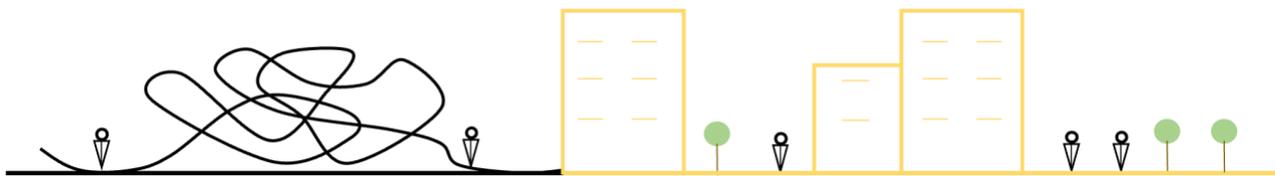


Urban Design, an antidote for informal settlements



Oussama Rouijel

Department of Planning and Landscape Architecture

University of Wisconsin-Madison

Spring 2022- Professional Project

Acknowledgement

I would like to express my gratitude to my supervisor Professor James A. LaGro Jr, whose support, guidance, and availability were valuable for this project and for my whole curriculum.

I would like to thank my committee member Professor Alfonso Morales. His insightful observations contributed to sharpen this work and make it successful.

A special thank you to Professor Carey McAndrews. Her presence and continuous advice were of a great help throughout my studies. I also thank Amy Rivera our graduate coordinator for her availability.

A special thought for my family members for their unconditional love and support.

A thought for my friends in the department and those I met in the campus; you made my experience at UW-Madison one of the most beautiful!

Table of Contents

| | |
|--|-----------|
| EXECUTIVE SUMMARY | 4 |
| 1. METHODOLOGY | 5 |
| 2. EXPLORE & OBSERVE | 6 |
| 2.1. CONCEPTUAL FRAMEWORK: CITIES & INFORMAL SETTLEMENTS AROUND THE WORLD | 6 |
| 2.1.1. <i>Cities and Urbanization</i> | 6 |
| 2.1.2 <i>Urban extensions: Crisis and issues</i> | 7 |
| 2.2. TOPIC DELINEATION | 8 |
| 2.2.1. <i>Informal settlements definition and main distinctions</i> | 8 |
| 2.2.2. <i>Informal settlements Rural-Urban continuums</i> | 9 |
| 3. DISMANTLE & ANALYZE | 10 |
| 3.1. SOME EXAMPLES AROUND THE WORLD..... | 10 |
| 3.1.1. <i>Rocinha, Favela. Rio de Janeiro, Brazil</i> | 10 |
| 3.1.2. <i>Dharavi, Slum. Mumbai, India</i> | 11 |
| 3.1.3. <i>Langrug community. Franschoek, South Africa</i> | 12 |
| 3.2. PHYSICAL ANALYSIS..... | 12 |
| 4. SYNTHESIZE & SUGGEST | 14 |
| 4.1. URBAN DESIGN, AN ANTIDOTE | 14 |
| 4.2. DESIGN GUIDELINES..... | 15 |
| 4.2.1 <i>Circulation & networks</i> | 15 |
| 4.2.2. <i>Units & Urban massing</i> | 16 |
| 4.2.3. <i>Open spaces & Urban acupuncture</i> | 17 |
| 5. CONCLUSION AND RECOMMENDATIONS | 18 |
| 5.1. CONCLUSION | 18 |
| 5.2. LIMITATIONS..... | 19 |
| 5.3. RECOMMENDATIONS..... | 19 |
| APPENDIX 1 | 20 |
| APPENDIX 2 | 24 |
| REFERENCES | 25 |

Executive summary

Informal settlements are widespread in many urban areas around the world. Despite the complexity of their definition, informal settlements broadly refer to communities developed within urban fabrics in substandard conditions through illegal ways. They are considered being in violation of land tenure, construction standards and urban regulations. This project aims to, theoretically, examine some pieces of literature review as an attempt to understand informal settlements' main distinctive traits. The report will mention three case studies from around the world to further understanding of informal settlements phenomenon. The goal of this work is to propose a set of practical design guidelines as innovative urban design and planning processes. The focus will be narrowed on the physical dimension, but the outcome's scope is intended to reach several other levels: social, economic, cultural, etc. The proposed guidelines are seen from a theoretical level as transferable solutions that can be applied and adapted to different contexts as well as upgrade paths for a successful urban integration.

1. Methodology

This work relies on a deductive approach that starts by a general exploration of informal settlements and their different implications. This deductive path consists of three essential steps intended to reach insightful physical interventions as an antidote for these settlements in addition to general recommendations regarding this topic. The first one is exploratory, an attempt to understand theoretically this phenomenon and to link it clearly with urban areas in today's world. The second step is observational through a benchmark of three examples. This step also attempts to dismantle informal settlement's physical composition and understand their development mode. Different views and scholars' positions will be discussed for a comprehensive assimilation of the phenomenon. The last step carries a synthetical thinking towards the suggestions of a couple of urban design interventions. Finally, the limitations of this work will be mentioned as well as potential recommendations for planners, decision-makers, and scholars.

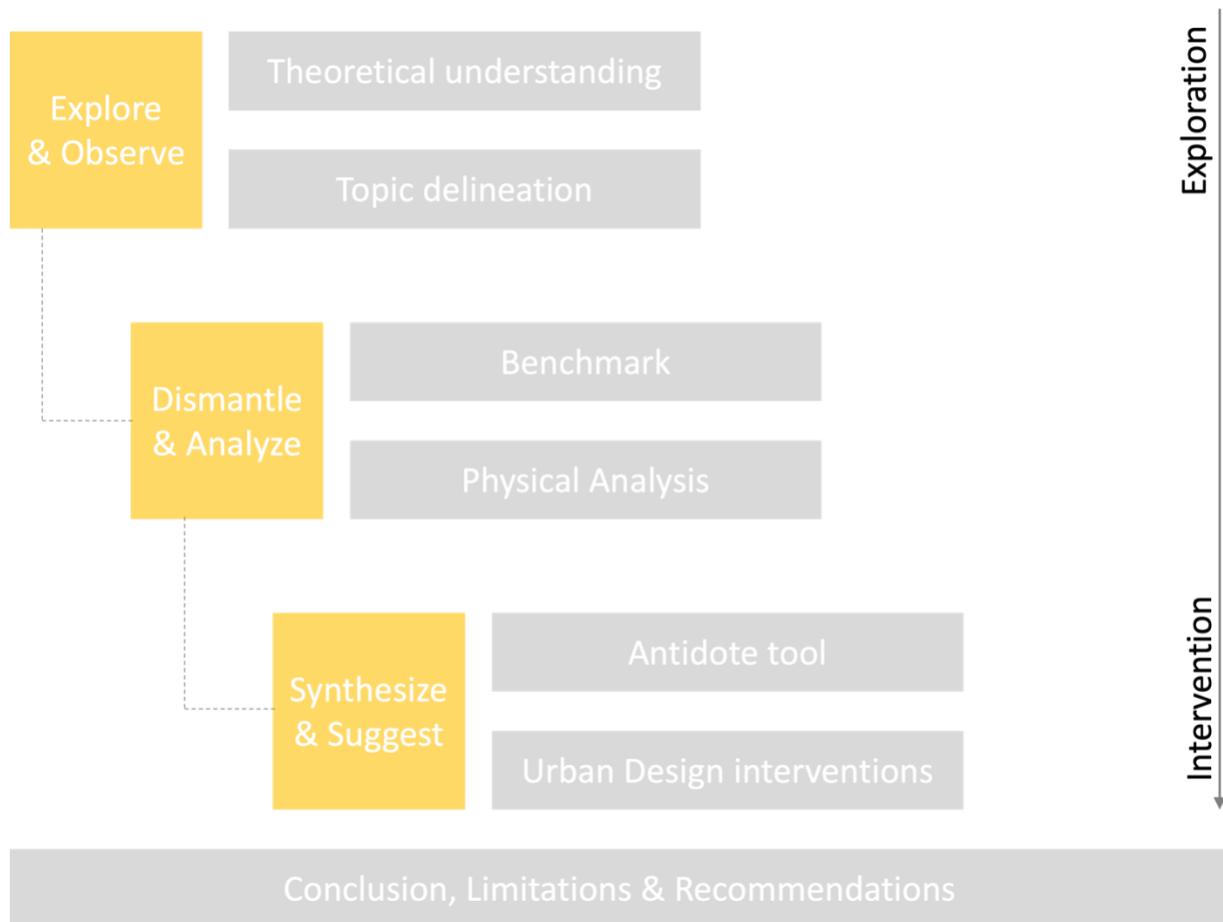


Fig 1: Methodology flow-chart.
Source: Rouijel.0

2. Explore & Observe

2.1. Conceptual framework: Cities & Informal settlements around the world

The topic of informal settlements in urban areas combines two broad subjects: informal settlements and urban areas. It is thus legitimate to ask the question: is it better to start with cities or with informal settlements? Both are connected in many ways and at multiple levels; it seems reasonable to consider cities first as they are the container of informal settlements.

2.1.1. Cities and Urbanization

The urban phenomenon is very ancient! It underwent multiple metamorphosis through time. This project will focus on urban areas in their modern and contemporary aspect during the 20th and 21st centuries. During this period, the global population witnessed an important increase coupled with an intense urbanization as residents were increasingly concentrating in urban areas. Our world urban population moved from 751 million people in 1950 to 4.2 billion in 2018; the percentage of urban population that shifted from 30% in 1950 to 55% in 2018 marking an exponential growth rate (United Nations, 2019).

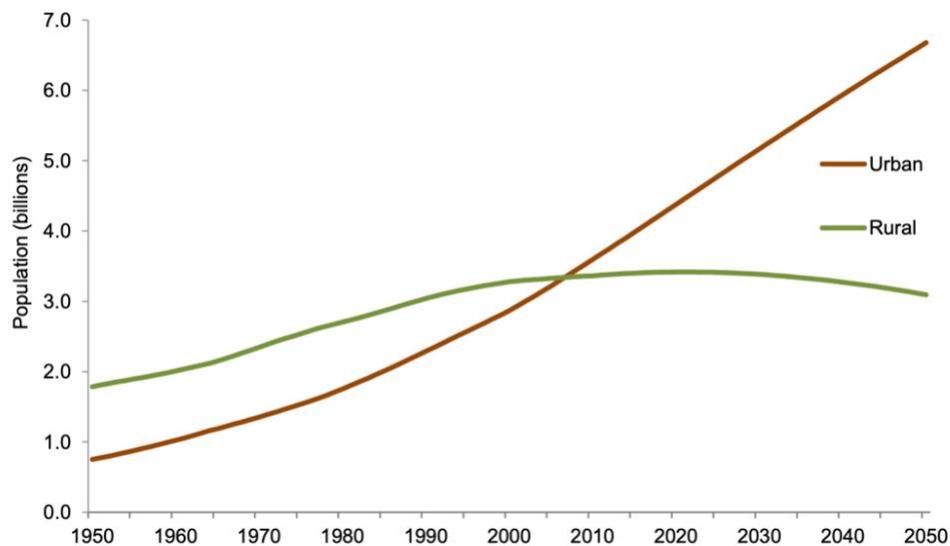


Fig 2: Urban and rural population at a global scale between 1950 and 2050.

Source: *World Urbanization Prospects 2018*.

This huge demographic and urban boom led to important evolutions among global settling patterns and lifestyles. Urbanization appeared to be a reality lived and a concept worth studying. According to the United Nations (2019), urbanization is seen as a process transforming from one side spaces from rural to urban settlements, and from the other side population distribution from rural to urban areas. Many neighboring concepts emerged in the framework of describing and analyzing these important urbanization patterns. The 20th century was the century of an increasing interest towards metropolization, mega-cities, global cities, sprawl, etc.

Rozemblat et al. (2018), considers that metropolization is a result of three factors: adoption of socioeconomic innovations, ability to attract innovative activities that attract skilled people, and the cumulative abilities of wealth and know-how. Cardoso and Meijers (2020), considers that the metropolization process can either take place through the domination of a large city within a region or as a set of similar cities forming a constellation that can be called “polycentric urban region”. Most of the qualificative concepts of cities gravitate around the notion of concentration. Cities are concentrations of people, services, industries, and many other activities. Huge cities emerged with important numbers of residents such as Tokyo with 37 million, New Delhi with 29 million, Shanghai with 26 million and many others (United Nations, 2019). In the same vein of analyzing urbanization, AlSayyad (2004) talks about the importance of Wirth’s (1938) three interrelated levels in considering urbanism and the urban phenomenon: the first one is the spatial structure, the second is the social composition and the third is the collective ideas and behaviors that distinguish this phenomenon. People join cities hoping for better futures. Cities embodied, more than any time before in history, the strong image of opportunity.

2.1.2 Urban extensions: Crisis and issues

The massive urbanization that characterizes our era created a very large spatial extension of cities also known as sprawl. According to Brueckner (2000), sprawl happens for three main reasons: the first one is population increase that naturally leads to a need for more spatial area to accommodate it, the second reason is linked to income increase leading to a need for more living space that orient the population to suburbs, the third reason is related to the accessibility of commuting cost and transportation infrastructure which allow city residents to move easily from the center to their homes.

The urban extensions of the 20th century took different dimensions and were essentially associated to several social and economic conditions. The United Nations (2019) expects that the world will have around 43 megacities, most of them emerging in developing countries.

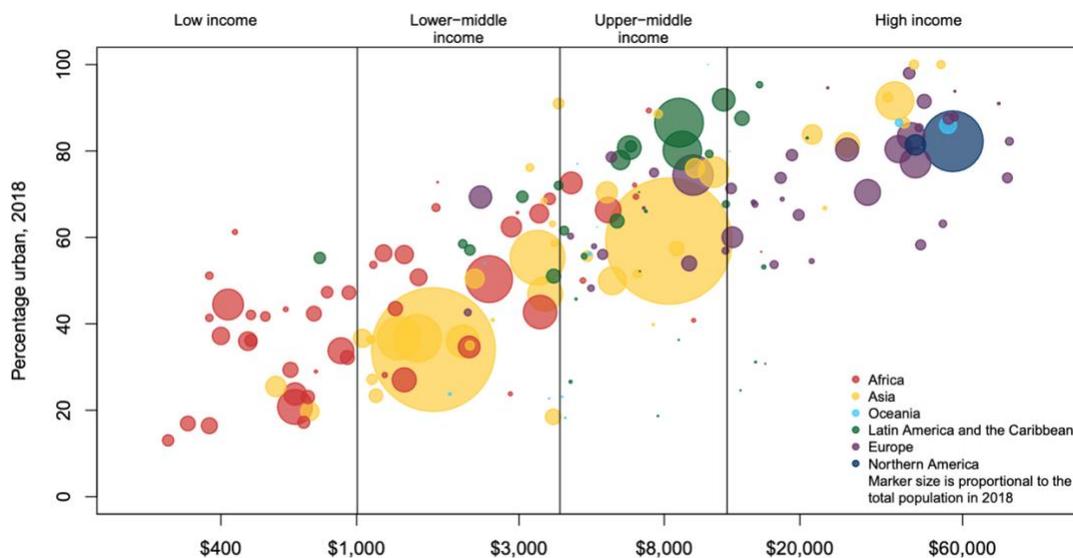


Fig 3: percentage of population residing in urban areas by income group per country, 2018.
Source: *World Urbanization Prospects 2018*.

The urbanization process is an important demand driver, cities in the 20th century were pressured by huge amounts of population and many problems aroused within urban fabrics. Cities, especially in developing countries, were lacking all types of infrastructure needed to accommodate these population fluxes as well as the required tools to manage this growth. As stated by Roy, A (2005), most of the urban growth is happening in third world countries while most of the knowledge and science intended to manage this growth is taking place in developed countries. These high waves of urbanization produced a new image of cities, the exact opposite of the one people dreamed of. Cities started being synonyms of congestion, informality, high density, pollution, and other negative features. Informal settlements aroused as a key problem in urban areas. According to United Nation Habitat (2005), informal settlements are a phenomenon that can be qualified as global and urban; it is a phenomenon that more greatly affects the cities of global south.

2.2. Topic delineation

Tackling the question of informal settlements leads us to talk about informality in general. Most of the time the qualification “informal” brings a broad perspective of non-compliance with rules and regulations. Gilbert (2004) stresses the difficulty of defining informality in a precise and meaningful way and considers it, at the residential level, as the self-help operation that people follow in building their shelter long before having access to services. Informality emerges in urban areas under different faces. Roy (2005) claims that recognizing the “right of the city” far from the logics of ownership is important while tackling informality. Most of the urban phenomena are somehow inter-related as they are part of a general and complex system that is the city. Roy, A (2005), argues against the long-time established dichotomy between formal and informal by considering that informality in urban areas is an interconnection of spaces and economies rather than a self-standing sector. Roy, A (2005) links urban informality to the term mode with its Latin root *modus* and its metaphysic connotation meaning a “state of being” to consider that informality in urban areas is not a sector, it is a mode.

2.2.1. Informal settlements definition and main distinctions

It is essential to proceed to a clear definition of informal settlements as a way of determining specifically their main distinctive traits. According to United Nations Habitat (2015), informal settlements are defined by three main characteristics: the first one is the absence of land tenure, the second is related to the lack or the absence of basic services provided in cities such as sanitation and water, and the third is related to the non-compliance with planning regulations and building codes. Dovey et al (2020), considers that informal settlements are defined in a broad way by their unauthorized, incremental, and self-organized way in developing new neighborhoods. It also important to mention that informal settlements are a large umbrella that encompasses several typologies with different names: favelas, bidonvilles, poblaciones, shacks, barrios, bajos, etc. (United Nations Habitat, 2015). This phenomenon has different manifestations around the world with different names, shapes, structures, and compositions. There are shades of differences that distinguish between those features. According to Roy, A (2015), there is a wide range of situations along the legality illegality continuum as many informal settlements developed invasively on lands without ownership while others are more of violations of land uses on lands legally owned.

It is largely believed that informal settlements are caused by urbanization that was driven by demographic growth and rural exodus. According to United Nations Habitat (2015), informal settlements are caused by a wide range of reasons such as population increase, rural urban exodus and other aspects related to the lack of affordable housing and governance.

2.2.2. Informal settlements Rural-Urban continuums

Situating informal settlements within urban areas is a challenging task. Indeed, cities of the 20th and 21st centuries are concentrations with multiple faces and shapes. Within the same city, we can distinguish multiple components, a sort of small “sub-cities”. The extension of cities took numerous forms and created multiple linkages with rural areas which made the spatial interpretation hard to decipher and the distinction between rural and urban more complex. Dewey (1960) considers that the factors on which authors base their distinction between rural and urban are heterogenous. The absence of clear academic consensus around the definition and the distinction between those concepts allow for multiple interpretations. Dewey (1960) argues that the absence of objective referents for this distinction gives no added value to their use; he thinks that the only elements that authors agree around while using those terms are variations of size and density of the population.

While we can notice a wide diversity of understandings regarding the classifications of urban areas and their distinction from rural ones, there are some operating approaches used in administrative contexts. As an example, the US department of agriculture (n.d) is making distinction of those areas based on a scale from 1 to 9. Three thresholds are for metro areas and 6 thresholds are for non-metro areas based on the population.

Our territories developed in a wide range of spatial forms: suburbs, exurbs, etc. Those in-between spaces are giving place to a blurred distinction between urban and rural. Cardoso and Meijers (2020) argue that urbanization changed the meaning of cities by converging a set of spaces that used to be considered as mutually exclusive such as urban, rural, suburban, or natural. These terms emerged as jargon used in both the planning practice and academia to qualify different types of developments. Cardoso and Meijers (2020) also argue that the orientation towards city-regions, within what they call “fuzzy territories”, is not only a topic of study by also a goal to be achieved by many communities in their quest for economic growth. Based on the different definitions of Informal settlements, we can understand that those settlements are not linked with a specific environment nor a specific place. They can emerge at all the levels within that Urban-rural continuum.

3. Dismantle & Analyze

3.1. Some examples around the world

Living in a world with high urbanization rates provides us with abundant examples of informal settlements. We will go through a limited benchmark of informal settlements around the world to grasp more clearly this reality and how it relates to the neighboring urban fabrics. The examples provided are from different continents, within various contexts, and reflect different typologies of informal settlements.

3.1.1. Rocinha, Favela. Rio de Janeiro, Brazil

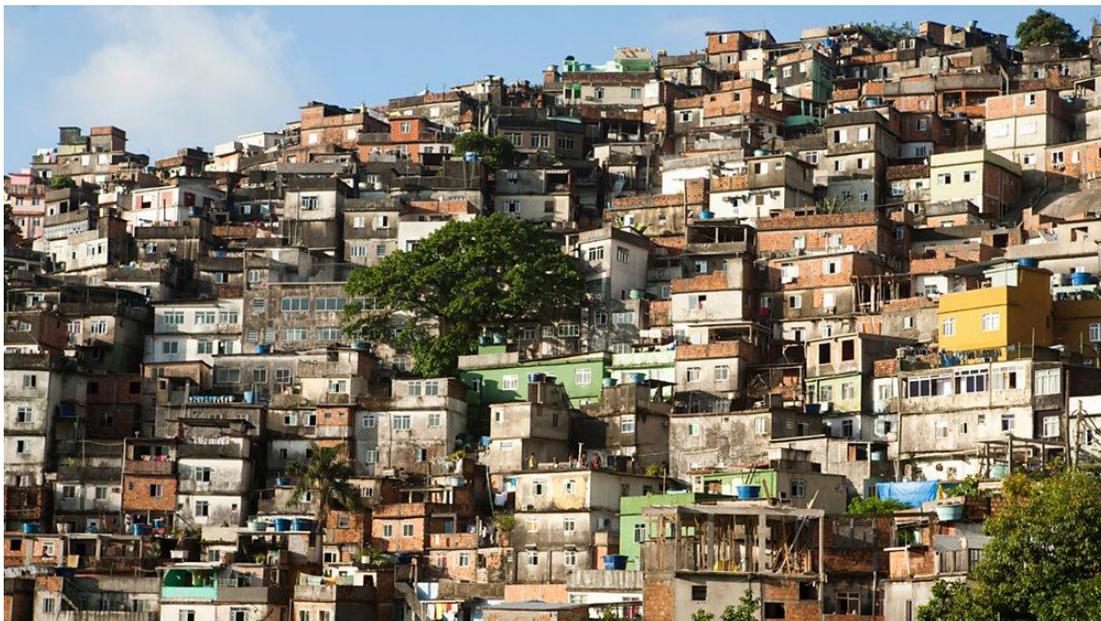


Fig 4: Rocinha Favela, Rio de Janeiro.

Source: BBC, <https://www.bbc.co.uk/bitesize/guides/zqdkkqt/revision/10>

Located in the south of Rio de Janeiro, Rocinha is the largest favela in Brazil. According to BBC, this informal settlement gathers between 60,000 and 150,000 residents. Around 5% of the Brazilian population is living in settlements similar to this Favela. Life expectancy in Rocinha is 20 years lower than the national average which denotes the difficult living conditions (MIT technology review).

Based on simple observation, we can notice that Rocinha is a consolidated informal settlement where residents are using building materials such as bricks and concrete. According to Creppi et al (2020), Rocinha's area is less than 2 square km with a density around 45,000 resident per square km living in a massive settlement of concrete, brick, and wooden houses. The author also considers Rocinha as a vibrant social place for activism with a population with diverse social status living in different sub-neighborhoods within this informal settlement.

3.1.2. Dharavi, Slum. Mumbai, India



Fig 5: Dharavi, India. Seen in 2010.

Source: *Los Angeles Times* (Rafiq Maqbool), <https://www.latimes.com/world-nation/story/2020-06-24/dharavi-slum-in-mumbai-india-contained-covid-19>



Fig 6: Dharavi in 2020.

Source: *BBC News*, <https://www.bbc.com/news/world-asia-india-53576653>

According to Reuters, Dharavi's population is estimated around 1million residents. This slum generates a turnover economy around \$1billion through small businesses (leather workers, potters, recycling networks...).

3.1.3. Langrug community. Franschoek, South Africa

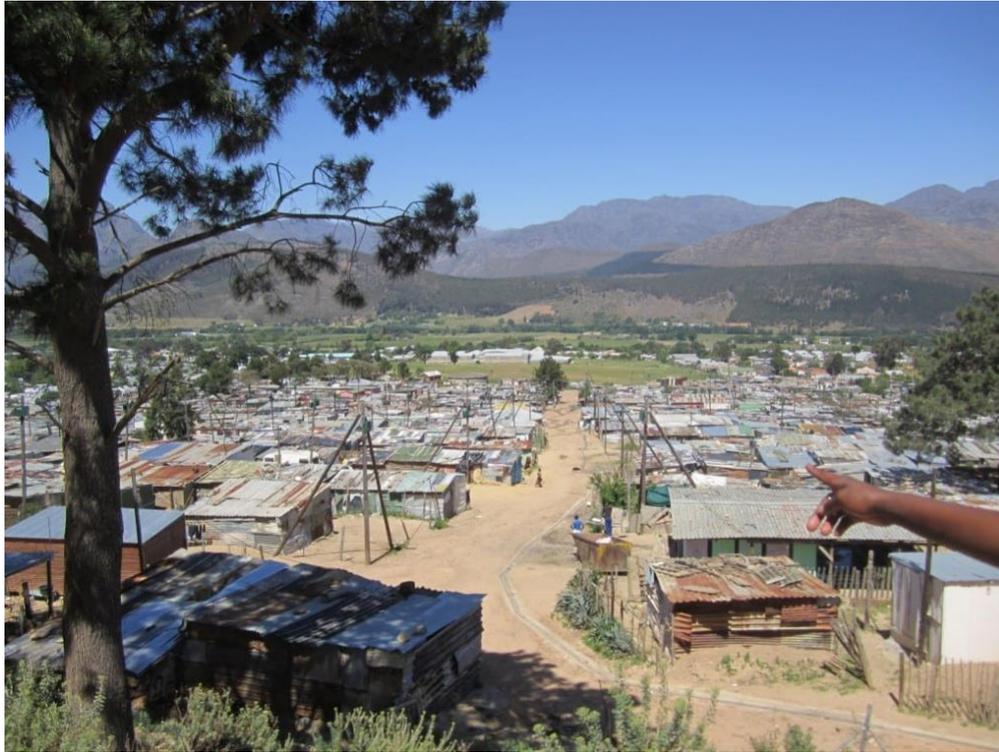


Fig 7: Lungrug community

Source: Cape Town Project Center, <https://wp.wpi.edu/capetown/projects/p2012/langrug/welcome-to-langrug/>

Langrug is an informal settlement located in the village of Franschoek. This settlement lacks clean water, sanitation and all the other basic requirements.

According to Worcester Polytechnic institute, Langrug hosts a population of 5,000 living in nearly 2,000. This information was gathered through research and fieldwork conducted by the institute between 2007 and 2015 as a part of project called “Cape Town Project Center”.

3.2. Physical analysis

Our interest, in this work, will focus heavily on the physical aspect of informal settlements. It is also essential to mention that the physical aspect of informal settlements is only one dimension among a set of others. AlSyyad (2004) affirms that the scholars contributing to the book he edited with Ananya Roy “*Urban Informality: transnational perspectives from the Middle East, Latin America, and South Asia*” consider that Wirth’s three perspectives of urbanism apply to understand how urban informality operates. In that sense, the spatial structure, the social structure as well as the collective urban behaviors are levels of analysis that can be applied to informal settlements as well.

Our focus on the spatial structure is by no means a way of isolating it from the other two perspectives. According to Dovey & King (2011), informal settlements manifestations vary widely depending on culture, climate, geography, and several other parameters. This emphasizes the idea of interrelation between Wirth's three perspectives, each perspective will lead us without any doubt to talk about the other. It is also a way of asserting that our focus on the physical aspect of informal settlements will somehow carry the reflection of many other dimensions.

Dovey et al (2020) also see informal settlements as an action of adaption to the multiple conditions of reality such as climate, land, market, regulations, planning regulations and others. This action of adaptation lead to a wide range of informal settlement's typologies. We were able to grasp the typologies' diversity as well as informal settlement's broad definition through the conceptual framework. The limited benchmark, in turn, informed us about the variety of ways and shapes under which they develop. Dovey and King (2011), stress the importance of the physical dimension for understanding this phenomenon. Based on that dimension, they distinguish eight types of informal settlements: Districts, Waterfronts, Escarpments, Easements, Sidewalks, Ahherences, Backstages, and Enclosures (Appendix 1). Those distinctions are seen by the authors more as a way of organizing their observations than a strict classification. The observed distinctions are essentially based on how and where informal settlements develop from a spatial perspective. Dovey & King (2011) also consider three modes for informal settlements development: the first is *settling* as an installation of those settlements in a land, the second is *inserting* as an invasive way of inhabiting neglected spaces, and the third is *attaching* as an outgrowth of those settlements out of formal spaces. Each of the typologies mentioned emerges following one of the three modes of development as there is always a correlation between morphology as well as growth patterns.

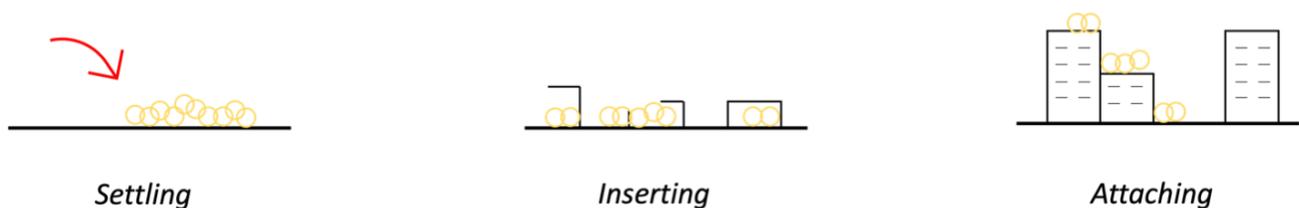


Fig 8: Schematic drawing of Dovey & King's three modes of informal settlement's development.
Source: Rouijel, O

Morphological characteristics allow for making different classifications and may serve as a tool for analysis and way of understanding the emergence of these settlements (Dovey & King, 2011). Tackling the physical dimension of informal settlements may take different perspectives. Dovey et al (2020) affirm that extensive studies have been done around informal settlement's morphology while less things are known for their morphogenesis. Exploring the existing literature pieces regarding informal settlement's physical structure reveal multiple ideas and analytical perspectives. Most of them stress the diversity of manifestation of those settlements as they do not follow specific and defined rules. We can thus assert the presence of a wide range of informal spatial forms and morphologies (see Appendix 2).

Dovey et al (2020) think that informal settlements are somehow an urban design and planning patterns with several logics that are weakly explored and understood. Indeed, while we start analyzing informal settlements, the impression randomness that appears as we observe informal settlements quickly disappear in favor of some development patterns. Dovey et al (2020), evokes those similarities by qualifying them as “morphological consistencies” such as narrow lanes, irregular networks access and small building increments.

The goal of this work is not to establish an exhaustive inventory of informal settlements physical features nor to track their morphogenesis and patterns of development, it is rather a way of achieving an understanding of the physical reality of those settlements to make upgrading interventions. The different pieces of literature explored are also attempts to go through different ways of thinking and dismantling this phenomenon.

4. Synthesize & Suggest

4.1. Urban design, an antidote

The importance of informal settlements and its global character led to numerous intervention attempts around the world. Those interventions vary widely in terms of operational approaches and proposed solutions. Many parameters come into play such as legal aspects of land tenure, financial means mobilized to tackle the phenomenon, resident’s social acceptability of the solution. Ren (2018) focuses on those settlements in Brazil, India, and China and establishes four main factors to analyze the interventions differences: intergovernmental relations, electoral politics, municipal finance, and the capacity of civil society. In addition to the factors involved in informal settlement’s interventions, we can mention the general orientation of those interventions towards re-development either in-situ or through displacement. Indeed, those solutions are considering informal settlements as mistakes to be corrected and as spaces to be developed following formal approaches.

The question of informal settlements presents a clear physical reality that is nurturing from one side an academic discourse and analysis and from the other side the efforts to resolve the situation. The previous steps of this work were essentially informative and analytical. This step will carry more of a synthetic thinking as a way of proposing some interventions. Each explored aspect regarding informal settlements will lead to draw a meaningful conclusion:

- The diversity of informal settlement’s typologies enables us to grasp the need for adaptive and flexible interventions rather than static approaches. Having flexible and adaptive interventions is a way of ensuring the transferability of those interventions to a wide range of informal settlements around the world.
- Identifying similarities between the typologies of those settlements is also a way of defining spaces that are the target of the interventions. This leads us to think about developing specific solutions for those similar development patterns. In that sense, the observed features become a part of the solution as they are target and eventually a feature of the proposed intervention itself.
- Finally, the relevance of urban analysis tools, as explored through Wirth’s three levels of analysis, lead us to consider urban design tools as an approach for intervention. The use of urban analysis is a way that will allow potential integration to formal existing urban fabrics.

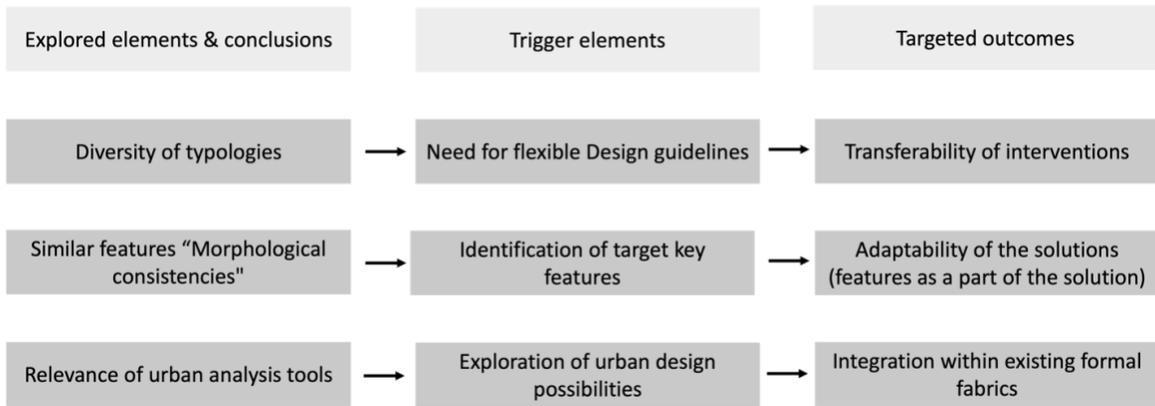


Fig 9: Synthesis of the explored elements and targeted outcomes.
Source: Rouijel, O

4.2. Design guidelines

The design guidelines step refers to the first spatial translation of the physical interventions. They are designed to embody all the targeted outcomes we concluded as a part of the synthesis. This is more of a creative part where practical urban design interventions are proposed.

4.2.1 Circulation & networks



This guideline aims for an upgrade of the existing lanes « tracé ». A wide range of street typologies might be considered depending on the existing lane width. Complete street might be considered as a way of linking a given settlement to the existing urban transportation network. It considers the space of lanes and streets not only as a circulation space but also as a basis for bringing different kind of services such as sanitation, clean water, public lighting, etc.

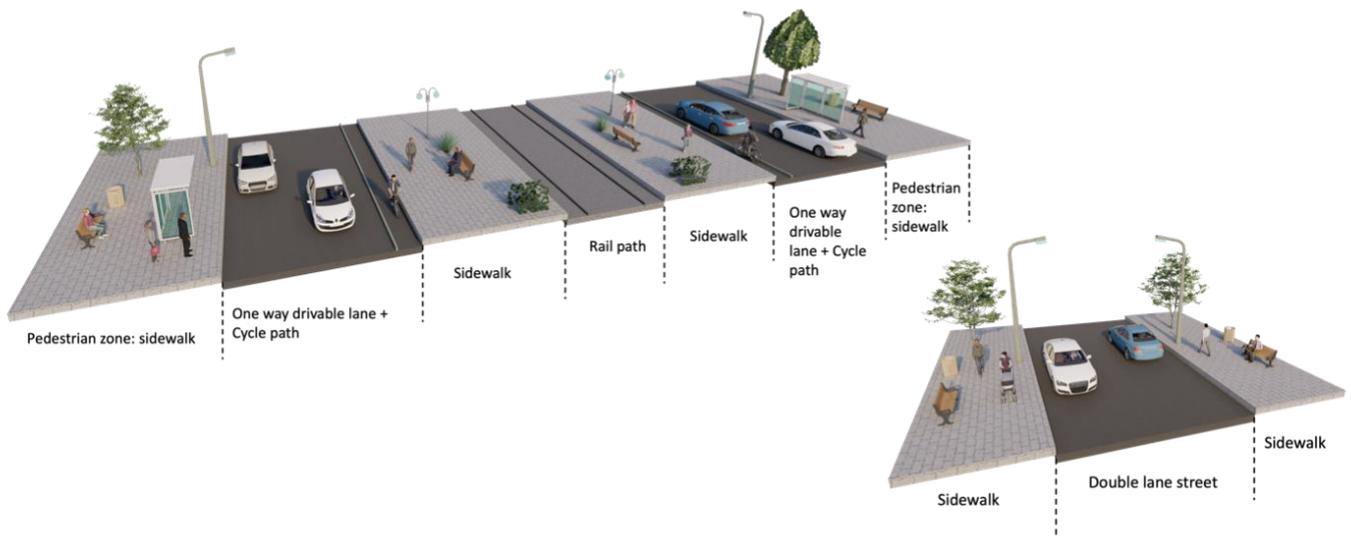


Fig 10: Perspectives of complete street and double lane street
Source: Rouijel, O

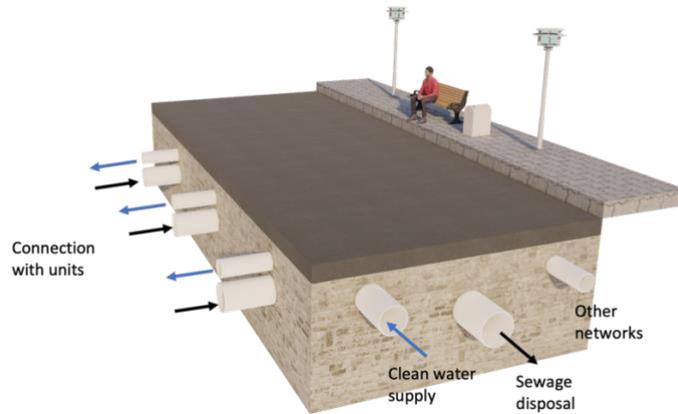
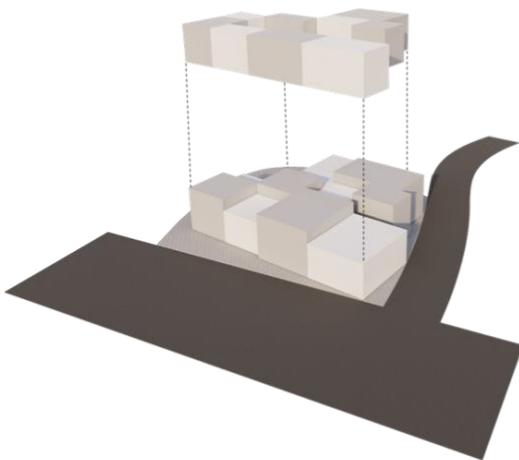


Fig 11: Perspective-section network services
Source: Rouijel, O

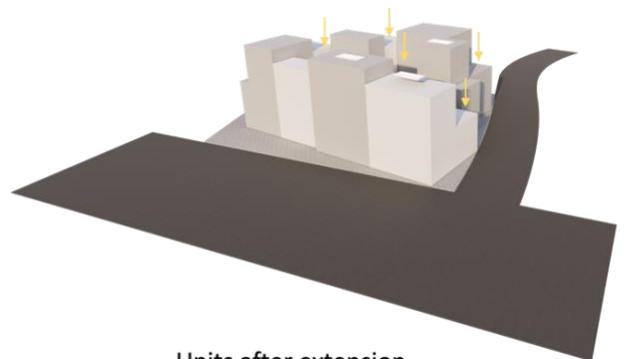
4.2.2. Units & Urban massing



This guideline operates at the level of units as a way of building meaningful and functional extensions of the existing units. Each volume is seen in as a part of the whole fabric of units rather than a single unit. Some possibilities are suggested such as having setbacks on narrow lanes to allow more lighting access. As many informal settlements are spread out at one level, it is also a way of exploring vertical possibilities of mutual extension.



Vertical Extension process



Units after extension

Fig 12: Perspectives of units 'extensions
Source: Rouijel, O

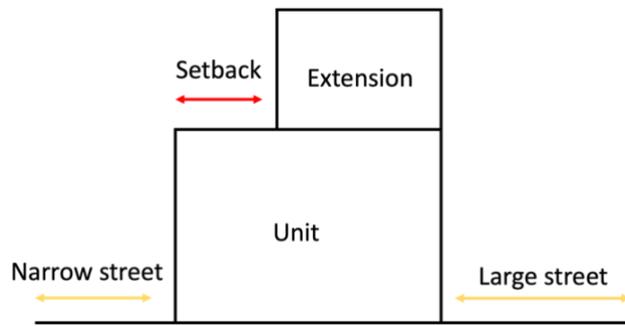


Fig 13: Schematic section of extensions possibilities
Source: Rouijel, O

4.2.3. Open spaces & Urban acupuncture



Given the fact that amenities are dramatically lacking within informal settlements, open spaces are seen as an opportunity for integrating amenities. Indeed, the presence of vacant areas within the fabrics of informal settlements is a chance to rethink those spaces in a functional way. It is a possibility that might offer new functions. A proposition of modular shelters is made to accommodate those amenities. Many basic services can be integrated such as first care amenities, postal services, retail stores, etc.



Fig 14: Perspective of an open space (Agora).
Source: Rouijel, O



Fig 15: Perspectives of modular shelters intended to host different types of amenities.
Source: Rouijel, O

5. Conclusion and Recommendations

5.1. Conclusion

Informal settlements in cities present a complex mode of development. The focus of this project on the physical dimension of informal settlements was an attempt to decipher some of their main characteristics. This project considers Urban Design interventions as a way of upgrading both the physical aspect of informal settlements and residents living conditions. The three proposed guidelines are seen as flexible and adaptive tools that may be applied in different ways following the specificities of each context. The following figure is a 3d modelling that represents a possible implementation of the proposed guidelines. Those guidelines can be implemented in numerous ways and can be layered with other types of interventions.

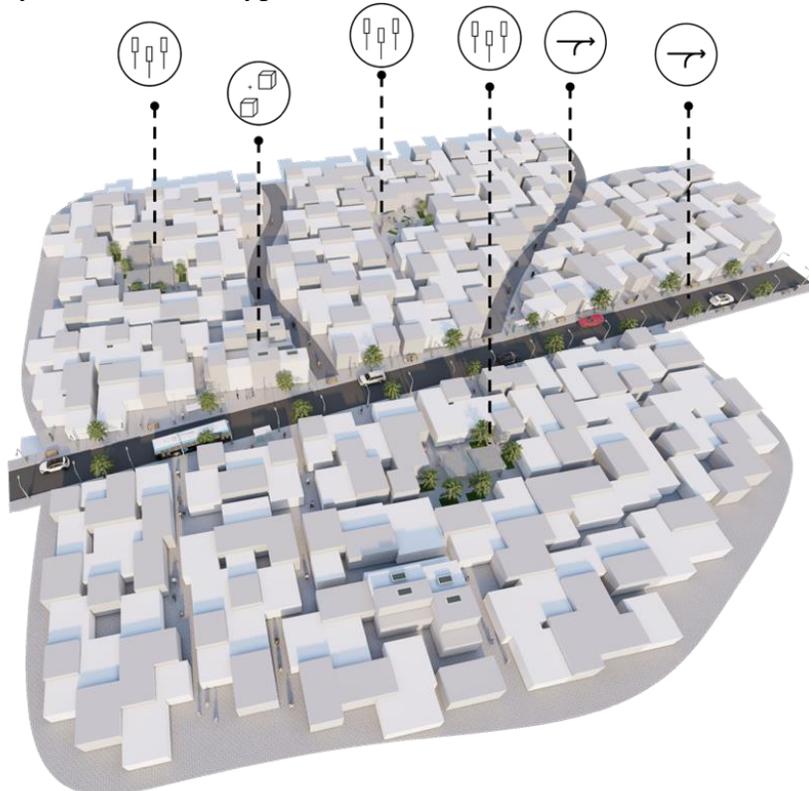


Fig 16: General perspective showing the implementation of the three guidelines.
Source: Rouijel, O

5.2. Limitations

The topic of informal settlements is broad and might be considered from different perspectives and multiples disciplines. The work developed here in no way claims to be perfect or to have addressed the issue exhaustively. It is more of a structured exploration of informal settlements at a theoretical level. Many limitations can be noted both in terms of the adopted approach and the suggested solutions.

Indeed, the explored pieces of literature are narrow compared to the whole existing body of knowledge regarding informal settlements. As for the benchmark, the three case studies, even though their importance, provided a limited illustration of the topic.

The third limitation is regarding the proposed guidelines that were focused on the physical dimension with an urban design spirit rather than being horizontal. Indeed, physical solutions may be a good antidote to informal settlements; however more holistic solutions should be considered.

5.3. Recommendations

The outcome of this work is seen as a basis for considering new horizons and reversing some well-established visions and attitudes regarding informal settlements. The following recommendations could be mentioned:

- From a governance perspective: informal settlements are wide scale forming integral parts of urban fabrics both in terms of their manifestation and development modes. They should be seen more as a reality to be integrated and improved rather than a problem to be removed. It is more of a conceptual recommendation regarding the general perception of informal settlements by local and central governments, scholars, and planning professionals.
- From an academic and scholar perspective: informal settlements are still hiding large fields of unexplored aspects. More multidisciplinary research should be conducted with convergent approaches to capture more efficiently the different patterns that distinguish those settlements.
- From an operational and design perspective: informal settlements are an ever-evolving phenomenon that requires adaptive and flexible interventions rather than static pre-conceived solutions.

Appendix 1

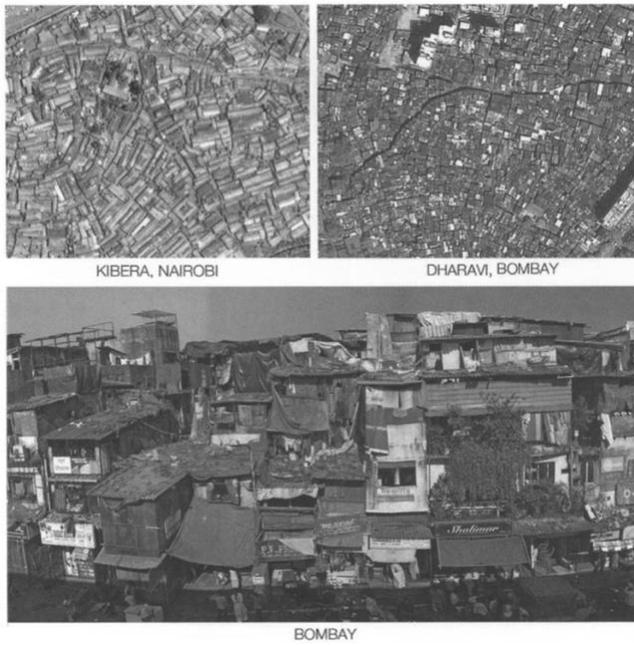


Figure 1: Urban districts. (Photos: DigitalGlobe (upper left); GeoEye (upper right); Kim Dovey (lower))

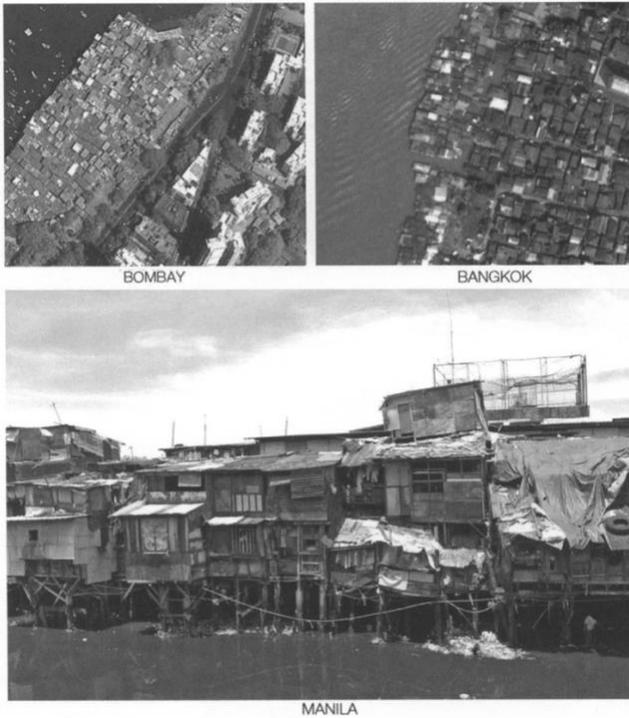


Figure 2: Waterfront settlements. (Photos: GeoEye (upper); Kim Dovey (lower))

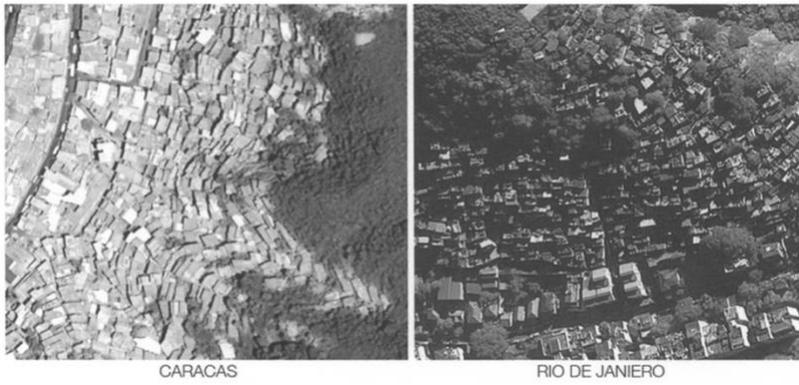


Figure 3: Escarpments. (Photos: DigitalGlobe (left); GeoEye (right))

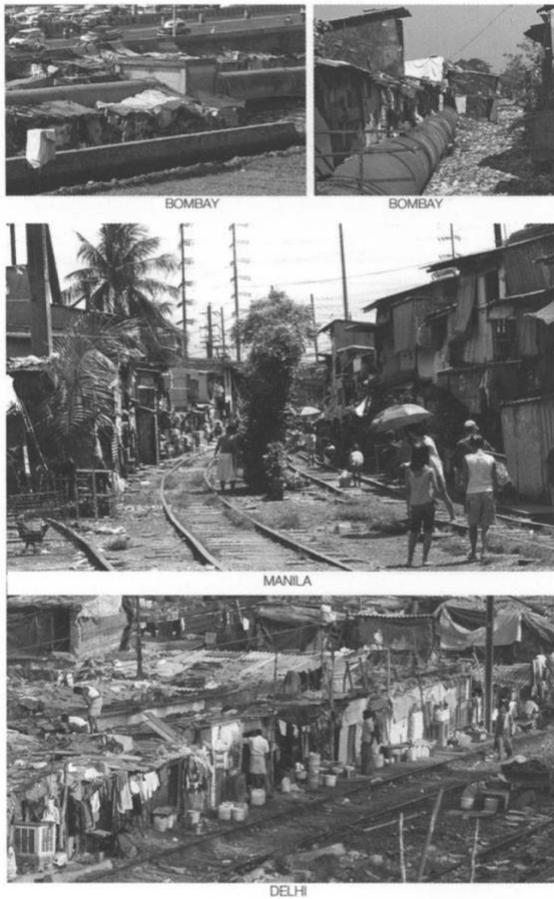
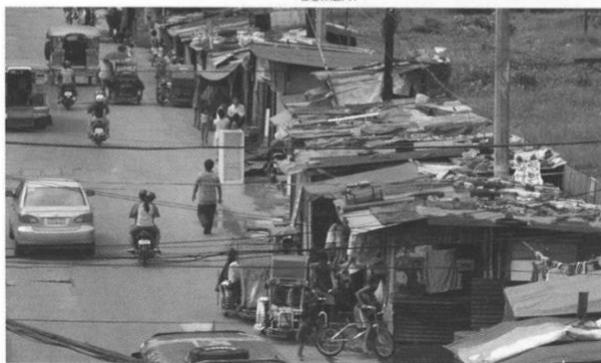


Figure 4: Infrastructure easements. (Photos: Kim Dovey)



BOMBAY

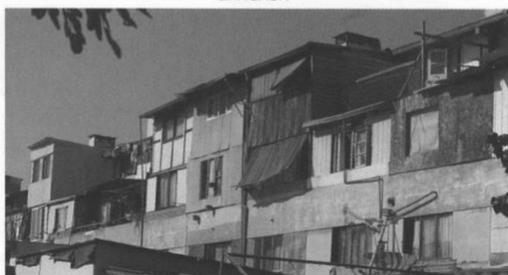


MANILA

Figure 5: Sidewalks. (Photos: Kim Dovey)



BANGKOK



SANTIAGO

Figure 6: Adherences. (Photos: Ross King (upper), Kim Dovey (lower))



Figure 7: Backstages. (Photos: Kim Dovey (upper), GeoEye (lower))



Figure 8: Enclosures. (Photos: Kim Dovey)

Appendix1 figures Source: Dovey, K., & King, R. (2011). Forms of informality: Morphology and visibility of informal settlements. *Built Environment*, 37(1), 11-29.

Appendix 2



Informal morphologies (200 × 200 m scale) - locations include Buenos Aires, Caracas, Cairo, Jakarta, Johannesburg, Karachi, Lima, Manila, Mumbai, Nairobi, Rio de Janeiro and Skyros (Photos: Google Earth).

Appendix 2 source: Dovey, K., van Oostrum, M., Chatterjee, I., & Shafique, T. (2020). Towards a morphogenesis of informal settlements. *Habitat International*, 104, 102240.

References

- AlSayyad, N. (2004). Urban informality as a 'new' way of life. *Urban Informality: Transnational Perspectives from the Middle East, Latin America, and South Asia*, 7-30.
- BBC. (n.d.). *Developing country case study - rio de janeiro - management of Urban Change - higher geography revision - BBC Bitesize*. BBC News. Retrieved March 30, 2022, from <https://www.bbc.co.uk/bitesize/guides/zqdkkqt/revision/10>
- Biswas, S. (2020, July 29). *India coronavirus: 'more than half of Mumbai slum-dwellers had covid-19'*. BBC News. Retrieved March 30, 2022, from <https://www.bbc.com/news/world-asia-india-53576653>
- Brueckner, J. K. (2000). Urban sprawl: diagnosis and remedies. *International regional science review*, 23(2), 160-171.
- Cardoso, R., & Meijers, E. (2020). The process of metropolization in megacity-regions. In *Handbook of Megacities and Megacity-Regions*. Edward Elgar Publishing.
- Ceppi, P., Masera, G., Tadi, M., & Rossi, A. M. (2020). The Rocinha Favela as a Paradigmatic Case Study of Informal Settlements in Large Cities: Current Situation and Past Slum-Upgrading Programmes. In *Environmental Performance and Social Inclusion in Informal Settlements* (pp. 1-13). Springer, Cham.
- Dewey, R. (1960). The rural-urban continuum: Real but relatively unimportant. *American Journal of Sociology*, 66(1), 60-66.
- Dovey, K., & King, R. (2011). Forms of informality: Morphology and visibility of informal settlements. *Built Environment*, 37(1), 11-29.
- Dovey, K., van Oostrum, M., Chatterjee, I., & Shafique, T. (2020). Towards a morphogenesis of informal settlements. *Habitat International*, 104, 102240.
- Duarte, F. Ratti, C (2021, April 28). *Rio de Janeiro is making a digital map of one of Brazil's largest favelas*. MIT Technology Review. Retrieved March 30, 2022, from <https://www.technologyreview.com/2021/04/28/1022742/rio-de-janeiro-digital-map-favelas-rocinha-brazil-cities/>

- Gilbert, A. (2004). Love in the Time of Enhanced Capital Flows: Reflections on the Links between Liberalization and Informality. | In *Urban Informality: Transnational Perspectives from the Middle East, Latin America and South Asia*, edited by Ananya Roy and Nezar AlSayyad, 33–66.
- Habitat, U. N. (2015). Habitat III issue paper 22—informal settlements. *New York: UN Habitat*.
- Ren, X. (2018). Governing the informal: Housing policies over informal settlements in China, India, and Brazil. *Housing Policy Debate*, 28(1), 79-93.
- Roy, A. (2005). Urban informality: toward an epistemology of planning. *Journal of the american planning association*, 71(2), 147-158.
- Rozenblat, C., Pumain, D., & Velasquez, E. (Eds.). (2018). *International and transnational perspectives on urban systems*. Singapore: Springer.
- United Nations, Department of Economic and Social Affairs, Population Division (2019). *World Urbanization Prospects 2018: Highlights* (ST/ESA/SER.A/421).
- USDA ERS (n.d.).- *Rural-urban continuum codes*. Rural-Urban Continuum Codes. Retrieved March 30, 2022, from <https://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx#.U0VBhleG-Hs>
- Wirth, L. (1938). Urbanism as a Way of Life. *American journal of sociology*, 44(1), 1-24.
- Worcester Polytechnic institute, Cape Town Project Center. (n.d.). Retrieved March 30, 2022, from <https://wp.wpi.edu/capetown/projects/p2014/wash-up-business/background-research/informal-settlements-in-south-africa/>