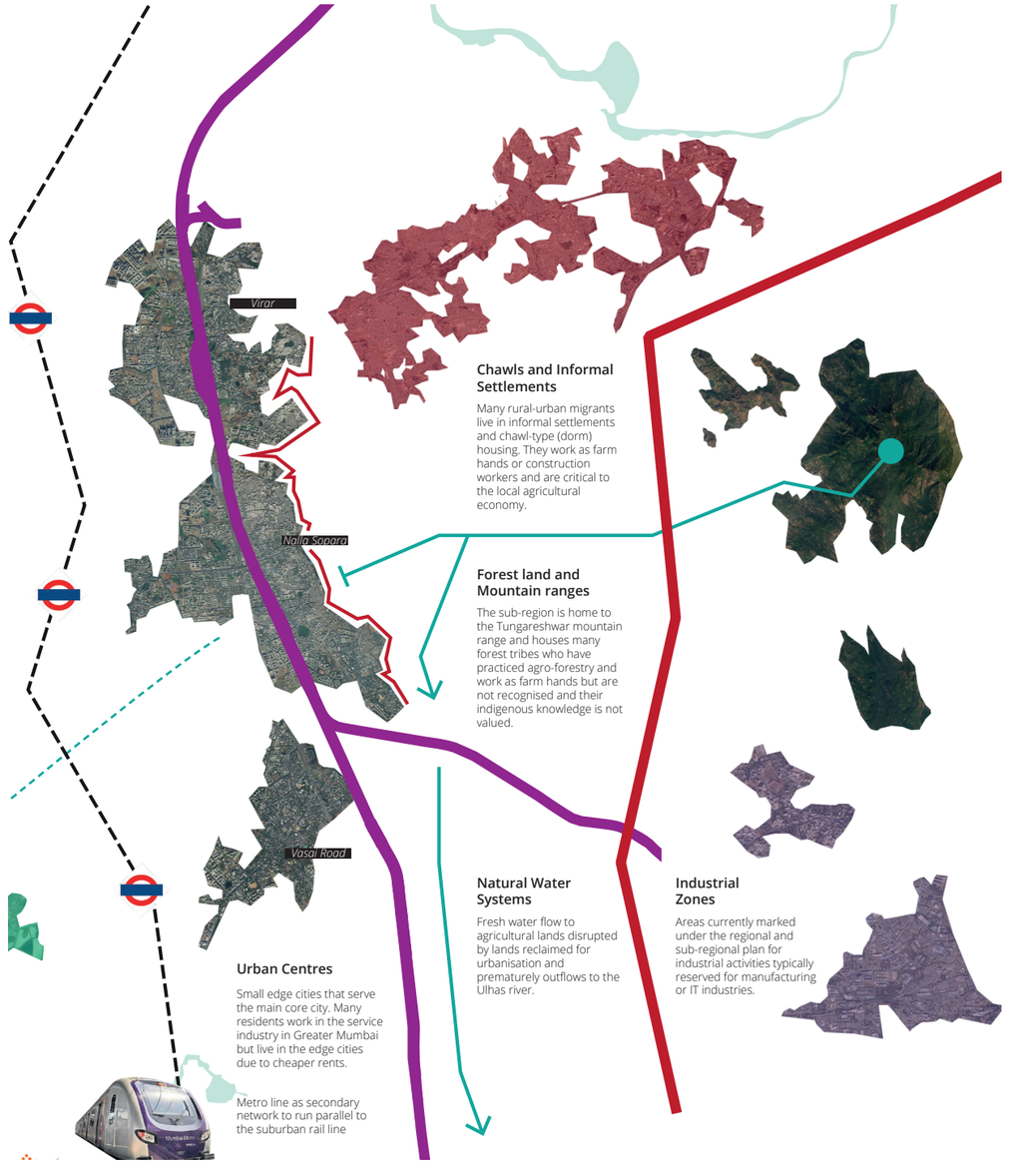
8.3. Abstract Map showing strategies for agro-urbanism to preserve the semi-fictional village settlement from speculative urban development.
Illustrations by Author (2018).

8.2 The Vasai-Virar Pilot

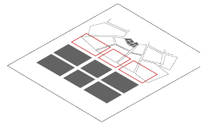
An Agro-Urban Sub-region: Introduction

This section identifies and describes land-use types that are relevant to implementing the agro-urbanism strategy at a sub-regional level.



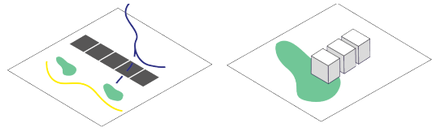


Agricultural and Plantation Lands under threat



Present model of urbanisation driven by real estate that overrides agricultural lands

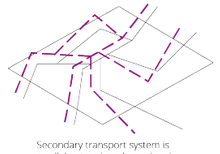
Salt-Pans under threat



Poorly planned urbanisation has resulted in the separation of sea water and fresh water resulting in salt-pan lands

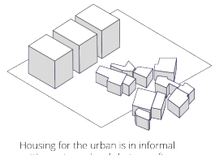
Salt-pans de-recognised as wetlands and be opened for real-estate expansion

Mobility



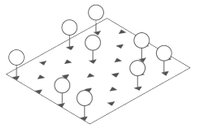
Secondary transport system is parallel network to the regional system that could potentialy create a class division along economic lines

Chawls and informal settlements

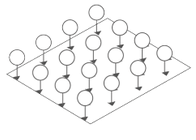


Housing for the urban is in informal settlements or chawls but are often resettled under housing schemes without economic support systems.

Forest and Water Management



Forest areas and mangroves are cut down to make room for urbanisation without consideration of ecological consequences



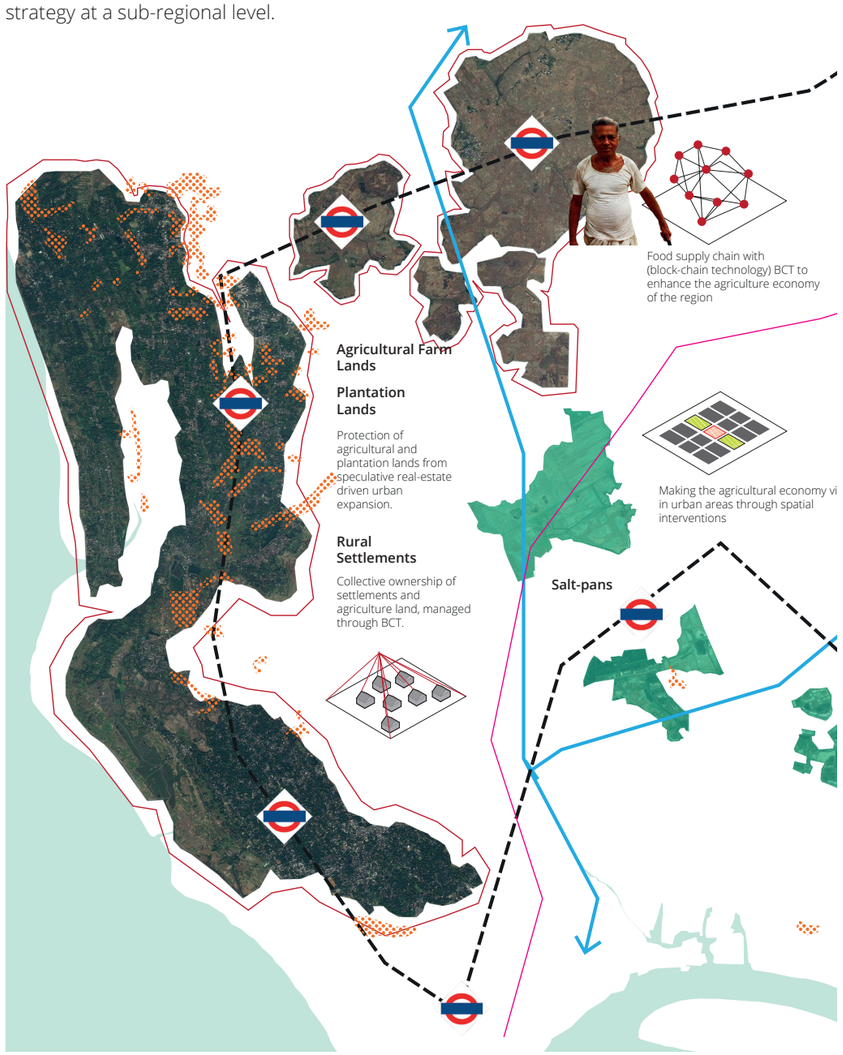
Afforestation projects by the MOEF is often single forest type models that is economically profitable (Eucalyptus Trees) without consideration of the bio-diversity of forests

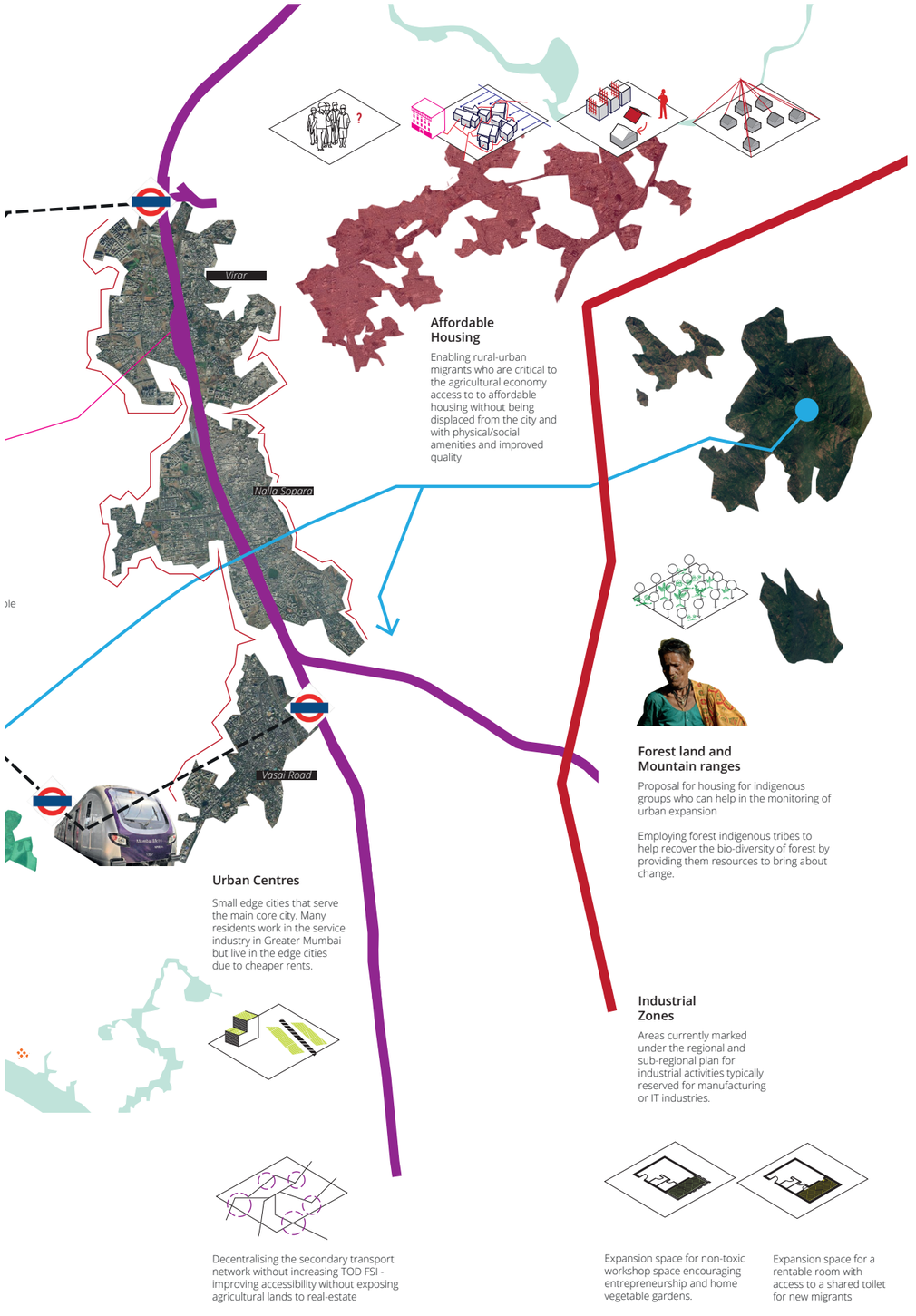
Image Sources

8.4. Abstract Map of the Vasai-Virar sub-region identifying relevant land-uses with land-use icons. Illustrations by Author (2018)

8.2 An Agro-Urban Sub-region: Introduction

This section describes policies and design proposals to work towards the agro-urbanism strategy at a sub-regional level.





leisure-tourist bike path and walking trails through ecologically sensitive areas

Creating room in the urban fabric for fresh water from the mountains and salt water from the flooding of the estuaries to making high saline areas suitable for agriculture

Decentralising the secondary transport network without increasing TOD FSI - improving accessibility without exposing agricultural lands to real-estate

Expansion space for non-toxic workshop space encouraging entrepreneurship and home vegetable gardens.

Expansion space for a rentable room with access to a shared toilet for new migrants

Image Sources

8.5. Abstract Map of the Vasai-Virar sub-region identifying relevant land-uses transformed through key policies and design proposals through icons. Illustrations by Author (2018)

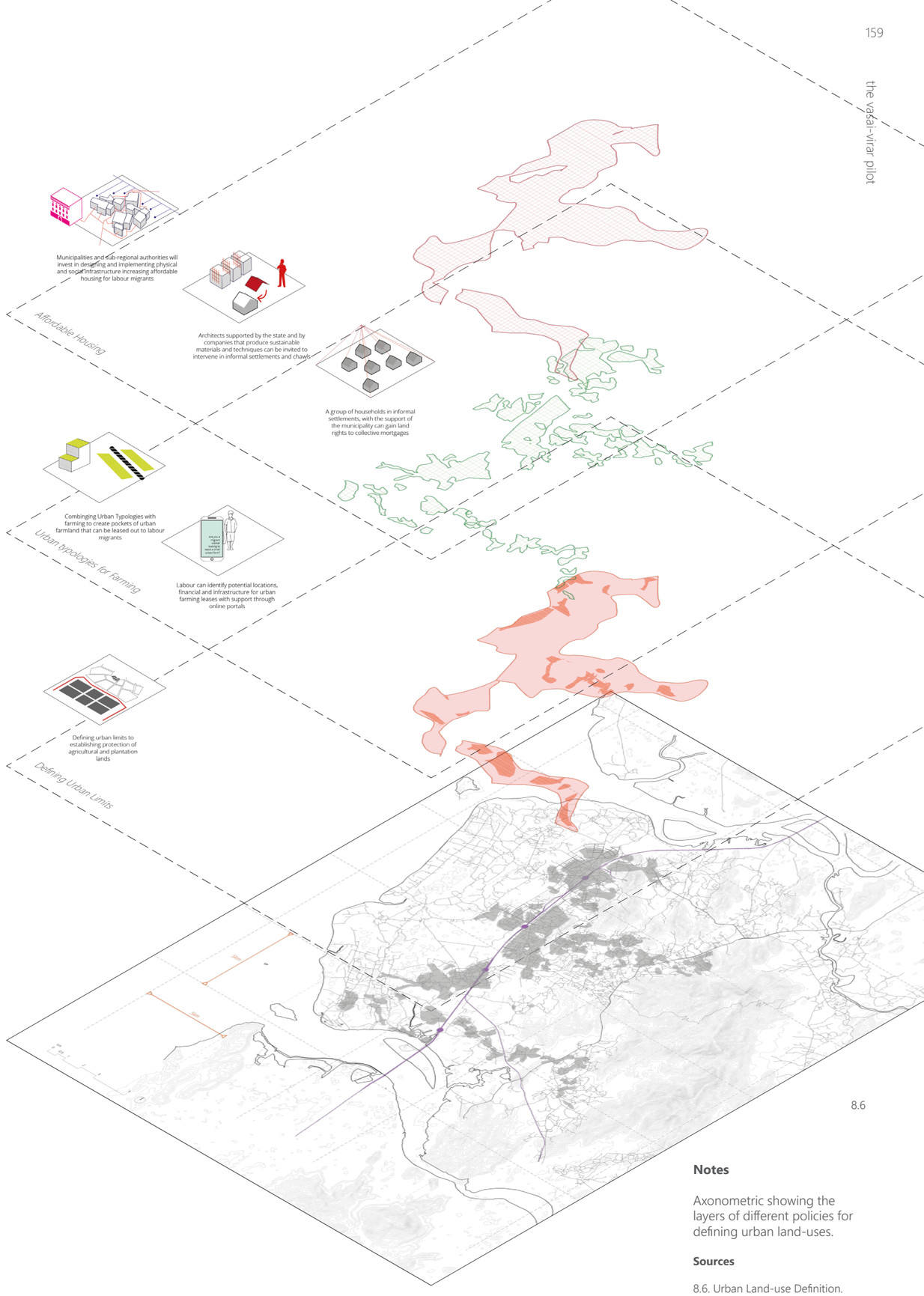
8.2 Urban Land-Use Definition

To improve work towards an agro-urban strategy for the Vasai-Virar sub-region the following policies and design proposals are to be implemented for land-uses defined as urban.

1) Affordable Housing
- Policies that help 3rd and 4th generation residents living in informal settlements gain collective ownership of land improving options for affordable housing.
- Policies that will help circular migrants find housing through chawls and rooms in urban villages

2) Redefining Urban typologies to include urban farming
- Government and Private institutions have a lot of single-ownership surface area that can be leased out to farmers or migrant worker to grow vegetables/crops.
- Social Amenities - Including urban farming and gardening into the programmes of schools and hospitals.
- Defining a percentage of organised open spaces as places suitable for urban farming.

3) Defining Urban Limits
- Defining and urban limit to reduce speculative acquisition of agricultural lands.
- Reduce the need for housing expansion through legitimisation slums.
- Densification within limits with planned typologies that innovatively make the most of the available surface area while retaining spatial quality.
- Improving management of water resources in urban areas to reduce pressure on agricultural lands.



8.6

Notes

Axonometric showing the layers of different policies for defining urban land-uses.

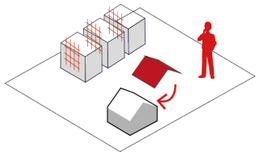
Sources

8.6. Urban Land-use Definition. Illustration by Author (2018).

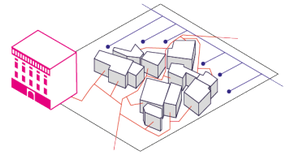
8.2

Slums and urban villages struggle to gain legitimacy in the the urban dominance of metropolitan policy. But they are but an archetype of rural housing and can gain urban legitimacy through the provision of basic infrastructure and architectural solutions.

8.7



Architects supported by the state and by companies that produce sustainable materials and techniqués can be invited to intervene in informal settlements and chawls



Municipalities and sub-regional authorities will invest in designing and implementing physical and social infrastructure increasing affordable housing for labour migrants

Rural typologies can co-exist with urban typologies

8.8

Sources

8.7-8.8. Improving informal housing conditions. Illustrations by Author (2018).

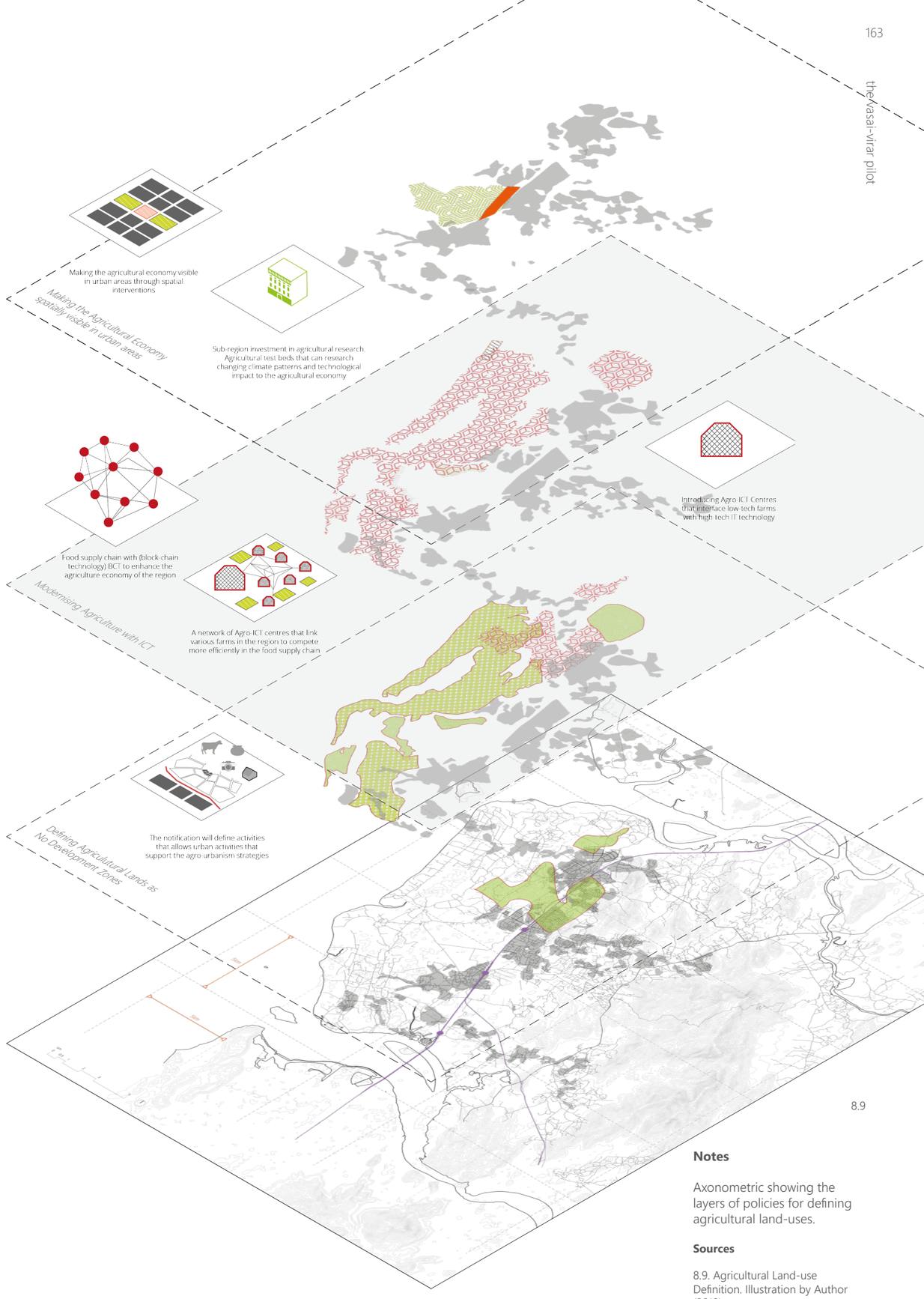
8.2 Agriculture Land-use Definition

To improve work towards an agro-urban strategy for the Vasai-Virar sub-region the following policies and design proposals are to be implemented for land-uses defined as agricultural or plantation land.

1) Making the Agricultural Economy of the sub-region spatially visible in urban areas.
- Introduction of a special agricultural zone (SAZ) detailed in the next chapter (8.3). This proposal will seek to promote agricultural institutions to undertake research and improving farming techniques by working in-situ with farmers. The region has a variety of agricultural produce, and would make a good test bed. For example, using hydroponic farming for farms struggling with less surface area. Additionally using green houses designed for the Indian climate that reduce the water consumption of farms by reducing the temperature.
- The proposal seeks to centrally locate the agriculture produce market yard from a peripheral location in the sub-region to a more central location (along with a the special agricultural zone) to make it more visible.

2) Modernisation of the farming sector through ICT
- Improving the relevance of farming through a pilot project in the sub-region that uses block-chain technology to empower farmer to better participate in the food supply chain.
- To achieve this the project introduces various Agro-ICT Centres that help present day farmers achieve this at the first phase and subsequently create a new generation of tech-savy future farmers

3) Protection of farmland as an ecologically sensitive no development zone



8.9

Notes

Axonometric showing the layers of policies for defining agricultural land-uses.

Sources

8.9. Agricultural Land-use Definition. Illustration by Author (2018).

8.2

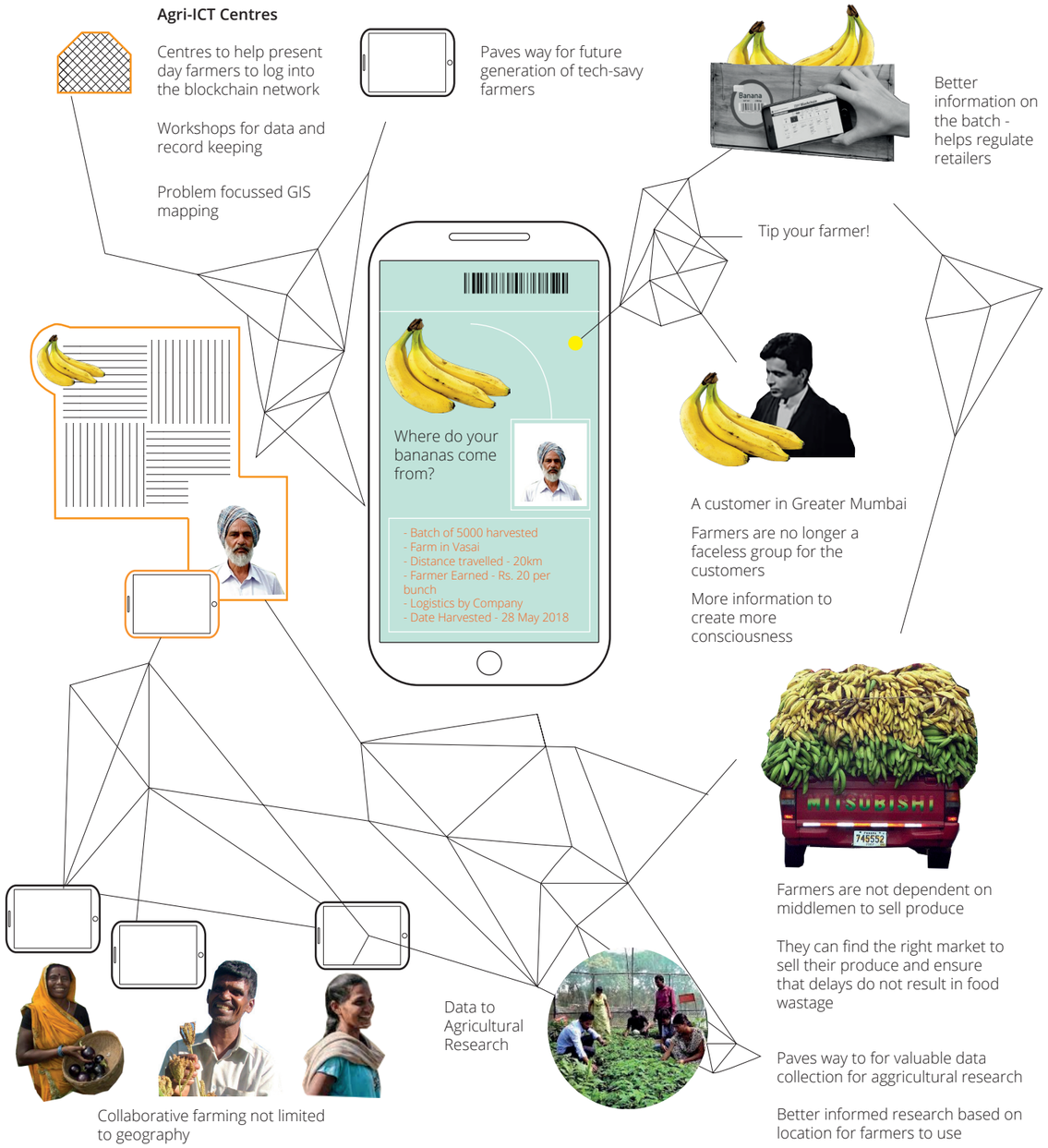
As described in the agriculture policy toolkit, block-chain technology is a means to better the agriculture economy by modernising it. The increase in efficiency will not only add value to agricultural production but also make agriculture a more popular field for younger and more urban residents.

Image Sources

8.10. How block-chain technology can help a farmer in Vasai. Illustration by Author (2018).

CASE Example: Dutch Company Moyee Coffee working with Ethiopian farmers

The company uses a fair-chain model to ensure that profits are shared 50-50 between Dutch and Ethiopian farmers



8.10

8.2 Strengthening Ecological Systems

One of the goals for the MMR is to promote the protection of ecologically sensitive areas and safe-guard them from urbanisation.

1) Water Management

- The sub-region receives a lot of rainfall (220cm anually) but still faces water shortage. This proposal seeks to address this problem by increasing traditional water collection points (talavs and bhowkals) with purification methods like aquaponics.
- Reducing urban demand of water through compulsory implementation of water harvesting and recycling when possible.

2) Desalination of the salt pans to increase its agricultural potential

- Room for the estuaries - the two rivers the frame the region are prone to flooding. This natural process is blocked by embankments, but subsequently leads to increased salinity and damage to property by flooding.
- Increasing the permeability of urban surfaces to improve the ground water table.

3) Forest Management - Conservation and Afforestation

- To achieve this in the subregion - 500m buffer-zones are proposed from the existing forest boundary notification.
- Monitor overlaps with urban areas and industrial zones to ensure no further encroachment takes place.
- Proposal for housing for indigenous groups who can help in the monitoring of urban expansion
- Employing forest indigenous tribes to help recover the bio-diversity of forest by providing them resources to bring about change.

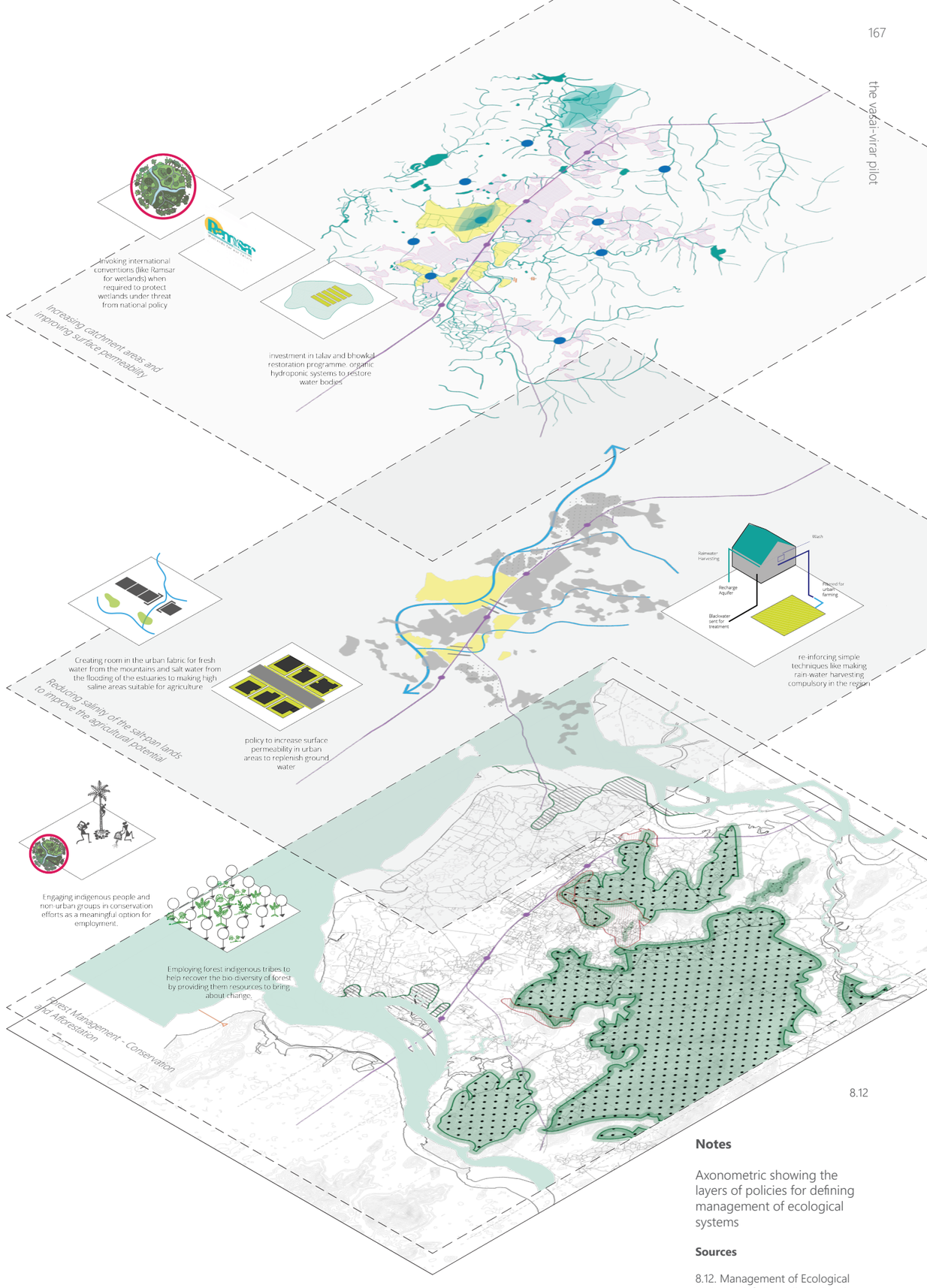
8.11

Notes

8.11. Eco and agro tourism is a means for the public to understand the importance of these ecological and agricultural systems. Citizen involvement is critical to ensure that government policies do not undermine these systems in favour for real-estate development.

Sources

8.11. Eco and agro tourism. Collage by Author (2018).



8.12

Notes

Axonometric showing the layers of policies for defining management of ecological systems

Sources

8.12. Management of Ecological Systems Definition. Illustration by Author (2018).

8.3 Future of the Salt-Pans

Pilot Project: Special Agricultural Zone (SAZ)

The project proposes a regional **Special Agricultural Zone (SAZ)** for the Vasai-Virar sub-region.

The objective behind this project is to create an area that combines agricultural research and recreation. That allows for different types of agricultural innovation in various zones. These may include water management techniques, effective and cautious extraction of resources, composting techniques and application of technology in agriculture.

Land Feasability

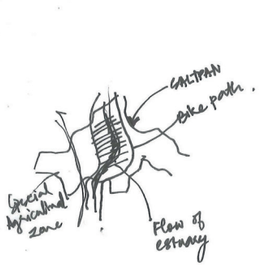
Making the salt-pans feasible for agricultural programmes by introducing a new water management system (detailed in the previous Chapter) and seasonal desalination of soil through salt leaching (Sawant, 2014).

Proposed Programme

1. Agricultural Produce Market Yard with additional Public Functions
2. Room for the Estuary
3. Aquaponics and Aquaculture Zone
4. Mangrove Afforestation
5. Farming Experimentation
6. Colloborative Farming
7. Managing Market Food Waste
8. Leisure Walking Routes and Bike Paths

Concept Sketches

Linking the Agricultural Produce Market with Food Waste not sold



8.16

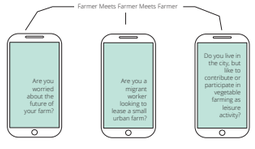
CASE Example: Parco Agricolo Sud Milano Regional buffer zone that is a protected rural area located south and south-east of Milano.

8.13

CASE Example: Macritchie Reservoir

Wetlands recreational areas.

8.14



Community Collaborative Farming

Farming currently has an uncertain future. A farmer has to take on multiple roles - farmer, agriculturist, nutritionist, economist. Technology can be used to connect migrant workers to farms and urban educated class interested in leisure farming who can also invest money and technical expertise.

8.15

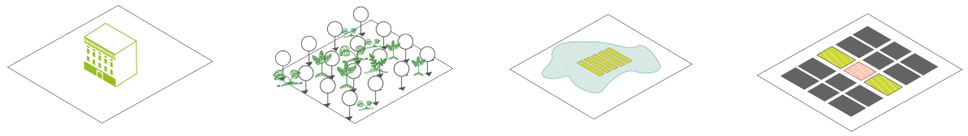
Sources

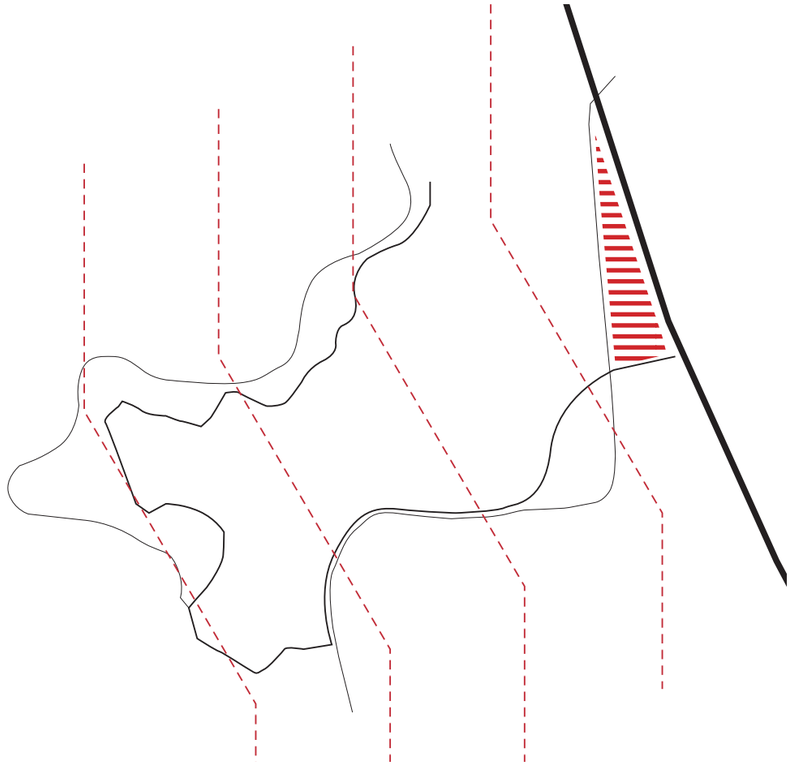
8.13. Parco Agricolo Sud Milano. Source - http://web.tiscali.it

8.14. 'Macritchie reservoir'. (Rich D, 2017)

8.15. 'Community Collaborative Farming'. Illustration by Author (2018).

8.16. Sketch Plan and icons by Author (2018)





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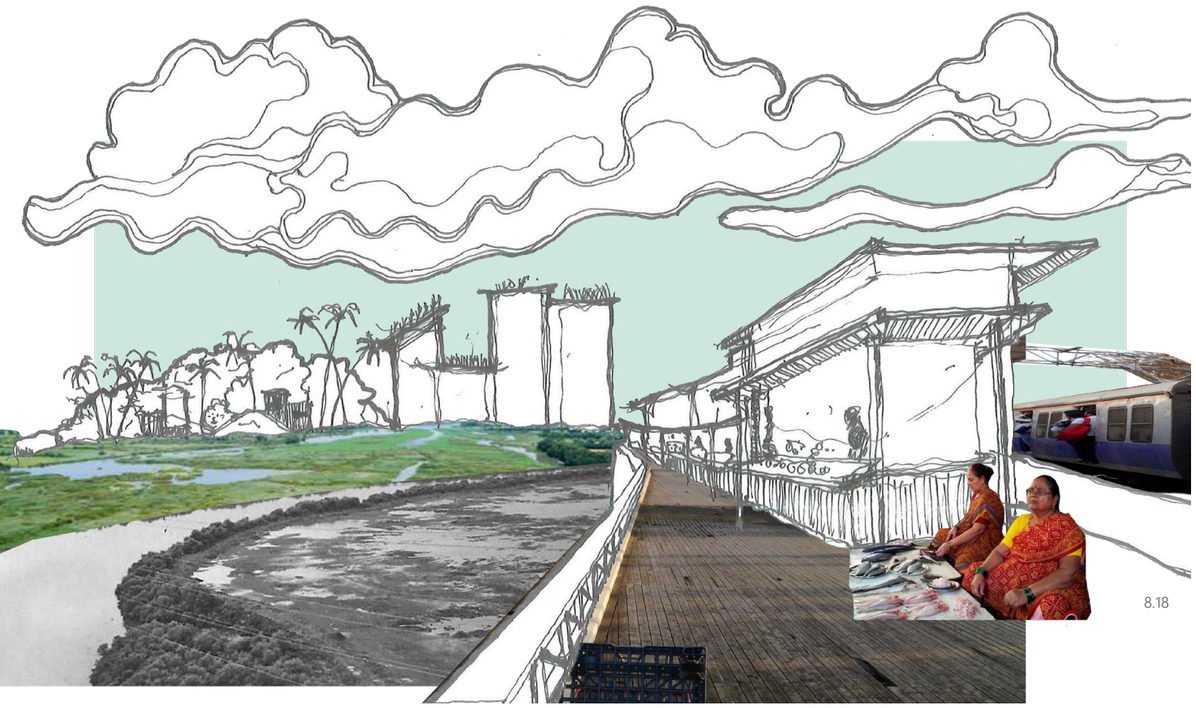
8.3



8.18

Wastelands
Experimenting with greenhouses to farm in wastelands

Pedestrian - Bike path
Part of a sub-regional goal to promote recreational cycling around places of interest

Agriculture Produce Market Yard
Relocation and re-invention of the Agricultural Produce Market Yard to a more central location with space alloted for regular citizens to access a farmer's market and food trucks that use local produce.

Room for the Estuary
Creating low lying areas for the estuary to flood

Managing Food Waste
Linking the Agricultural Produce Market with Food Waste not sold

Water-intense Farming
Mixing water-intense farming with aquaponics and testing salt-tolerant crops in saline areas.

Mangrove Reforestation
Mixing water-intense farming with aquaponics
Test

Water-intense Farming
Mixing water-intense farming - like rice or paddy with aquaponic and fish farming

8.19

Image Sources

8.18. 'A Special Agriculture Zone'. Collage by Author (2018).

8.19. 'A Special Agriculture Zone'. Sketch Plan and collage by Author (2018).

8.4 Agro-ICT Centres
Local level Pilot Project

To transition the farming sector into the project's proposal to enhance agriculture through Blockchain (BCT) and ICT, the sub-region proposes a network of Agro-ICT centres. These centres are located in dense village settlements to help farmers adapt to the BCT for Vasai strategy in the sub-regional plan.

Bridging Farming and Technology

A typical ICT centre would be a place where farmers can access ICT infrastructure like tablets/software. Additionally, there will be places for workshops to help farmers to digitally collect and record relevant data.

Conservation of Water bodies

Other potential programmes are proposed to ensure multi-functionality. A main characteristic of these centres is that they will be strategically located around a bhowkal or a talav (based on the location). These were an integral part of the traditional water system, but they have fallen into disuse. A significant feature of these centres would be a conservation project that looks at conservation and restoration of these water bodies with techniques like organic hydroponics.

Prototype for Alternate Farming

Additionally, the centre will also be a prototype for advanced or alternate farming models. Visitors can learn how they can adapt their urban buildings with vegetable gardens or urban farms. The centre will also have connections with specific industries in the region that produce relevant equipment and help network with both conventional farmers and urban dwellers interested in retrofitting their houses.

Hydroponic Garden Wall

Vertical farming through hydroponic systems. This can be replicated on building surfaces or vacant buildings.

Terrace Farming

Value Farm in Shenzen by Thomas Chung that intersects issues of urban transformation with architecture and urban agriculture.

Recreational Public Spaces

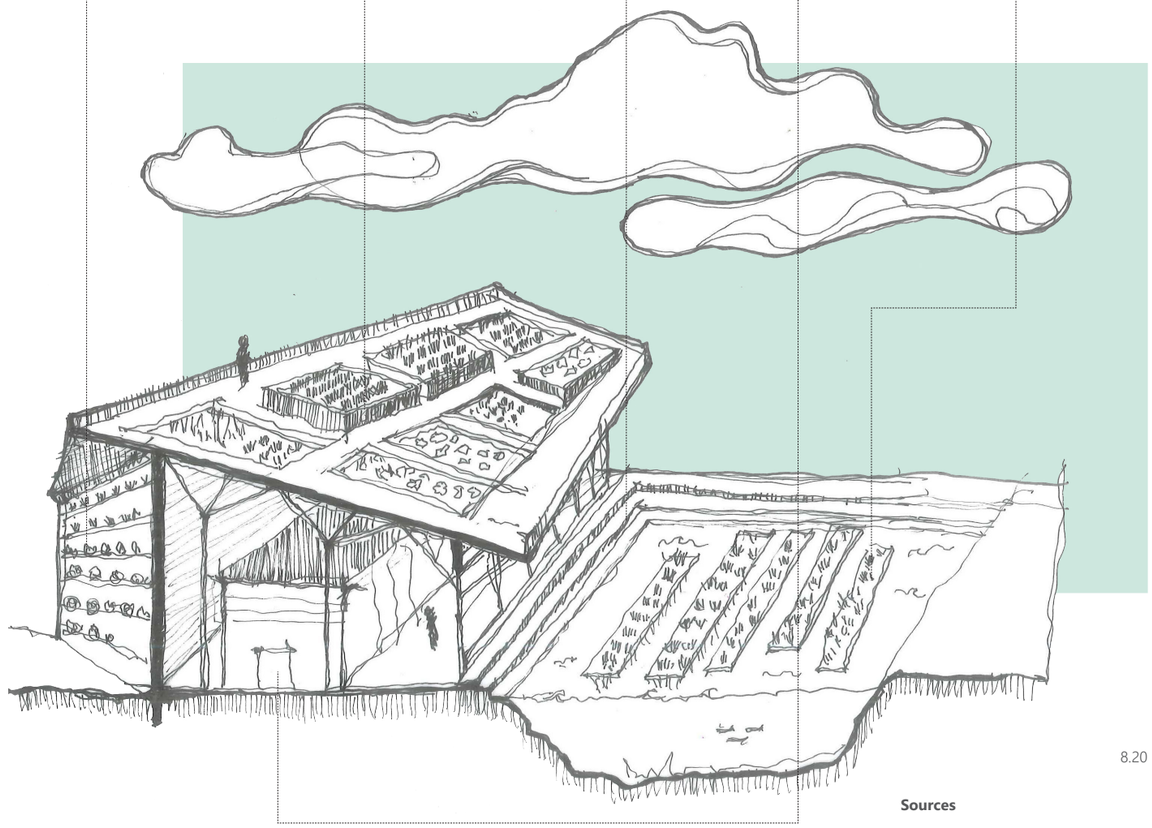
Most talavs have a religious building attached to them, this programme seeks to disconnect the religious connotation for a more secular function.

Transitioning Farmers

Helping farmers gain the benefits of block-chain technology through access to softwares/hardware and workshops on data collection and record keeping

Hydroponic Filters

Using floating hydroponic systems to filter nitrate from polluted water bodies. This can inform farmers on methods to purify village bhowkals - traditional ponds used for farming irrigation



8.20

Sources

8.20. Prototype of an agro-ICT centre. Illustration by Author (2018).

8.5 Metropolitan Governance

Key roles for the new MMRDA

The MMRDA needs to be redefined with new roles to ensure decentralisation of urban governance and subsequently devolution of top-down hierarchical governance systems

8.21

1. The MMRDA will be responsible for setting a regional strategy with a vision that the entire region and all the relevant stakeholders can work towards.

For example, a strategy of agro-based urbanism to achieve key goals towards the betterment of the region

2. Overall goals, checkpoints, restrictions and regulations

The MMRDA will set **goals** towards a strategy for agro-urbanism - decentralisation, capacity building, reducing speculative land acquisition and protecting ecologically sensitive areas.

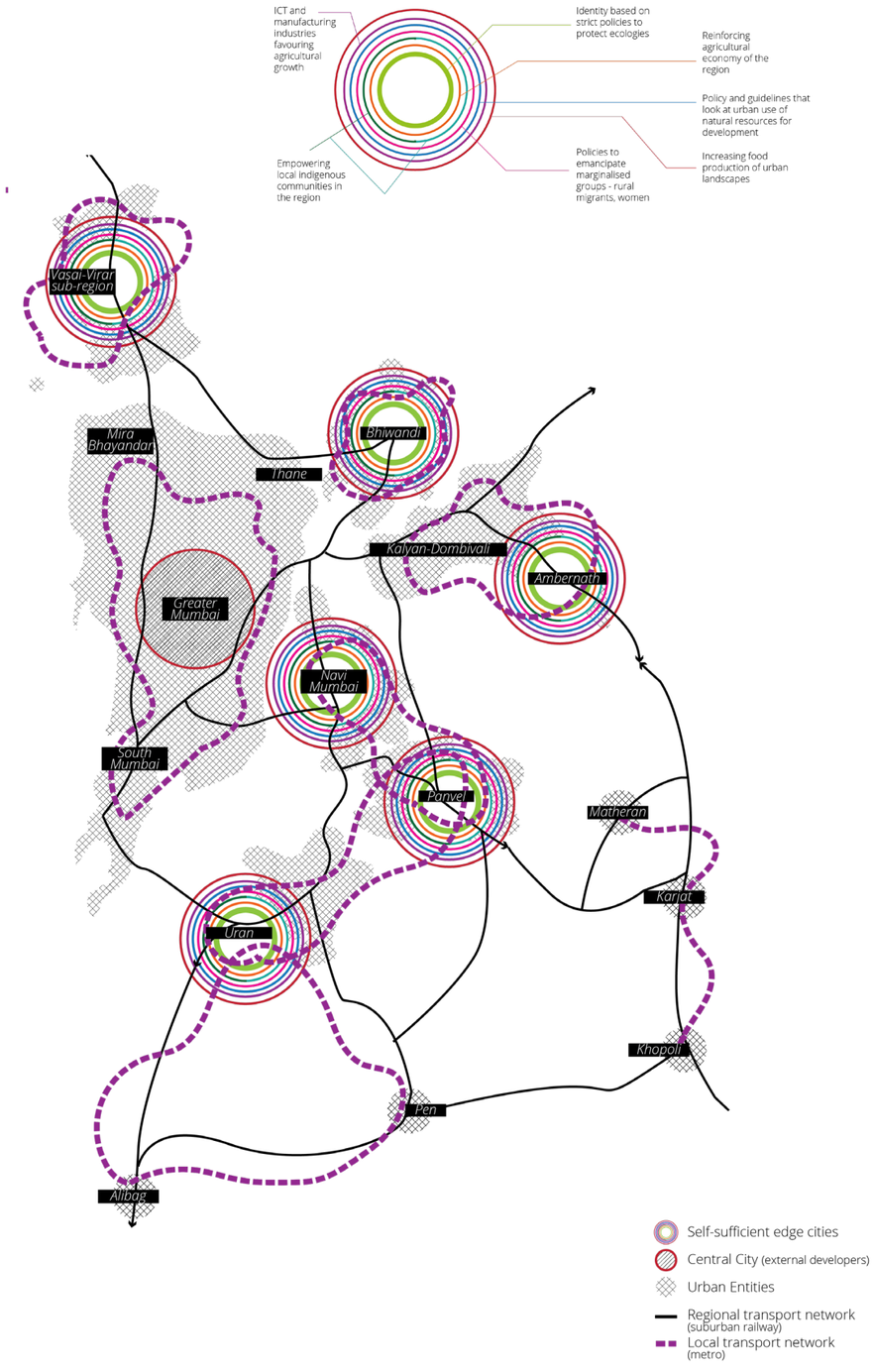
Checkpoints to achieve these goals and specific will be set with different sub-region groups based on meetings with local stakeholders and representatives to ensure local relevance and modification of goals. A time-frame to achieve the goals will be based on local feasibility.

Regulations - at the regional scale the MMRDA will also look at national/state policies for regulations and modify them where necessary. Clear publications will be issued with PR campaigns on the regions policy on regulations.

Restrictions - the MMRDA will also set some restrictions in the region. For example, a ban against factories producing single use plastic items.

3. The MMRDA will start a region-wide PR campaign to promote agro-urbanism and the importance of protecting ecologically sensitive areas to create general awareness. Also information on incentives for various stakeholders adhering to these values.

4. The MMRDA will be responsible for mediating regional infrastructure proposed by state and union authorities with local authorities. They will mitigate consequences on non-urban groups who are usually displaced by such projects. The MMRDA will advocate for the region and ensure that its regional strategy is not compromised by parastatal policies. •



8.22

Sources

8.21. MMRDA Logo. Source MMRDA (2017).

8.22. Decentralisation of the MMR with focus on the periphery. Illustration by Author (2018).

9

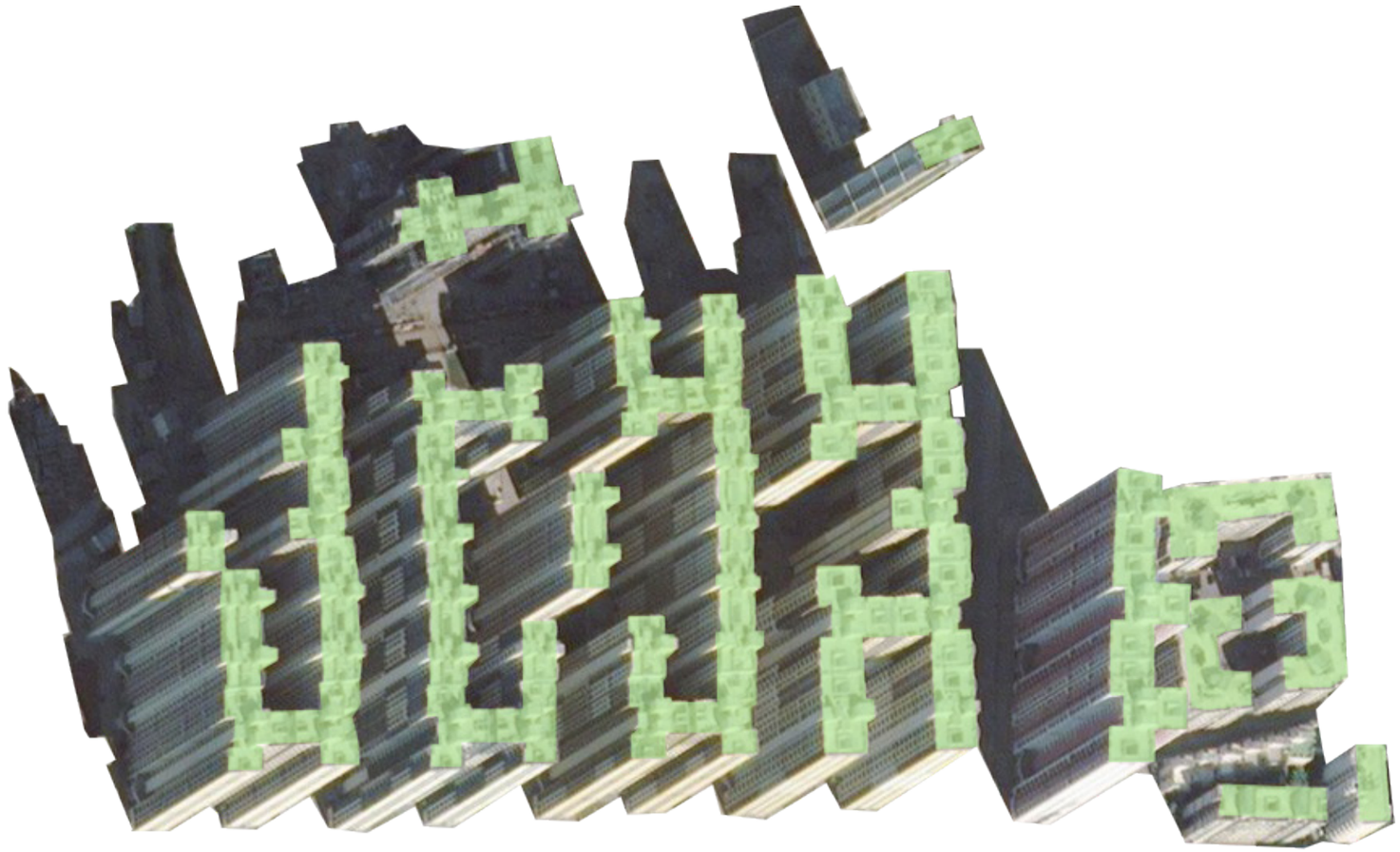
Epilogue

A first step to shifting
the urban bias

Conclusion
Reflection

Appendix

Bibliography
Image References
List of Abbreviations and Vocabulary



9.1 Conclusion
Countering the urban bias

Addressing the research questions

In what way does regional planning in the Mumbai Metropolitan Region manifest an urban bias in development processes that results in a rural to urban population flux?

This project set out to research the urban bias in the regional planning processes in the metropolitan region revealing an unbalanced growth model. It was noted that despite a physically decentralised structure of the region, the parts that make the whole were in service to the centre rather than independent self-sustaining entities. Ecological areas are encroached by slum dwellers who lack access to affordable housing, agricultural land is acquired for urban and industrial development, rural labour migrants and *adivasis* (forest indigenous tribal population) work as construction workers in the real-estate industry to create speculative housing and regional landfills are located in the peripheries to accommodate urban waste amongst other issues.

9.1
With the present model of urban planning, this farmer in Vasai may eventually be pushed out - by planning authorities and real-estate developers.

How can development and planning processes in Mumbai encourage balanced growth with equal emphasis to agrarian or rural lifestyles?

This project seeks to address this urban bias by reverting focus from the central core toward the edge cities with a balanced rural and urban development. It identifies rural and urban values to promote in the region. It addresses this through different scales. At a regional scale it proposes schemes around the initial research themes to achieving the goals of the strategy. This is supported through a decentralisation of governance project, with a new role for the MMRDA.

9.2
But with the new model, this farmer can proudly embrace both his farm and urban life. He may know more about a new technology than the average urban dweller. His daughter might work in an office during the day and work on data collection for the farm in the evening. Or maybe the efficiency of the farm allows him to be a DJ at night thanks to better connection of villages to cities.

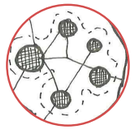
Image Sources

9.1. Farmer in Vasai. Original Photograph by (MS Gopal, 2011). Edited by Author (2018).

9.2. Future of the farmer in Vasai. Graphic by Author (2018).

9.3. Conclusions of the Research and Design Themes. Icons by Author (2018).

Design Strategy Themes



9.3

The project *Beyond Urban* addresses key urban issues through the following themes in a regional strategy proposal. These include -

Politics of Governance
Decentralised Planning governance model that helps effective development and management of the region

Agricultural Production and Rural Lifestyles
Reviving agricultural sector through technological interventions

Benchmark for Sustainable Urban Regions
Creating an identity for the MMR that is progesively focused on urban ecologies that other metropolitan regions can follow

Urban Ecological Systems
A regional narrative of protecting ecologically sensitive areas to protect cities from disasters and loss of life/ property

Mobility
Refocusing secondary transport systems at a sub-regional scale

Housing
Enabling and empowering 3rd and 4th generation slum dwellers to collectively own the land they live on. Transitioning climate-change migrants through *chawl*/ dorm type housing

Water Management
Policies and design solutions that reduce water demand or urban areas and ensure equal water access to peripheral areas.

Non-urban Groups
Working with Indigenous groups in a knowledge change that benefits them and their eco-systems.

Gender Balance
Using land-ownership and community oriented mapping as means to empower women

Sub-Region Application at Vasai-Virar

At a sub-regional scale application of the regional strategy is at the precipice of change - it is expected to undergo changes in the shadow of the Delhi-Mumbai Industrial corridor and the multi-modal Virar-Alibag project. This could potentially imply that regional landscape could change drastically. But under the new sub-regional plan there is focus and direction for development. Agriculture takes a forefront with a pilot project that uses BCT (block chain technology) to help farmers make the most of the global food supply. This would boost the agricultural sector and create meaningful employment for migrants and non-migrant groups.

The sub-regional plan is conscious of local land-uses and conditions and promotes location specific strategies based on the analysis to affect change.

This pilot project is articulated in the re-invention of the salt-pan lands and the introduction of agro-ICT centres that help farmers transition to this technology model.

9.2 Reflection

Design as Politics

This project carried out within the department of Urbanism as a part of the Design as Politics (DasP) research group. The DasP group covers a variety of themes ranging from finances to welfare. This year, the studio focused on migration under the banner – A City of Comings and Goings.

Introducing Beyond Urban

In the backdrop of this studio, this project investigates the urban bias in regional planning in the Metropolitan Region of Mumbai, India. The metropolitan region is home to a variety of communities not typically considered as "urban"; these include rural migrants, agrarian communities, fishing villages and indigenous tribal groups. All these groups struggle to gain urban citizenship within the narrative of bourgeois urbanism in the race to become a world class city (Priya et al., 2017). The project seeks to counter this urban bias by revitalising the primary sector in order the preserve and enhance existing social-economic structures. Further, this is also a strategy to create meaningful employment for migrants following cyclical migration pattern between their villages and the city.

Role

The project takes on the perspective of a consultant to the Mumbai Metropolitan Regional Development Authority (MMRDA), who are the current authors of the Mumbai Regional Plan 2016-2036. This planning authority at present takes on a centralised role to the state government to undertake large scale planning and execution of projects. This graduation project however takes on a critical role of the institution itself with three keys changes. Firstly, it seeks to decentralize its current power structure to empower smaller urban local bodies (ULBs). Secondly, it also seeks to reinforce the MMRDA's role as a coordinator between various hierarchical levels and ULBs in the region. Lastly, it also attempts to set the MMRDA in a provocative position and a pioneer in setting stricter regulations as a metropolitan region, which may not always be in compliance with the larger national policy. By taking advantage of India's federal structure, it is a means to set standards for other metropolitan regions and is critical to the regions own self-preservation.

Scientific Relevance

This project addresses literature gaps in the field of planning in two key aspects

1) A new planning model for local needs - Current planning in the global south is often based on colonial planning systems and continue to aspire to a western model of order. James C. Scott describes this phenomenon as (Scott, 2008). With this trend, there is a need for city's to brand themselves as 'world-class' cities, competing to attract multi-national companies, investors and the creative class. This has had a negative impact even on western cities, where this is has resulted in gentrification of neighbourhoods making them unaffordable for many. In 2017, despite municipal support, a new Google campus in the Kreuzberg district of Berlin was reject by local residents fearing negative consequences on rents, their livelihoods and the unique character of the neighbourhood (Knight, 2017). Richard Florida famous for pioneering the advent of the creative class in The Rise of the Creative Class has since been reflective of the resultant gentrification in cities and in his follow-up A New Urban crisis he acknowledges the rise of "superstar cities" and the negative impact of cities competing with each other (Wainwright, 2017). In the global south, and particularly in India, the problems are comparable but different. Indian cities seek to promote world-class cities and bourgeois urbanism at the expense of urban citizenship for non-cosmopolitan groups. This project attempts a more inclusive planning model sensitive to local conditions.

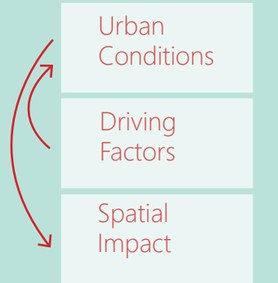
2) Additionally, urbanisation of the countryside has a global impact. While current discourse does emphasize on self-reliant cites in food production (Steel, 2013), there needs to be a large change in the planning process. At present, developing countries like India and China are following dangerously in the footsteps of the consumerist culture and dependency on a global hinterland, and are renouncing food self-reliance. In 2016, India made its first purchase of corn in 16 years as reported by Reuters (Bhardwaj, 2016). Similarly China, struggling to feed its increasing urban population, has become the world's largest importer of grain and soya (Steel, 2013). Land rich countries like Brazil and Argentina have benefitted economically from this move, but at what cost? Brazil's ambitions to meet export demands has pushed soya farmers into encroaching the Amazon forest (Branford & Torres, 2017). This has a huge negative impact on global ecological systems. Urbanisation in India needs to develop a model that is inclusive of urban and peri-urban agriculture. Such a model not only strengthens food-security but also generates job opportunities for migrants and the urban poor. This project urges planning to not dismiss agriculture in Indian planning processes, but instead enhance the system through better strategies supported by new technology.

3) This project seeks to apply Blockchain Technology (BCT) in farming and while this is being considered amongst many ICT research groups globally, its spatial implication through strategies and planning have not been considered. Not doing so could lead to large scale consequence that may have a more negative rather than positive impact.

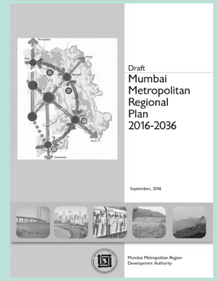
Societal Relevance

The project easily fits into an ongoing societal discourse. As described in the newspaper articles, migration of rural-urban migrants has increased due to lack of emphasis in the development of the countryside. The decline in agriculture has not only triggered migration into cities but has also driven farmers to suicide. Maharashtra, the home state of Mumbai has one of the highest rates of farmer suicide in the country. Urbanism has the potential to improve the farming sector to enhance cities and generate meaningful employment for labour migrants

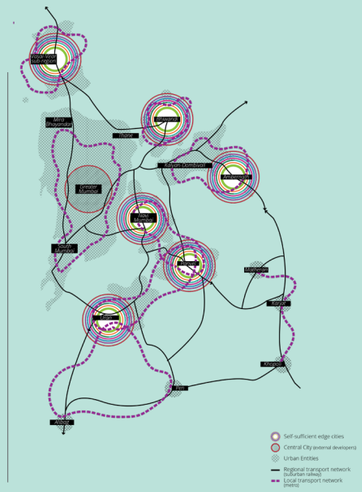
Design as Politics
To understand this urban system, the region has categorised as a series of urban conditions, their driviing factors and the subsequent spatial impact.



Issues
To understand this urban system, the region has categorised as a series of urban conditions, their driviing factors and the subsequent spatial impact.



MMR Plan 2016-2036
Policy Review
The issues identified in the urban system are evaluated against the policies proposed for them or ignored altogether.



9.4

9.5

Threat to the habitat systems
The current rate of urban expansion has led to a change in regulations to convert saltpans into urban development zones. This extent of expansion is expected to have an adverse impact on the habitat of migratory birds.

Sources

9.4. Relation between Research and Design. Source - Author (2018)

9.5. Screenshot of Scroll.in article describing threat to salt-pans. Jayaraman (2017). Retrieved by Author (2018).

9.2

9.6

9.7

in cities. At present, most labour migrants seek employment as construction workers in a real-estate industry bent on creating speculative housing. Contributing to the food self-sufficiency of the region creates better livelihoods and resilient cities.

Positioning the project

The project can be understood by positioning it against the studio framework to grasp its academic relevance. Design as Politics places projects as a function of – conflict, position and price [Fig. 9.8]. Beyond Urban looks at mitigating urban biases in the planning processes of the metropolitan region. The conflict here is urban versus the non-urban. The graduation project is positioned to empower non-urban groups to achieve better urban environment. The price here is investment in new agricultural technologies and strategies to enhance the primary sector and creating meaningful employment.

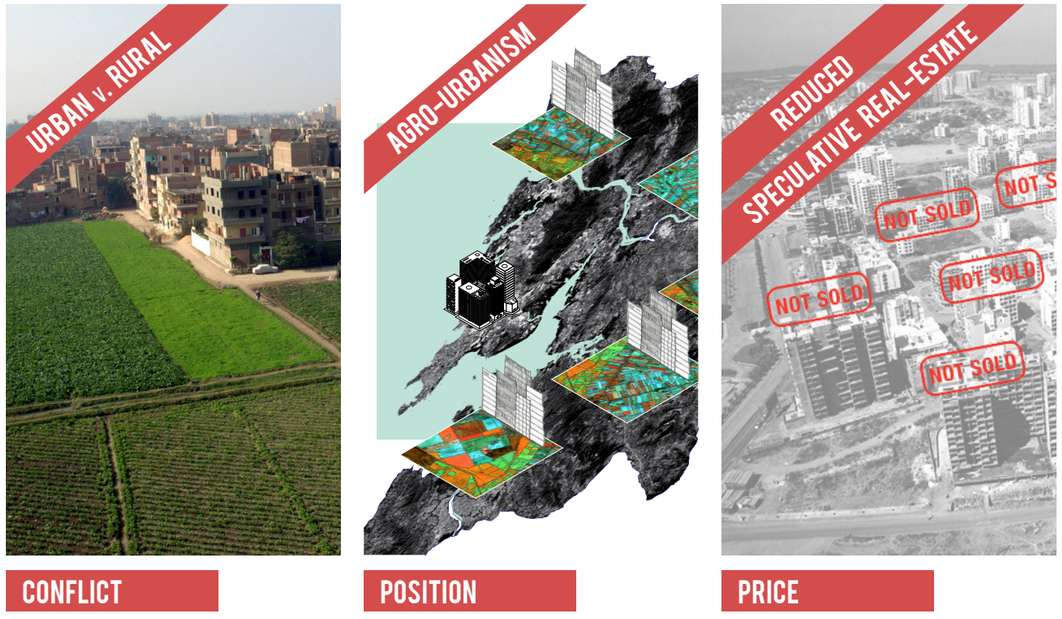
Relationship between research and design

Within the Design as Politics theme of A City of Comings and Goings, the project follows the migration narrative of rural urban migrants. This trajectory led to a literature review that revealed how various aspects of the rural landscape is casually transformed by urbanisation. In parallel a study of the relevant issues in the region – the urban conditions, the corresponding driving factors and the subsequent spatial impact – is carried out in the backdrop of the issue of migration in the city. A policy review of the regional plan is also included in the research to evaluate the existing planning methods and the MMRDA's position on these issues. The regional strategy, sub-regional strategy and the local design are a direct reaction to this overview of the metropolitan region.

Ethical Implications

A large scale regional project such as this has implications at various levels.

1) Intensification of IT technology in farming – using ICT technology like Blockchain technology (BCT) is still new and its applications and implications on resources (manufacture of devices, heat generated from additional servers) is not fully explored. It could have drastic implications on the large scale if not carefully implemented.
2) Adapting farming with technology could result in loss of jobs, it is critical that the strategy is self-aware of implications and ensure alternate job creation.
3) BCT is still a fairly new technology, and is still not full tested, while it is more secure than conventional data systems, in the current era of privacy concerns, data privacy could be threatened.
4) The decentralisation of many urban processes could result in chaotic development and needs to be monitored.



9.8

Limitation and potential for future scientific research

A variety of limitations exist while undertaking a project of this scope. The MMR spans a 4355 skqm. and houses a population of 21.7 million. Mumbai is a complex metapolis with and extremely complex urban system (Echanove & Srivastava, 2014) exists that would take years of study to comprehensively design for. Considering the time limitations of the Masters' program the scope of the project is limited to key issues that are often overlooked.

Additionally, the time and geographic limits forces the research to be reliant on various resources – academic papers, discussion with local professionals, theses on Mumbai and even newspaper clippings. Collecting empirical data and first-hand local level analysis was restricted. Furthermore, despite a vast number of second-hand resources available to create an image of the region, it is possible there are some issues that are not addressed in this project. It remains as a potential for future research. •

References

Bhardwaj, M. (2016, February 1). Food imports rise as Modi struggles to revive rural India. Reuters. Retrieved from http://in.reuters.com/article/india-farming/food-imports-rise-as-modi-struggles-to-revive-rural-india-idINKCN0VA3NL

Branford, S., & Torres, M. (2017, February 8). Soy invasion poses imminent threat to Amazon, say agricultural experts. Retrieved 19 September 2017, from https://news.mongabay.com/2017/02/soy-invasion-poses-imminent-threat-to-amazon-say-agricultural-experts/

Echanove, M., & Srivastava, R. (2014). Mumbai's Circulatory Urbanism. Mumbai/Goa: Institute of Urbanology.

Knight, B. (2017, April). Berlin residents reject Google Campus. Retrieved 15 May 2018, from http://www.dw.com/en/berlin-residents-reject-google-campus/a-38586077

Priya, R., Bisht, R., Randhawa, P., Arora, M., Dolley, J., McGranahan, G., & Marshall, F. (2017). Local Environmentalism in Peri-Urban Spaces in India: Emergent Ecological Democracy? ESRC STEPS Centre. Retrieved from https://opendocs.ids.ac.uk/opendocs/handle/123456789/13042

Scott, J. C. (2008). Seeing like a state: how certain schemes to improve the human condition have failed (Nachdr.). New Haven, Conn.: Yale Univ. Press.

Steel, C. (2013). Hungry city: how food shapes our lives. London: Vintage.

Wainwright, O. (2017, October 26). 'Everything is gentrification now': but Richard Florida isn't sorry. The Guardian. Retrieved from http://www.theguardian.com/cities/2017/oct/26/gentrification-richard-florida-interview-creative-class-new-urban-crisis

Sources

9.6. Screenshot of Scroll.in article describing condition of rural migrants escaping climate conditions in the rural heartland. Retrieved by Author (2018).

9.7. Screenshot of Times of India article describing farmer suicides in India. Retrieved by Author (2018).

9.8. Placing the project with Design as Politics criteria. Graphic by Author (2018).

10 Appendix
References

Angueletou, A. (2006). Water poverty in the peri-urban territories of Mumbai, India. Presented at the Conference 'The multidimensions of urban poverty in India', IGIDR, Indira Ganghi Institute of Development Research, CSH, Centre de Sciences Humaines, Mumbai, 6-7 octobre 2006. Retrieved from https://halshs.archives-ouvertes.fr/halshs-00186276/document

Babu, S. (2015). Landpooling for Smart-Cities (Presentation). CIDCO.

Belinda, B., & Keil, R. (2017). Decentralizing the Global City Region: Suburban Identities in Frankfurt and Toronto. MONU - Magazine on Urbanism, 26(Spring).

Bernd Upmeyer, & Lars Leryp. (2017). The City is Dead! Long Live Urbanisation: Interview with Lars Lerup. MONU - Magazine on Urbanism, 26(Spring).

Bhagat, R. (2014). Urban Migration trends, challenges and opportunities in India (Background Paper). Internation Organization for Migration.

Bhardwaj, M. (2016, February 1). Food imports rise as Modi struggles to revive rural India. Reuters. Retrieved from http://in.reuters.com/article/india-farming/food-imports-rise-as-modi-struggles-to-revive-rural-india-idINKCN0VA3NL

Bharucha, N. (2017a, January). Speculators lock up nearly 13 lakh flats in housing-starved Mumbai region - Times of India. Retrieved 5 January 2018, from http://timesofindia.indiatimes.com/city/mumbai/speculators-lock-up-nearly-13-lakh-flats-in-housing-starved-mumbai-region/articleshow/56284157.cms

Bharucha, N. (2017b, March 26). BMC allows builder to use TDR in island city - Times of India. The Times of India. Retrieved from https://timesofindia.indiatimes.com/city/mumbai/bmc-allows-builder-to-use-tdr-in-island-city/articleshow/57832539.cms

Bolchover, J., & Lin, J. (2014). Rural urban frameworks: transforming the Chinese countryside. Basel: Birkhäuser.

Branford, S., & Torres, M. (2017, February 8). Soy invasion poses imminent threat to Amazon, say agricultural experts. Retrieved 19 September 2017, from https://news.mongabay.com/2017/02/soy-invasion-poses-imminent-threat-to-amazon-say-agricultural-experts/

Census. (2011). Vasai Virar City Population Census 2011 | Maharashtra. Retrieved 16 May 2018, from https://www.census2011.co.in/census/city/363-vasai-virar.html

Chaubey, V. (2017, September 30). Elphinstone stampede: death toll climbs to 23. The Hindu. Retrieved from http://www.thehindu.com/news/cities/mumbai/elphinstone-stampede-death-toll-climbs-to-23/article19777052.ece

Chew, W. C. (2018, January 30). Perfecting Food Safety: How China does it with IoT and Blockchain. Retrieved 19 May 2018, from https://hackernoon.com/perfecting-food-safety-how-china-does-it-with-iot-and-blockchain-9948ceb7ce9c

Christiaensen, L., & Todo, Y. (2014). Poverty Reduction During the Rural–Urban Transformation – The Role of the Missing Middle. World Development, 63(Supplement C), 43–58. https://doi.org/10.1016/j.worlddev.2013.10.002

Cox, W. (2012, May 3). World Urban Areas Population and Density: A 2012 Update | Newgeography.com. Retrieved 12 March 2018, from http://www.newgeography.com/content/002808-world-urban-areas-population-and-density-a-2012-update

Das, P. K. (2015, October 19). Claiming Participation in Urban Planning and Design as a Right. Retrieved 12 March 2018, from https://www.thenatureofcities.com/2015/10/19/claiming-participation-in-urban-planning-and-design-as-a-right/

Das, S., Jain-Chandra, S., Kochhar, K., & Kumar, N. (2015). Women Workers in India: Why So Few Among So Many? (Working Paper No. WP/15/55). Asia and the Pacific: Internation Monetrary Fun.

Davenport, C., & Tabuchi, H. (2018, April 5). E.P.A. Prepares to Roll Back Rules Requiring Cars to Be Cleaner and More Efficient. The New York Times. Retrieved from https://www.nytimes.com/2018/03/29/climate/epa-cafe-auto-pollution-rollback.html

Deb, A. (2016). MMRDA Rental Housing Scheme: A Case of Affordable Housing. Shelter - HUDCO - HSMI Publication, 17(1).

Echanove, M., & Srivastava, R. (2014). Mumbai's Circulatory Urbanism. Mumbai/Goa: Institute of Urbanology.

Edelblutte, É., & Gunnell, Y. (2014). The tribal populations of Sanjay Gandhi National Park, Mumbai (India): A Brief Political Ecology. EG Espace géographique, 43(1), 1–70.

Falzon, M.-A. (2004). Paragons of Lifestyle: gated communities and the politics of space in Bombay. City <html_ent Glyph="@amp;" Ascii="&"/> Society, 16(2), 145–167. https://doi.org/10.1525/city.2004.16.2.145

Fernandez, N. (2011). End of the Line. In Mumbai Reader '10. Urban Design Research Institute.

Ge, L., Brewster, C., Spek, J., Smeenk, A., Top, J., Diepen, F. van, … Ruyter de Wildt, M. de. (2017). Blockchain for agriculture and food: findings from the pilot study. Retrieved from https://doi.org/10.18174/426747

Graham-Harrison, E. (2015, August 26). Women-only carriages around the world: do they work? | World news | The Guardian. The Guardian. Retrieved from https://www.theguardian.com/world/2015/aug/26/women-only-train-carriages-around-the-world-jeremy-corbyn

Gupta, S. (1999, November 17). History of Mumbai: Mumbai/Bombay pages. Retrieved 28 October 2017, from http://theory.tifr.res.in/bombay/history/

Hammerich, T. (2018, January 24). How Blockchain Helps Smallholder Farmers in Developing Countries. Retrieved 19 May 2018, from https://futureofag.com/how-blockchain-helps-smallholder-farmers-in-developing-countries-64bf6f13c049

Harvey, D. (2012). Rebel cities: from the right to the city to the urban revolution. New York: Verso.

Jacob, G., & Aneerudha, P. (2017). Landscapes of Resistance: Ecology and Economy in the VVSR.

Jayaraman, N. (2017). India's new wetland rules threaten to destroy 65% of its water bodies rather than protect them [Text]. Retrieved 19 May 2018, from https://scroll.in/article/853515/indias-new-wetland-rules-threaten-to-destroy-rather-than-protect-65-of-its-water-bodies

Jha, M. K., Pushpendra, Vyas, M., Hebbar, R., Bandyopadhyay, M., & Singh, S. (2015). Cities, Rural Migrants and the Urban Poor - II: Migration & the Urban Question in Mumbai. Policies and Practices, 73.

Johari, A. (2015, November). Why residents of a Mumbai fishing village want development, but not slum rehabilitation. Scroll.In. Retrieved from https://scroll.in/article/769751/why-residents-of-a-mumbai-fishing-village-want-development-but-not-slum-rehabilitation

Karmarkar, D. (2014). Migration in Colonial Bombay during 18 th and 19th Century AD. In Internal and International Migration: Issues and Challenges. Ulhasnagar.

Kedia, S. (2017, August 10). Aruna Roy on India's agrarian crisis: 'Policy without dialogue is killing our farmers'. Retrieved 6 October 2017, from https://yourstory.com/2017/08/aruna-roy-farmer-suicides-policy/

Khan, M. (1954). Amar. Retrieved from https://www.youtube.com/watch?v=rPEi7KeCPn8

Kingsley, M., & Ma, M. (2018). Affording Hong Kong: the struggle of low-income families in sub-divided homes. Atlantis: Magazine for Urbanism and Landscape Architecture, 28(3).

Kishore, A. M., & Shivkumar, R. (2017a). Nostalgia for the Future.

Kishore, A. M., & Shivkumar, R. (2017b, December 7). Nostalgia For The Future Co-directors [Video]. Retrieved from https://www.youtube.com/watch?v=2nmjyYH7X-U

Knight, B. (2017, April). Berlin residents reject Google Campus. Retrieved 15 May 2018, from http://www.dw.com/en/berlin-residents-reject-google-campus/a-38586077

Krishnankutty, M. (2018). Fragmentary Planning and Spaces of Opportunity in Peri-urban Mumbai. Economic and Political Weekly, 53(12). Retrieved from http://www.epw.in/journal/2018/12/review-urban-affairs/fragmentary-planning-and-spaces-opportunity-peri-urban-mumbai

Kumar, M. (2015). Erstwhile villages in urban India. Development in Practice, 25(1), 124–132. https://doi.org/10.1080/09614524.2015.986066

Leahy, J., & Fontanella-Khan, J. (2010). Part 1: A voyage from rural to urban India. Retrieved from https://www.ft.com/video/5085cb6a-bf46-3b5f-9e19-55df826465f8

Leahy, J., & Fontanella-Khan, J. (2011). The Indian dream, part 3: Down and out in the Maximum City. Retrieved from https://www.ft.com/video/6df3d12b-cf1e-3f67-bdb0-99516b044078

Lefebvre, H., & Nicholson-Smith, D. (2011). The production of space (Nachdr.). Malden, Mass.: Blackwell.

London School of Economics and Political Science, Cities Programme, Urban Age Project, Alfred Herrhausen Gesellschaft für Internationalen Dialog, & Urban Age India Conference (Eds.). (2007). Urban india: understanding the maximum city. London; Berlin: Cities Programme, the London School of Economics and Political Science ; Alfred Herrhausen Society.

Mars, R. (n.d.). Immobile Homes. Retrieved from https://99percentinvisible.org/episode/immobile-homes/

Marshall, F., & Randhawa, P. (2017). India's peri-urban frontier: rural-urban transformations and food security. IIED Working Paper Series. Retrieved from http://pubs.iied.org/10794IIED/

Mehrotra, R. (2007). The Static And The Kinetic. Retrieved from https://lsecities.net/media/objects/articles/the-static-and-the-kinetic/en-gb

Mehrotra, R. J. (1991). Bombay City: One Space, Two Worlds. Architecture + Design, Vol VIII(No 6). Retrieved from http://www.rmaarchitects.com/essays/one-space-two-worlds.pdf

Meinzen-Dick, R., Koppen, B. van, Behrman, J., Karelina, Z., Hope, L., Akamandisa, V. M., & Wielgosz, B. (2012). Putting gender on the map: Methods for mapping gendered farm management systems in Sub-Saharan Africa (Discussion Paper No. IFPRI 01153). Internation Food Policy Research Institute: Environment and Production Technology Division. Retrieved from https://www.researchgate.net/publication/237052843_Putting_gender_on_the_map_Methods_for_mapping_gendered_farm_management_systems_in_Sub-Saharan_AfricaLink

Meinzen-Dick, R., Quisumbing, A., Doss, C., & Theis, S. (2017). Women's land rights as a pathway to poverty reduction: Framework and review of available evidence. Agricultural Systems. https://doi.org/10.1016/j.agsy.2017.10.009

MMRCHS, & CRIT. (2005). Heritage Policy and Regulations for the Vasai-Virar sub-region. Mumbai.

MMRDA. (2016). Draft Mumbai Metropolitan Regional Plan (Draft). Mumbai: Mumbai Metropolitan Region Development Authority.

MS Gopal. (2011). The wells of Bhuigaon [Photograph]. Retrieved from http://www.indiawaterportal.org/

10

articles/between-city-and-salty-sea-wells-bhuigaon-thane-greater-mumbai-guest-post-ms-gopal

Nagendra, H. (2017, September 2). Mumbai floods : what happens when cities sacrifice ecology for development | The Indian Cities [Online Platform for The Indian Cities Foundation]. Retrieved 16 September 2017, from http://theindiancities.com/articles/mumbai-floods-what-happens-when-cities-sacrifice-ecology-for-development/

Nallathiga, R. (2005). Regulatory Impacts on Land and Housing Markets in Mumbai (SSRN Scholarly Paper No. ID 987479). Rochester, NY: Social Science Research Network. Retrieved from https://papers.ssrn.com/abstract=987479

Nallathiga, R., & Dharmasi, G. G. (2016). MMRDA Rental Housing Scheme: A Case of Affordable Housing. Shelter - HUDCO - HSMI Publication, 17(1).

Namati. (2014). CRZ pocket reference: India's Coastal Zone Regulations Made Clear. Namati – Centre for Policy Research. Retrieved from https://namati.org/news/indias-crz-made-clear/

Nove-Josserand, H. (2013). Metropolitan Strategies around the world - Interview #11 Mumbai, India.

Patel, S. B. (2014). State of Affordable Housing in India. Praja Foundation.

Paul, A. (2016). Learning from Informality. KRVIA: Reflections 2016 - The Production Fo Home.

Percot, M. (2005). Dabbawalas, Tiffin Carriers of Mumbai:Answering a Need for Specific Catering. Retrieved from https://halshs.archives-ouvertes.fr/halshs-00004513/document

Perur, S. (2016, March 30). Story of cities #11: the reclamation of Mumbai – from the sea, and its people? The Guardian. Retrieved from http://www.theguardian.com/cities/2016/mar/30/story-cities-11-reclamation-mumbai-bombay-megacity-population-density-flood-risk

Pethe, A., Gandhi, S., & Tandel, V. (2011). Assessing the Mumbai Metropolitan Region: A Governance Perspective. Economic & Political Weekly, xlvi(26 & 27).

Prakash, G. (2010). Mumbai fables. Princeton Oxford: Princeton University Press.

Priya, R., Bisht, R., Randhawa, P., Arora, M., Dolley, J., McGranahan, G., & Marshall, F. (2017). Local Environmentalism in Peri-Urban Spaces in India: Emergent Ecological Democracy? ESRC STEPS Centre. Retrieved from https://opendocs.ids.ac.uk/opendocs/handle/123456789/13042

Ramnath, N. (2016, September 13). Single woman seeking a house in Mumbai? 'Bachelor Girls' tells you why it's like hell [Text]. Retrieved 13 November 2017, from https://thereel.scroll.in/816356/single-woman-seeking-a-house-in-mumbai-bachelor-girls-tells-you-why-its-like-hell

Rao, P. (2006). A Case for the Peripheries (KRVIA Fellowship Programme). KRVIA, Mumbai.

Rode, P. (2007). Mumbai: The Compact Mega City. Retrieved 29 October 2017, from https://lsecities.net/media/objects/articles/mumbai-the-compact-mega-city/en-gb/

Sanvitale, P. (2014, August 7). Dabbawalla, Food Express Delivery Service Made in India. Retrieved 18 April 2018, from https://www.finedininglovers.com/stories/dabbawalla-food-delivery-mumbai/

Sathe, D. (2017). The political economy of land acquisition in India: how a village stops being one. Singapore: Palgrave McMillan.

Saunders, D. (2011). Arrival city: [how the largest migration in history is reshaping our world]. London: Windmill Books.

Sawant, S. (2014, September). Ecological Study of a Tidal Creek: An management of a progressively altered landscape (Masters Thesis in Landscape Architecture). Faculty of Architecture, CEPT University, Ahmedabad.

Scott, J. C. (2008). Seeing like a state: how certain schemes to improve the human condition have failed (Nachdr.). New Haven, Conn.: Yale Univ. Press.

Shah, S. P. (2014). Street corner secrets: sex, work, and migration in the city of Mumbai. Durham: Duke University Press.

Sharma. (2017, September 8). What 70 years of Independence has meant for the farmer, once pride of the nation. Retrieved 6 October 2017, from https://yourstory.com/2017/09/agrarian-crisis-india-at-70/

Sharma, T., & Vora, Y. (2017, February 13). Can the New Urban Agenda heal India's urban-rural divide? Retrieved 6 October 2017, from http://citiscope.org/commentary/2017/02/can-new-urban-agenda-heal-indias-urban-rural-divide

Shetty, P. (2015, March 5). The new face of Metropolitan Governance in Mumbai. Retrieved 10 January 2018, from https://aesopyoungacademics.wordpress.com/2015/03/05/the-new-face-of-metropolitan-governance-in-mumbai/

Shukla, A. M., & Baliga, L. (2008). Mumbai's gaothans are a forgotten heritage. DNA India. Retrieved from http://www.dnaindia.com/mumbai/report-mumbai-s-gaothans-are-a-forgotten-heritage-1174585

Srivastava, R., & Echanove, M. (2014, November 28). 'Slum' is a loaded term. They are homegrown neighbourhoods. The Guardian. Retrieved from http://www.theguardian.com/cities/2014/nov/28/slum-loaded-term-homegrown-neighbourhoods-mumbai-dharavi

Steel, C. (2013). Hungry city: how food shapes our lives. London: Vintage.

Sundaram, R. (2009). Pirate modernity: Delhi's media urbanism. London ; New York: Routledge.

Tacoli, C., McGranahan, G., & Satterthwaite, D. (2015a). Urbanisation, rural–urban migration and urban poverty. International Institute for Environment and Development. Retrieved from http://www.jstor.org/stable/resrep01308

Tacoli, C., McGranahan, G., & Satterthwaite, D. (2015b). Urbanisation, rural–urban migration and urban poverty. International Institute for Environment and Development. Retrieved from http://www.jstor.org/stable/resrep01308

TERI. (2014). Environment Status Report of Mumbai Metropolitan Region (MMR) (No. 2012MC01). Mumbai: The Energy and Resources Institute (TERI).

The Free Press Journal. (2017). Mumbai: BDD chawl project gets three bids. Retrieved from c

Thomas, E. (n.d.). I Won't Farm! Retrieved from http://www.bbc.co.uk/programmes/w3csvsc3

Venkatraman, T. (2018, January 6). CM Fadnavis, planning committee pass regional plan for Mumbai Metropolitan Region. Hindustan Times. Retrieved from https://www.hindustantimes.com/mumbai-news/cm-fadnavis-planning-committee-pass-regional-plan-for-mumbai-metropolitan-region/story-HT2TVhtlukVHCgb5GNphIK.html

VVCMC. (2013). Vasai Virar City Development Plan Report. Vasai-Virar City Municipal Corporation.

Waghmare, A. (2016a, June 13). In Mumbai, Marathwada Migrants Rise Above Poverty Line. Retrieved 27 October 2017, from http://www.indiaspend.com/cover-story/in-mumbai-marathwada-migrants-rise-above-poverty-line-79514

Waghmare, A. (2016b, June 14). Short Of Land, Water, Education; Not Aspiration: Babban's Story. Retrieved 28 October 2017, from http://www.indiaspend.com/cover-story/short-of-land-water-education-not-aspiration-babbans-story-11730

Waghmare, A. (2016c, June 15). Rural Jobs Collapse In 2016 Fuels Migration: Yashodabai's Story. Retrieved 28 October 2017, from http://www.indiaspend.com/cover-story/rural-jobs-collapse-in-2016-fuels-migration-yashodabais-story-98694

Wainwright, O. (2017, October 26). 'Everything is gentrification now': but Richard Florida isn't sorry. The Guardian. Retrieved from http://www.theguardian.com/cities/2017/oct/26/gentrification-richard-florida-interview-creative-class-new-urban-crisis

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List of Illustrations and Sources

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1.3. A rough scale comparison of India with Europe, Maharastra with Germany and Mumbai with the Ranstad. Compilation and Illustrations by Author (2018).

1.4. 'Map of India, with location of Maharashtra, Mumbai's home state, since 1951.' U.S. Central Intelligence Agency. (2001). India (Physiography). Lambert Conformal Conic Projection, SP 12N/33N. Retrieved from http://www.lib.utexas.edu/maps/middle_east_and_asia/india_physio-2001.jpg. Edited by Author (2017)

1.5. The Metropolitan Region of Mumbai (MMR). Source - Author (2018)

1.6. Location Map of Mumbai with urban hierarchies. Source - Author (2017)

1.7. 'Mumbai: An Emancipatory Machine.' Data source - Waghmare, A. (2016b, June 15). Rural Jobs Collapse In 2016 Fuels Migration: Yashodabai's Story. Retrieved 28 October 2017, from http://www.indiaspend.com/cover-story/rural-jobs-collapse-in-2016-fuels-migration-yashodabais-story-98694. Graphic redrawn by (Author, 2017).

1.8.1. 'Flooded street in Mumbai'. Photograph Source - Kashyap, S. S. (2017). People walk through a flooded road at Andheri in Mumbai on Tuesday, August 29, 2017. Retrieved from http://www.hindustantimes.com/india-news/mumbai-floods-why-india-s-cities-are-struggling-with-extreme-rainfall/story-wsWPNy2MXh4b9JYTqtA0QJ.html

1.8.2. 'Photograph of Elphinstone Stampede'. Elphinstone Stampede. (2017). [Photograph]. Retrieved from http://www.thestatesman.com/india/elphinstone-stampede-railways-not-celebrating-dussehra-1502502509.html

1.8.3. 'Photograph of Kamala Mills Fire'. Padalkar, H. (2017). Kamala Mills Fire. Retrieved from http://www.dnaindia.com/mumbai/report-over-90-mumbai-restaurants-don-t-comply-with-fire-safety-norms-check-if-your-favourite-place-is-on-the-list-2574431

1.9. Screenshot of an India Today Article describing politician Hema Malini's comments after the Kamala Mills Fire. Source - India Today. (2017, December 29). Hema Malini on Kamala Mills fire: Mumbai's high population responsible for such incidents. India Today. Retrieved from https://www.indiatoday.in/india/story/hema-malini-on-kamala-mills-fire-mumbai-high-population-to-blame-1118762-2017-12-29. Retrieved by Author (2017)

1.10. 'Problem Field'. Illustration by Author (2018).

1.11. Speculative Land Acquisition. Original Map - Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Collage by Author (2018).

1.12. 'Displacement of non-urban groups'. Original Photographs - Menon, G. (2014). A Warli Woman. Retrieved from https://www.thebetterindia.com/9921/walvanda-tribal-art-music-culture-travel-maharashtra/. MS Gopal. (2011). The wells of Bhuigaon [Photograph]. Retrieved from http://www.indiawaterportal.org/articles/between-city-and-salty-sea-wells-bhuigaon-thane-greater-mumbai-guest-post-ms-gopal. Nikam, J. (2016). Babban Chavan [Photograph]. Collage by Author (2018).

1.13. 'Disregard for Urban Ecologies.' Kakatkar, M. (2010) Retrieved from - http://coastalcare.org/wp-content/uploads/2010/08/mangroves-mumbai22.jpg). Edited by Author (2018).

1.14. 'Project Summary'. Illustration by Author (2018).

1.15. 'Project Methodology'. Illustration by Author (2018)

1.16. 'Time Frame'. Illustration by Author (2017).

Chapter 2 – Migration Histories

2.0. 'Bombay and Surrounding Country' depicting the extents of modern day metropolitan Mumbai between 1924-1926. Published in 1934. Map Source - Calcutta : Survey of India. (1934). Bombay and Surrounding Country. Calcutta: Survey of India. Retrieved from Dostupné také z: http://digitool.is.cuni.cz/R/?func=dbin-jump-full&object_id=1171884.

2.1. Timeline Part 1 featuring 16th century to mid-19th century by Author (2018). Images sourced from the public domain and edited by Author.

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2.3. Time-line Part 3 featuring mid 20th Century to 2018 by Author (2018). Images sourced from the public domain and edited by Author.

2.4. 'Mera Gaon' – Exhibition. Source - Bhau Daji Lad Museum, & Nair, R. (2017). Mumbai Return: Journeys Beyond the City - 'Mera Gaon' [Exhibition]. Retrieved from http://www.hindustantimes.com/mumbai-news/where-are-you-really-from-an-art-show-traces-the-history-of-migration/story-70IqZb7DtgfpFYFbsmDtWP.html.

2.5. 'Post card stories on migration'. Illustrations by Author (2017).

2.6. 'Mumbai's Circulatory Migration'. Source - urbz, Echanove, M., & Srivastava, R. (2014). Mumbai's Circulatory Urbanism. Retrieved from https://urbz.net/articles/why-mumbai-extends-far-beyond-its-metropolitan-limits.

2.7. Rural vs Urban Livelihoods for the Circular Migrant. Illustrations by Auhor (2018).

Chapter 3 – Literature Review

3.1. Collage by Author illustrating relevance of literature review for problem field. Covers sourced from Immerwahr, D. (2015). Thinking small: the United States and the lure of community development. Cambridge, Massachusetts: Harvard University Press. Sathe, D. (2017). The political economy of land acquisition in India: how a village stops being one. Singapore: Palgrave McMillan. Saunders, D. (2011). Arrival city: [how the largest migration in history is reshaping our world]. London: Windmill Books. Scott, J. C. (2008). Seeing like a state: how certain schemes to improve the human condition have failed (Nachdr.). New Haven, Conn.: Yale Univ. Press. Other illustrations by Author (2018).

3.2. P. Chidambram. Source - CC. Edited by Author (2018)

3.3. 'Re-organisation of the Rural Landscape by Urbanisation'. Diagrams by Author (2017)

3.4. 'Land Acquisition of Agricultural land by development authorities'. Sketch by Author (2017)

3.5. 'Transformation of the Rural Landscape - A summary'. Diagrams by Author (2018)

3.6.1. Daily wage migrants. Source - Kakodkar, P. (2016). Mazdoor nakas hit, construction workers skipping meals - Times of India [Photograph]. Retrieved from http://timesofindia.indiatimes.com/city/mumbai/Mazdoor-nakas-hit-construction-workers-skipping-meals/articleshow/55716408.cms.

3.6.2. 'Gender Imbalance and Red-light districts'. Original Image – Getty Images/CC.

3.7.1. Map of Dharavi Koliwadi before urbanisation. Source - unknown. Copyright in the Public Domain.

3.7.2. Satellite image of Dharavi. Source - Google Earth. Retrieved by Author (2018).

3.8. Food [in] security. Representative of image. Source - Hindustan Times. (2017). Vendors at Navi Mumbai's APMC market said 220 vegetable-bearing trucks had arrived on Saturday. Retrieved from https://www.hindustantimes.com/mumbai-news/farmers-strike-called-off-veggie-prices-in-mumbai-s-markets-will-return-to-normal-by-monday/story-FQ4Re1fAgMWREdsJH6R8kI.html.

3.9. Conclusion of Literature Review. Source - Author (2017)

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4.0. Research and Design themes. Illustrations by Author (2018)

4.1. Present urban development themes by P.K. Das (2018). Illustrated by Author (2018).

4.2. Conclusions of the Literature Review [Chapter 3]. Illustrations by Author (2017).

4.3. Research and Design themes. Illustrations by Author (2018).

4.4. Hierarchy of urban governance in the Mumbai Metropolitan Regions depicting four different levels. Source – Author (2018)

4.5. Screenshot of Hindustan Times article reporting on the status of MMRDA hearings of the 2016-2036 regional plan. Source - Venkatraman, T. (2018, January 6). CM Fadnavis, planning committee pass regional plan for Mumbai Metropolitan Region. Hindustan Times. Retrieved from https://www.hindustantimes.com/mumbai-news/cm-fadnavis-planning-committee-pass-regional-plan-for-mumbai-metropolitan-region/story-HT2TVhtlukVHCgb5GNphIK.html. Retrieved by Author (2018).

4.6. Screenshot of DNA article reporting on lack of accountability due to multiple actors involved. Source - Bhujbal, D. (2017, May 13). MMRDA, BMC pass the buck as monorail debris lies untouched. DNA. Retrieved from http://www.dnaindia.com/mumbai/report-mmrda-bmc-pass-the-buck-as-monorail-debris-lies-untouched-2436701. Retrieved by Author (2018).

4.7. Mumbai's urban identity. Collage by Author (2018).

4.8. The complex global food supply chain with author's comments on the problems farmers and consumers face. Original graphic - CB Insights. (2018). How Blockchain Can Track The Origins of Food Products. Retrieved from https://www.youtube.com/watch?v=m6w0yhALSEE. Edited with comment by Author (2018).

4.9. 'Hereditary transfer of property'. Data source - Sathe, D. (2017). The political economy of land acquisition in India: how a village stops being one. Singapore: Palgrave McMillan. Illustrations by Author (2018).

4.10. Screenshot of BBC news article that describes the farmer's protest and negotiations with the government in Mumbai in March 2018. Source - Rowlatt, J. (2018, March 12). Thousands of India farmers end protest. BBC News. Retrieved from https://www.bbc.com/news/world-asia-india-43368050. Retrieved by Author (2018)

4.11. 'Farmer suicide in India'. Kedia, S. (2017, August 10). Aruna Roy on India's agrarian crisis: 'Policy without dialogue is killing our farmers'. Retrieved 6 October 2017, from https://yourstory.com/2017/08/aruna-roy-farmer-suicides-policy/. Graphic redrawn by Author (2018).

4.12. 'No more self-reliant'. Source - Union Ministry of Agriculture and Farmers Welfare & Directorate General of Commercial Intelligence and Statistics (2017).

4.13. Mangrove forest cover in Greater Mumbai. Graphic by Author (2017).

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4.14. Flood diagram in Greater Mumbai. Source - Perkins, R. (2008). ASLA 2008 Student Awards: Mumbai Flood Diagram [Diagram]. Retrieved from https://www.asla.org/awards/2008/studentawards/044.html.

4.15. Screenshot of Scroll.in article describing change in wetlands nortification from the union government. Source - Jayaraman, N. (2017). India's new wetland rules threaten to destroy 65% of its water bodies rather than protect them. Retrieved 19 May 2018, from https://scroll.in/article/853515/indias-new-wetland-rules-threaten-to-destroy-rather-than-protect-65-of-its-water-bodies. Retrieved by Author (2018).

4.16. Manicured landscapes replacing bio-diverse environments.

4.17. Sand-dredging. Graphic by Author (2018).

4.18. Image of Top Soil Damage in Bangladesh, similar conditions in peri-urban regions of MMR. Image Source - Roy, S. D. (2016). Labourers taking out topsoil from farmland to make bricks at Madaner Chak village in Lalmonirhat Sadar upazila. Large-scale extraction of topsoil is causing cultivable land to lose fertility in five upazilas of the district. [Photograph]. Retrieved from http://www.thedailystar.net/frontpage/brick-kilns-breed-woes-farmers-207520. Graphic edited by Author (2018).

4.19. Example of Chawl Housing Typology in Mumbai. Source Adarkar, N., Imprint One, & Rupali. (2011). Mumbai Chawls. Retrieved 16 January 2018, from http://aprovisionalpractice.blogspot.com/2011/06/mumbai-chawls.html. Edited by Author (2018)

4.20. Example of Chawl Housing Typology in Mumbai. Edited by Author (2018)

4.21. Speculative Vacant Housing. Collage by Author (2018).

4.22. Screenshot of Times Of India article reporting on vacant speculative housing. Source - Bharucha, N. (2017, March 26). BMC allows builder to use TDR in island city - Times of India. The Times of India. Retrieved from https://timesofindia.indiatimes.com/city/mumbai/bmc-allows-builder-to-use-tdr-in-island-city/articleshow/57832539.cms. Retrieved by Author (2018).

4.23. 'Photograph of a Warli Painting'. Original Art by - Dombre, A. M. (2017). Photograph of Warli Art. Retrieved from https://www.mojarto.com/artworks/unknown-artist/warli-art-247537. Photograph – Unknown. Retrieved from – mojarto.com.

4.24. Climate migrants from Latur in temporary camps. Source - Waghmare, A. (2016b, June 15). Rural Jobs Collapse In 2016 Fuels Migration: Yashodabai's Story. Retrieved 28 October 2017, from http://www.indiaspend.com/cover-story/rural-jobs-collapse-in-2016-fuels-migration-yashodabais-story-98694

4.25. Example of Fishing Communities in the Metropolitan Region. Source - Unknown. (n.d.-a). Manori to Marve Sea Link, Mumbai, India. Retrieved from http://www.panoramio.com/photo/53330822. Edited by Author (2018).

4.26. Agrarian Villages swallowed by expanding cities. Original Photograph by Author (2018) Modified by Author (2018.)

4.27. Two carriages reserved for women representative of women participating in the Indian labour-force. Illustration by Author (2018).

4.28. 'A 'ladies special' train'. Original Image - Chitrakar, N. (2015). A 'ladies' special' train in Mumbai [Photograph]. Retrieved from http://www.theguardian.com/world/2015/aug/26/women-only-train-carriages-around-the-world-jeremy-corbyn. Edited by Author (2018)

4.29. 'Gender Imbalance and Red-light districts'. Original Image – Getty Images/CC. Edited by Author (2018)

4.30. 'Women land holding rights.' Data source and original graph - Tripathi, B. (2018, February 19). Lakshadweep, Meghalaya Have Most Women Land Holders; Punjab, West Bengal Fewest. Retrieved 16 June 2018, from http://www.indiaspend.com/special-reports/lakshadweep-meghalaya-have-most-women-land-holders-punjab-west-bengal-fewest-54024. Graphic Redrawn by Author (2018).

4.31. Additional FSI for Real-estate Developers. Original Image - Unknown. (n.d.-b). Mumbai property FSI hike: Representative Image. Retrieved from http://www.zeebiz.com/india/news-mumbai-property-fsi-hike-in-land-starved-city-it-companies-to-get-a-boost-42490. Edited by Author (2018)

4.32. TDR for Heritage Buildings. Original Image (Unkown). Redrawn by (Author, 2018)

4.33. Urban Heat Map from OpenStreetMap data. CC. (2015). Mumbai Suburban Railway [Heatmap]. Retrieved from https://en.wikipedia.org/w/index.php?title=Mumbai_Suburban_Railway&oldid=832035426.

4.34. External Influences on the MMR Urban System. Source - Author (2018)

4.35. Travel distance by train in India. While the train networks lack speed and capacity, they make up in cheap fares making mobility extremely affordable. Source - Kalia, A. (2018, January 10). The daily commute: travel times to cities around the world – mapped. Retrieved 28 February 2018, from http://www.theguardian.com/cities/gallery/2018/jan/10/daily-commute-travel-times-cities-world-pictures-maps-uk-china-mali. Weiss, D. J., Nelson, A., Gibson, H. S., Temperley, W., Peedell, S., Lieber, A., … Gething, P. W. (2018). A global map of travel time to cities to assess inequalities in accessibility in 2015. Nature, 553(7688), 333–336. https://doi.org/10.1038/nature25181.

4.36. Cover of the draft of the MMRDA Regional Plan 2016-2036. This is the third regional plan issued by the MMRDA since its conception. Source - MMRDA. (2016). Draft Mumbai Metropolitan Regional Plan (Draft). Mumbai: Mumbai Metropolitan Region Development Authority.

4.37. Original Image source - (AFP/Stringer/Getty Images, CC). Modified by Author (2018)

4.38-4.39. MMRDA Plans from 1971 and 1996. Source – MMRDA (1974) and MMRDA (1996).

4.40. Vasai-Virar City Municipal Corporation Plan by CIDCO. Source VVCMC (2017).

4.41. Bhiwandi Special Planning Area Plan. Source MMRDA (2016)

4.42. Regional Plan for the MMR 2036. Source - MMRDA. (2016). Draft Mumbai Metropolitan Regional Plan (Draft). Mumbai: Mumbai Metropolitan Region Development Authority.

4.43. 'MMRDA Goals and Strategies for the MMR in 2016-2036'. Data and information sourced from MMRDA. (2016). Draft Mumbai Metropolitan Regional Plan (Draft). Mumbai: Mumbai Metropolitan Region Development Authority. Compiled and Illustrated by Author (2018). Satellite Imagery from Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

4.44. 'Area under Development Control Regulations'. Original Image Source - MMRDA. (2016). Draft Mumbai Metropolitan Regional Plan (Draft). Mumbai: Mumbai Metropolitan Region Development Authority. Sketch by Author (2017).

4.45. Screenshot from MMRDA advertisement of the Virar-Alibag multi-nodal corridor with potential to "open the hinterland for sustained development". Source - MMRDA. (2014). Multimodal Corridor from Virar to Alibaug. Retrieved from https://www.youtube.com/watch?v=VUROQIxtHtQ. Retrieved by Author (2018).

4.46. 'Horizontal Slums to Vertical Slums. Affordable Housing as a result of MMRDA Policy. Sketches by Author (2018).

4.47. Screenshot from MMRDA Regional Plan 2016-2036. Source - MMRDA. (2016). Draft Mumbai Metropolitan Regional Plan (Draft). Mumbai: Mumbai Metropolitan Region Development Authority. Retrieved by Author (2018).

4.48. The peripheries are aligned to serve the core city. Illustrations by Author (2018).

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4.50. Summary of Policy. Illustrations by Author (2018). Original vector files sourced from FreePik.com.

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5.0. Satellite Image of the MMR. Source - Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Edited by Author (2018).

5.1. Land-use data. Source - TERI. (2014). Environment Status Report of Mumbai Metropolitan Region (MMR) (No. 2012MC01). Mumbai: The Energy and Resources Institute (TERI). Pie-chart by Author (2018).

5.2. Historic Topography of Mumbai and its Environs. Image in the public domain.

5.3. Land-use map of the MMR. Source - TERI. (2014). Environment Status Report of Mumbai Metropolitan Region (MMR) (No. 2012MC01). Mumbai: The Energy and Resources Institute (TERI). Map by Author (2018)

5.4. Mumbai Churchgate station. Source - Salgado, S. (1995). Churchgate Station [Photograph].

5.5. Map of Metropolitan Mobility with travel distance by the suburban railway line. Map by Author (2018). Data source – Esri, DeLorme, HERE, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, Tomtom.

5.6. Example of real-estate driven urban development. Source - Google Earth Satellite Imagery.

5.7. Urban villages in Mumbai are in danger of becoming highly dense similar to urban villages in Shenzen due to FSI based policy. Sketch by Author (2018). Photograph - Luth, C. (2014). This densely urban village in DaLang, Shenzhen [Photograph]. Retrieved from http://www.uncubemagazine.com/blog/12232723.

5.8. Map of Urban Expansion as per the Mumbai regional plan of the MMRDA. Map by Author (2018). Data source - Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. MMRDA. (2016). Draft Mumbai Metropolitan Regional Plan (Draft). Mumbai: Mumbai Metropolitan Region Development Authority.

5.9. Dependency for Agricultural produce of the city extends towards the hinterland. Data Source - TERI. (2014). Environment Status Report of Mumbai Metropolitan Region (MMR) (No. 2012MC01). Mumbai: The Energy and Resources Institute (TERI). Map by Author (2018).

5.10. Map of Urban Expansion as per the Mumbai regional plan of the MMRDA with ecologically sensitive areas. Map by Author (2018). Data Source - Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. MMRDA. (2016). Draft Mumbai Metropolitan Regional Plan (Draft). Mumbai: Mumbai Metropolitan Region Development Authority.5.11. Satellite Image of the Vasai-Virar sub-region. Source - Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Edited by Author (2018).

5.11. Satellite Image of the Vasai-Virar sub-region. Source - Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP,

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5.14. 'Bassein Fort'. Photograph by (Author, 2018)

5.15. Topographic change over time. Image Source - Sawant, S. (2014, September). Ecological Study of a Tidal Creek: An management of a progressively altered landscape (Masters Thesis in Landscape Architecture). Faculty of Architecture, CEPT University, Ahmedabad.

5.16. Historic Evolution of the Vasai-Virar sub-region. Image and description text sources - Jacob, G., & Aneerudha, P. (2017). Landscapes of Resistance: Ecology and Economy in the VVSR; MMRCHS, & CRIT. (2005). Heritage Policy and Regulations for the Vasai-Virar sub-region. Mumbai; Sawant, S. (2014, September). Ecological Study of a Tidal Creek: An management of a progressively altered landscape (Masters Thesis in Landscape Architecture). Faculty of Architecture, CEPT University, Ahmedabad.

5.18. 'Migratory Birds'. Photograph. CC

5.19. Section explaining regional topography. Based on Sources - Jacob, G., & Aneerudha, P. (2017). Landscapes of Resistance: Ecology and Economy in the VVSR; Sawant, S. (2014, September). Ecological Study of a Tidal Creek: An management of a progressively altered landscape (Masters Thesis in Landscape Architecture). Faculty of Architecture, CEPT University, Ahmedabad. Image redrawn by (Author, 2018)

5.20. Climate Data for the region. Based on Data Source - VVCMC. (2013). Vasai Virar City Development Plan Report. Vasai-Virar City Municipal Corporation. Table by Author (2018).

5.21. Topographic satellite map with road network and contours. Source - Author (2018).

5.22. Land-use graph. Based on Data Source - VVCMC. (2013). Vasai Virar City Development Plan Report. Vasai-Virar City Municipal Corporation. Table by Author (2018). Pie-chart by Author (2018).

5.23. Salt extraction. Photograph - Kelly, L. (2014). Salts of the City: Part 2 RITUAL – Lewis Kelly Architecture. Retrieved 17 May 2018, from https://lewiskellyarchitecture.wordpress.com/2015/05/09/salts-of-the-city-part-2-ritual/.

5.24. Data Source - Sawant, S. (2014, September). Ecological Study of a Tidal Creek: An management of a progressively altered landscape (Masters Thesis in Landscape Architecture). Faculty of Architecture, CEPT University, Ahmedabad; Google Maps; Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Map by (Author, 2018).

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5.26. Salt extraction. Source - Kelly, L. (2014). Salts of the City: Part 2 RITUAL – Lewis Kelly Architecture. Retrieved 17 May 2018, from https://lewiskellyarchitecture.wordpress.com/2015/05/09/salts-of-the-city-part-2-ritual/. Image Re-drawn by Author (2018).

5.27. Screenshot of drone footage of the Vasai-Virar region. Source - Surani, Y. (2017). PPOF, Drone ride to Vasai beach. Retrieved from https://www.youtube.com/watch?v=rWlrnr3jl5Q.

5.28. Virar West real-estate project. Screenshot from promotional video by a real-estate developer. Source - Housiey. (2017). Global City,Virar west E-Visit : Real Tour Housiey.com. Retrieved from https://www.youtube.com/watch?v=AWGvZJoO7qM.

5.29. Agashi Town, a rural settlement in the Vasai-Virar region. Source - MMRCHS, & CRIT. (2005). Heritage Policy and Regulations for the Vasai-Virar sub-region. Mumbai.

5.30. Collage of travel times between railway stations. Data from m-indicator travel Android app. Extracted by Author (2018). Collage by Author (2018).

5.31. A tradition bhowkal in Bhuigaon. A tradition bhowkal in Bhuigaon. Source - MS Gopal. (2011). The wells of Bhuigaon [Photograph]. Retrieved from http://www.indiawaterportal.org/articles/between-city-and-salty-sea-wells-bhuigaon-thane-greater-mumbai-guest-post-ms-gopal.

5.32. 'Water Stagnation'. Source - Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

5.33-35. Key Observation from the hydrological analysis. Data - Sawant, S. (2014, September). Ecological Study of a Tidal Creek: An management of a progressively altered landscape (Masters Thesis in Landscape Architecture). Faculty of Architecture, CEPT University, Ahmedabad. Maps by Author (2018).

5.36. Data and Inferences Source - Angueletou, A. (2006). Water poverty in the peri-urban territories of Mumbai, India. Presented at the Conference 'The multidimensions of urban poverty in India', IGIDR, Indira Ganghi Institute of Development Research, CSH, Centre de Sciences Humaines, Mumbai, 6-7 octobre 2006. Retrieved from https://halshs.archives-ouvertes.fr/halshs-00186276/document. Sawant, S. (2014, September). Ecological Study of a Tidal Creek: An management of a progressively altered landscape (Masters Thesis in Landscape Architecture). Faculty of Architecture, CEPT University, Ahmedabad.). Map by Author (2018).

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7.1. - 7.2. 'Visualisation of Rural and Urban Values'. Sketch by Author (2018). Inspiration from Correa, C. (1999). Housing & urbanisation. Bombay: Urban Design Research Institute.

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7.10. California vs. Scott Pruitt of the EPA. Source – Collage by Author (2018)

7.11. LA Downtown in 2002, cloaked with pollution, this forced the state government to enforce stricter emission laws. Source – McNew, D. (2002). Downtown high-rise buildings are shown cloaked in dirty air shortly after sunrise September 11, 2002 in Los Angeles, California. [Photograph].

7.12. Policy toolkit for Agricultural production. Illustrations by Author (2018).

7.13. Physical Commodity Movement and potential sharing of data through blockchain. Source - Rabobank, & Lefroy, W. (2017). Blockchain: Changing Interaction in the F&A Supply Chain from Paddock to Plate. Retrieved 15 June 2018, from https://research.rabobank.com/far/en/sectors/farm-inputs/Blockchain_changing-interaction-in-the-FandA-supply-chain-from-paddock-to-plate.html.

7.14. JD.com and BCT for the food supply chain. Source - Huang, E. (2017). Blockchain could fix a key problem in China's food industry: the fear of food made in China. Retrieved 14 June 2018, from https://qz.com/1031861/blockchain-could-fix-a-key-problem-in-chinas-food-industry-the-fear-of-food-made-in-china/.

7.15. Railway line pocket farms for urban farming Wildschut, H. (2013). Urban Farming, Photo | Henk Wildschut. Retrieved from http://www.henkwildschut.com/work/photo-urban-farming/urban-farming-photo/

7.16. Policy toolkit for Affordable Housing. Illustrations by Author (2018).

7.17. Applewood mobile homes community in Midvale. Source - Mars, R. (2018). Immobile Homes. Retrieved from https://99percentinvisible.org/episode/immobile-homes/

7.18. Policy toolkit for Affordable Housing - Part 2. Illustrations by Author (2018).

7.19. 'A House We Built'. A part of the Homegrown Cities Initiative. Source - urbz. (2014). A House We Built. Retrieved from https://www.youtube.com/watch?v=whyfh1xOkh0. Screenshots retrieved by Author (2017).

7.20. Domat Limited's 'Society of Conscience' Source – Kingsley, M., & Ma, M. (2018). Affording Hong Kong: the struggle of low-income families in sub-divided homes. Atlantis: Magazine for Urbanism and Landscape Architecture, 28(3).

7.21. Policy toolkit for Forest Management. Table and illustrations by Author (2018).

7.22. Policy toolkit for Water Management. Table and illustrations by Author (2018).

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8.14. 'Macritchie reservoir'. (Rich D, 2017). Retrieved from https://www.tripadvisor.ie/LocationPhotoDirectLink-g294265-d1527627-i277894002-MacRitchie_Reservoir-Singapore.html.

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9.4. Relation between Research and Design. Source - Author (2018)

9.5. Screenshot of Scroll.in article describing threat to salt-pans. Jayaraman, N. (2017). India's new wetland rules threaten to destroy 65% of its water bodies rather than protect them [Text]. Retrieved 19 May 2018, from https://scroll.in/article/853515/indias-new-wetland-rules-threaten-to-destroy-rather-than-protect-65-of-its-water-bodies. Retrieved by Author (2018).

9.6. Screenshot of Scroll.in article describing condition of rural migrants escaping climate conditions in the rural heartland. Retrieved by Author (2018).

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List of Abbreviations

BCT – Block-chain Technology
BMC – Brihanmumbai Municipal Corporation
CIDCO – City and Industrial Development Corporation
DCRs – Development Control Regulations
GES – Gaothan Expansion Scheme
JNNURM – Jawaharlal Nehru National Urban Renewal Mission
MCGM – Municipal Corporation of Greater Mumbai
MHADA – Maharashtra Housing and Area Development Authority)
MIDC – Mumbai-Delhi Industrial Development Corridor
MMR – Mumbai Metropolitan Region
MMRDA – Mumbai Metropolitan Region Development Authority
MOEF – Ministry of Environment and Forestry
MPC – Metropolitan Planning Commission
MSRDC – Maharashtra State Road Development Corporation
NCR – National Capital Region
NHx – National Highway [Number]
SHx – State Highway [Number]
NHAI – National Highway Authority of India
SME – Small & Medium Enterprises
SPAs – Special Planning Authorities
SRA – Slum Rehabilitation Authority
TERI – The Energy and Resources Institute
ULBs – Urban Local Bodies
VVSR – Vasai Virar Sub-Region
VVCMC – Vasai-Virar City Municipal Corporation