Self-settlement in future Indian cities

Thomas Spindelberger

TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

MASTERARBEIT

Self-settlement in future Indian cities

A proactive incremental housing strategy complementing current formal planning practice

ausgeführt zum Zwecke der Erlangung des akademischen Grades eines Diplom-Ingenieurs

unter der Leitung von

Ass.Prof. Arch. Dipl.-Ing. Dr.techn. Markus Tomaselli
Univ.Lektor Dipl.-Ing. Michael Rieper

E260 Institut für Städtebau, Landschaftsarchitektur und Entwerfen
E260/S - Fachbereich Städtebau

eingereicht an der Technischen Universität Wien
Fakultät für Architektur und Raumplanung

von

Thomas Spindelberger
0625935
Neubaugasse 6/1/7
1070 Wien

..... Wien, am, 08.01.2016

IMPRINT

Author:
Thomas Spindelberger

Supervision:
Michael Rieper
Markus Tomaselli

Consultation:
Maria Megina (urban planning)
Daniel Wadl (graphic design)
Ian Banerjee (literature)

Lectorate:
Matthew Tam
Sophia von Salisch

Support (graphic elaboration):
Sophia von Salisch
Daniel Wadl

Print:
Thomas Spindelberger (at MVD)

Binding:
Helmut Fritz

Typeface:
Helvetica Neue LT Com, 55 Roman
OCR A Extended, Regular

Paper:
Recycling CyclusOffset 140g/m²

Neubaugasse 6/1/7, 1060 Wien

ABSTRACT

English

We are in the year 2015. India has 1.28 billion inhabitants and is currently in a critical phase of change; the economic liberalization and the adjunctive transformation from an agrarian society into an industrial and service nation leads to a distinctive rural exodus.[1] To make things worse, a total population growth of approximately 400 million is expected by 2050. Until then, the urban population will have doubled and the demand for urban living space will be enormous.[2, 3] To tackle this situation, the Indian government is planning for example the construction of 24 cities in the area between Delhi and Mumbai. However, even if there was enough living space for all the people who will move to future Indian cities, it would not be affordable for the lowest 25% of the population, who are considered “extremely poor” by the World Bank and have to get along with only 1.25$ per day.[4] This population stratum consists largely of farmers, who cannot survive with their income anymore and are forced to migrate to the cities in search for jobs. History has shown us, that the inevitable result of this will be the formation of urban informal settlements with all their problems and consequences. Therefore, a proactive urban strategy shall be developed, in order to create affordable living space for those, for whom the market will not provide any housing. Inspired by the principle of self-settlement, framework conditions shall be introduced for future new towns, in which specifically semi-informal living space can emerge and grow up to a liveable and valuable urban quarter in a regulated and guided manner.

Deutsch

Wir schreiben das Jahr 2015. Indien hat 1.28 Milliarden Einwohner und befindet sich momentan in einer kritischen Umstellungsphase; die wirtschaftliche Liberalisierung und die damit einhergehende Umwandlung von einer Landwirtschafts- in eine Industrie- bzw. Dienstleistungsgesellschaft führt zu einer stark ausgeprägten Landflucht.[1] Hinzu kommt ein immenser Bevölkerungszuwachs von ungefähr 400 Millionen Einwohnern bis zum Jahr 2050. Die urbane Bevölkerung wird sich bis dahin verdoppelt haben und der Bedarf an urbanem Wohnraum wird enorm sein.[2, 3] Als Reaktion darauf, lässt die Indische Regierung beispielsweise zur Zeit 24 Städte entlang der Achse zwischen Delhi und Mumbai entstehen. Doch selbst wenn es genug Wohnungen für all die Menschen, die in naher Zukunft in Indiens Städte ziehen werden, geben würde, wären diese für die unterste Bevölkerungsschicht niemals leistbar: 25% der Bevölkerung müssen mit 1.25$ pro Tag auskommen und gelten somit laut Weltbank als “extrem arm”.[4] Diese Bevölkerungsschicht besteht zu einem großen Teil aus Bauern die auf dem Land kein Auslangen mehr finden und deshalb gezwungen sind, auf der Suche nach Arbeit, in die Städte zu ziehen. Die Geschichte hat uns gelehrt dass dies unweigerlich die Entstehung von informellen Siedlungen, mit all ihren Problemen, zur Folge haben wird. Deshalb soll eine proaktive urbane Strategie entwickelt werden, die leistbaren Wohnraum für diejenigen schafft, für die der Markt keine Wohnmöglichkeiten bieten wird. Inspiriert vom Prinzip des Selbstbaus sollen in zukünftigen Reißbrettstädten Rahmenbedingungen geschaffen werden, in denen gezielt semi-informeller Wohnraum entstehen und kontrolliert zu einem lebenswerten und qualitativ hochwertigen Stadtquartier heranwachsen kann.

1 cf. http://www.indiastat.com/default.aspx (05.12.2015)
2 cf. http://esa.un.org/unpd/wpp/Graphs/ (05.12.2015)
3 cf. http://esa.un.org/unpd/wup/highlights/wup2014-highlights.pdf (05.12.2015)
4 cf. “Dollar a Day Revisited” Report, Ravallion, Chen & Sangraula, The World Bank - Washington DC, 2008

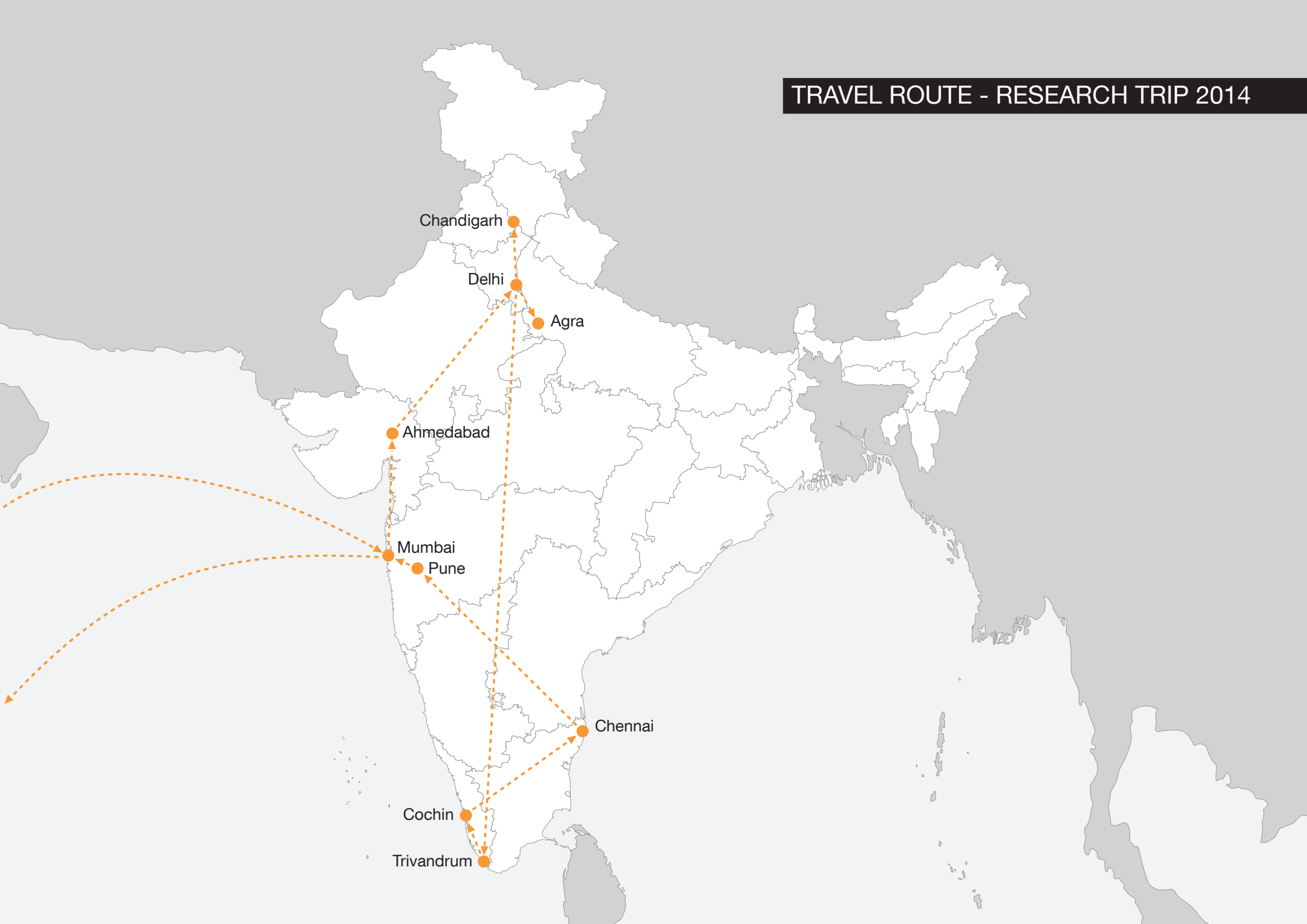
INDEX

FOREWORD

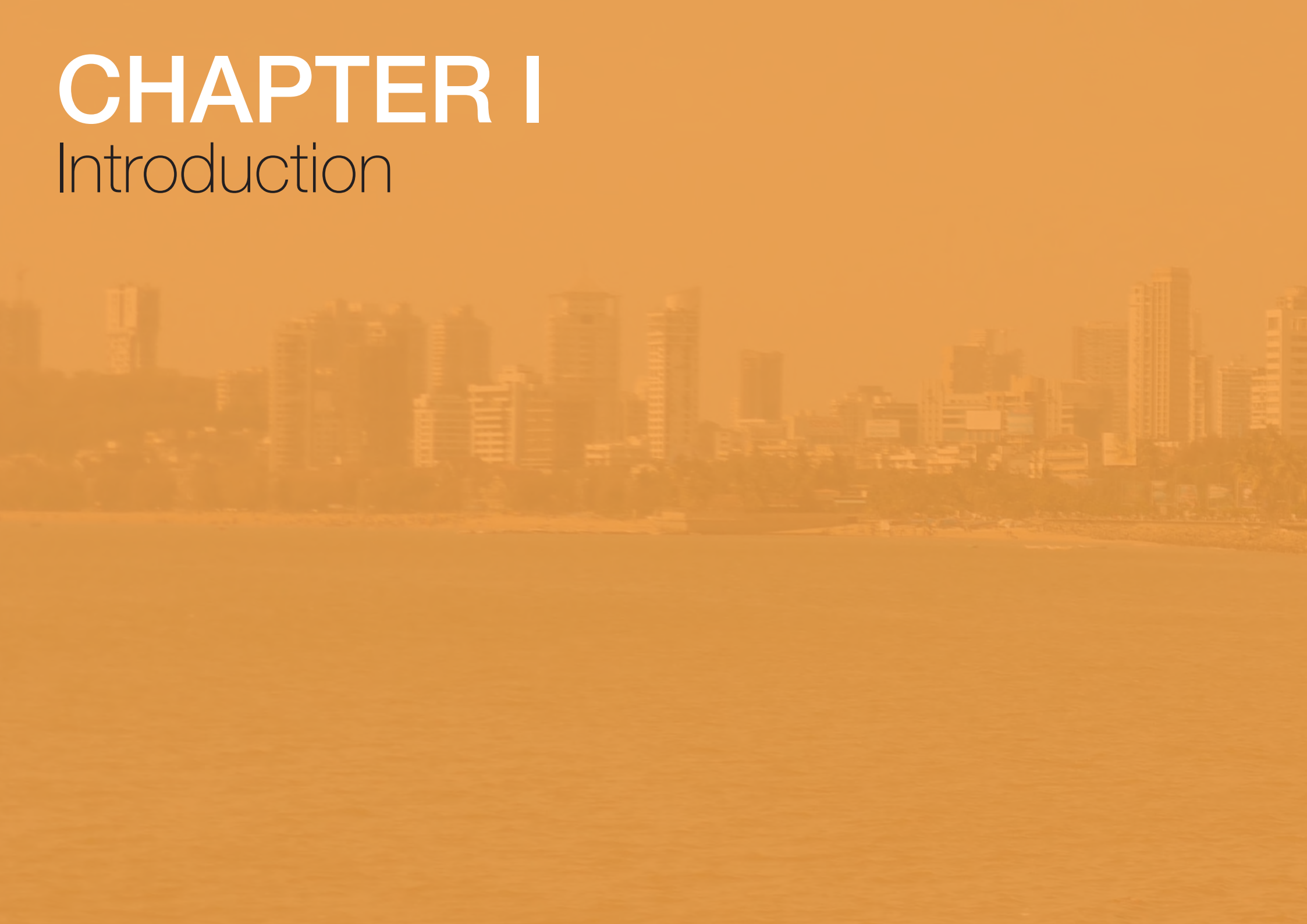
The idea for this paper evolved bit by bit during my research trip to India in February and March 2014. (All photos shown in this work, if no other source is mentioned, were taken during this trip.) My goal was to learn as much as possible about Indian cities in general and get firsthand information about recent tendencies in urban strategies. I wanted to find out how people in power want to manage the 400,000,000 additional people who will come to inhabit India's cities in the near future. How would this change our image of the typical Indian city? And how will these Indian cities be organized? Will it be just the simple reproduction of the typical western New Town? Or could something more original, more individual and independent evolve, not just in means of sole formalism, but much more in respect of its idiosyncrasy, embracing its very own culture, society and situation to create something more unique; more convenient, considering tradition and the needs of the poor? Will India go through the usual transformation process; from an agricultural economy over industrialization to finally become a service economy? Or will it even be able to take advantage of its situation, learn from the mistakes other countries have already made decades or centuries ago and maybe even skip some stages of this transformation process and avoid some negative side effects that we all know occurred during historic periods of great societal and economical change e.g. the great industrial revolution which started in the second half of the 18th century in England?

However, my initial interest for this topic was aroused by a report of Brigitte Voykowitsch about Indian Mega Cities, in which she described the phenomenon of slums sprouting around emerging Hi-Tech-Parks and Cyber Cities, which is (not only but) primary a result of migration combined with a lack of living space. On my following trip I visited the renowned Architecture Schools of Sir JJ College in Mumbai, the Chandigarh School of Architecture and the Centre for Environmental Planning and Technology (CEPT University) in Ahmedabad and had the opportunity to talk to several professional urbanists familiar with the contemporary discourse and developments in India's urban environments, as well as representatives of NGOs operating in the fields of urban informality in India. The fundamentals of my theory can be traced back to three key moments experienced during my journey; three meetings with three different Institutions: At first, the meeting with members of the NGO *URBZ* in Mumbai, who explained how the site and service principle is being applied to improve life quality in Shivaji Nagar, a small annex of the much better known informal settlement of Dharavi. Secondly, the meeting with the NGO *CURE* and Sarah Habersack in Delhi, who described the systematics of slum upgrading. And finally the meeting with Amitabh Kant, the former president of the *DMIC* corporation, who is in charge of the master plans for 24 new cities between Mumbai and Delhi.

Having seen the slums of Mumbai and Delhi, and the street vendors of Ahmedabad and Pune, I realized that the informal, the unplanned, was in fact an inextricable part of the present Indian city. So when I saw the tidy top-down masterplans of the DMIC, one big question was more and more obtruding: How can these cities be strictly formal, as shown in the masterplans and the visualizations, while in fact there is no bigger city without a certain amount of informality in it? Will there be no poverty anymore and everyone will be able to afford formal urban living space? Or are these New Towns exclusive cities, built only for those who can afford to live there? How can the people in charge be sure that these cities do not have the same fate as Rourkela and dozens of other New Towns in the Indian history, which turned partly into slums? After some research, I saw that in fact such a scenario was not far-fetched. So I decided to adapt these master plans; to develop a proposal, in which a certain degree of planned informality is introduced, to absorb the arriving current of migrants in the context of urbanization and population growth.


TRAVEL ROUTE - RESEARCH TRIP 2014
Chandigarh
Delhi
Agra
Ahmedabad
Mumbai
Pune
Chennai
Cochin
Trivandrum

CHAPTER I
Introduction




Panasonic

INDIA TODAY
FACTS & FIGURES

Trends and Drivers

This Chapter gives you a brief overview about recent developments in India and tries to portray the current state of affairs regarding poverty in a nutshell. 2015 is an excellent year to do a review about current developments as well as to serve as starting point for projections, as it's the terminal year for several large scale programs such as the UN Millennium Development Goals - Program, providing the most recent data. The most significant trends we can identify are:

Increasing economic disparity
The urban areas, where India's middle and upper classes make their living, have seen the greatest degree of economic growth, while the rural areas have lagged further behind. Since 1991, India has undergone a great deal of liberalisation internally and externally, but its benefits have mostly gone to the upper and middle classes.

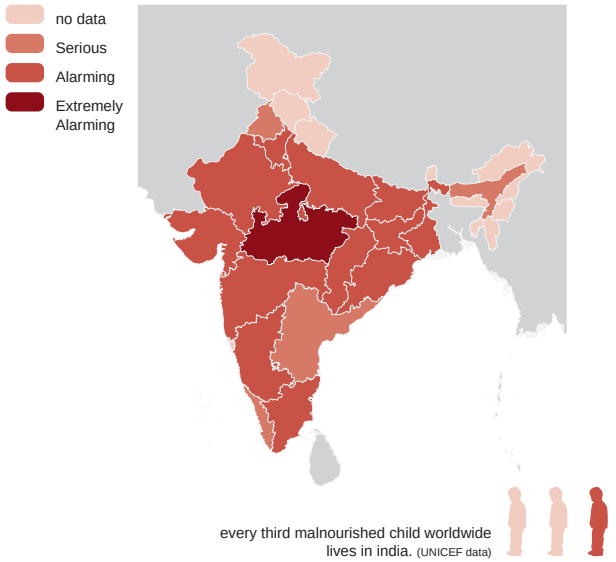
Decreasing poverty (in % of the population)
In its very ambitious Poverty Development Goals Agenda that was established following the UN Millennium Summit in 2000, the UN expected India's poverty rate to drop from 51% in 1990 to about 22% in 2015. And it turned into reality. According to the MDG India Country Report of 2015, the eradication of extreme poverty is actually on track, although the effects of the worldwide recession in 2009 have slowed down the developing process. Nevertheless it must be stated that these numbers have to be seen critically, as there are many different opinions and heavy disputes about where to actually set the poverty line. Poverty-numbers published by various institutions are regularly challenged by the Indian population as well as the Indian government.

Growing middle class
Despite all the causes, India currently adds 40 million people to its middle class every year. Analysts such as Marvin J. Cetron, write that an estimated 300 million Indians now belong to the middle class; of which one-third have emerged from poverty in the last ten years.

Increasing hunger
The 2011 Global Hunger Index (GHI) Report places India amongst the three countries where the GHI between 1996 and 2011 went up from 22.9 to 23.7, while 78 out of the 81 developing countries studied, including Pakistan, Nepal, Bangladesh, Kenya, Nigeria, Myanmar, Uganda and Malawi succeeded in improving hunger conditions.[1]

Current Condition

India State Hunger Index
The India State Hunger Index (ISHI) is a tool to calculate hunger and malnutrition at the regional level in India. It is constructed in the same fashion as the Global Hunger Index which combines three equally-weighted indicators: undernourishment of the population, underweight children under the age of five and the mortality rate of children under the age of five. It was calculated for 17 states in India, covering more than 95 percent of the population. Despite the good economic performance, with over 200 million people who are food insecure, India is home to the largest number of hungry people in the world. In the ranking of the Global Hunger Index 2008 it is positioned at 66 out of 88 ranked countries and has an "alarming" food security situation. The major problem in the country is the high prevalence of underweight children under five, which is a result of low nutrition and educational status of women.



State Hunger Index in India
(The ISHI: Comparisons Of Hunger Across States, Report 2008)

ISHI Key findings:

- ISHI 2008 scores for Indian states range from 13.6 ("serious") for Punjab to 30.9 ("extremely alarming")

for Madhya Pradesh. In Madhya Pradesh more people suffer from hunger than in Ethiopia or Sudan. 60 percent of the children are undernourished.

- All 17 states have ISHI scores quite far away from “low” and “moderate” hunger categories. Twelve of the 17 states fall into the “alarming”, one into the “extremely alarming” category.

- ISHI scores are closely aligned with poverty, but there is little association with state level economic growth. High levels of hunger are seen in states that are performing well from an economic point of view.

- Inclusive economic growth and targeted strategies to ensure food sufficiency, reduce child mortality and improve child nutrition are urgent priorities for all states in India.[2]

Latest UNICEF data shows, that one of three malnourished children worldwide is found in India, while 42% of the nation’s children, under the age of five, are underweight. It also shows that a total of 58% of children under five, surveyed, were stunted. The main cause for this malnourishment is dietary practices, and not economic poverty. Rohini Mukherjee, of the Naadi foundation compares the situation to sub-Saharan countries: “It is very clear that in Africa malnutrition is a result of absolute poverty. They are starving... In our case, to me it seems it is about eating and feeding practices... Most children we measured have never been hungry, but what the child is eating is almost all carbohydrate.” Furthermore, malnutrition is often associated with diseases like diarrhea, malaria and measles, due to the lack of access in health care, which are also linked to the problem of poverty.

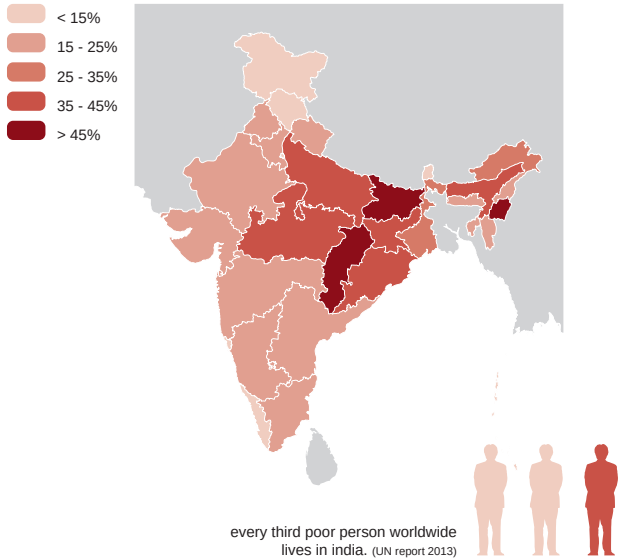
“IN 2010 32.7% OF ALL PEOPLE IN INDIA FELL BELOW THE INTERNATIONAL POVERTY LINE OF US$ 1.25 PER DAY.”

Poverty lines

With the nation estimated to have a third of the world’s poor (2013 UN report), poverty is still a pressing issue in India. In 2010, the World Bank reported that 32.7% of all people in India fell below the international poverty line of US$ 1.25 per day (68.7%< $2, 81.1%<2.50$, 96.9%<5$).[3] But within the last years there seems to have been some massive improvement, so that today in 2015 the share of extremely poor is expected to decline to about 20.74%. (Official target set by the government of India: 23.90) (Comment: Again, this is just one single isolated aspect, namely the share of population with consumtion expenditures under a certain benchmark which does therefore not reflect the general living situation of the people in a region as a whole!)

This improvement is partly the result of the currently strong Indian economy, which has grown continuously over the last two decades. But its growth has been uneven regarding social/economic groups and geographic regions as well as rural and urban areas. Poverty rates in rural Orissa (43%) and rural Bihar (41%) are among the world’s most extreme. While there is a general consensus that total overall poverty in India has declined in percentage, the picture is not so clear if one considers other non-pecuniary dimensions, such as health, education, crime and access to infrastructure. Therefore the real extent of poverty reduction is often debated.

With the rapid economic growth that India is experiencing, it is likely that a large fraction of the rural population will continue to migrate toward cities, making the issue of urban poverty more significant in the long run.

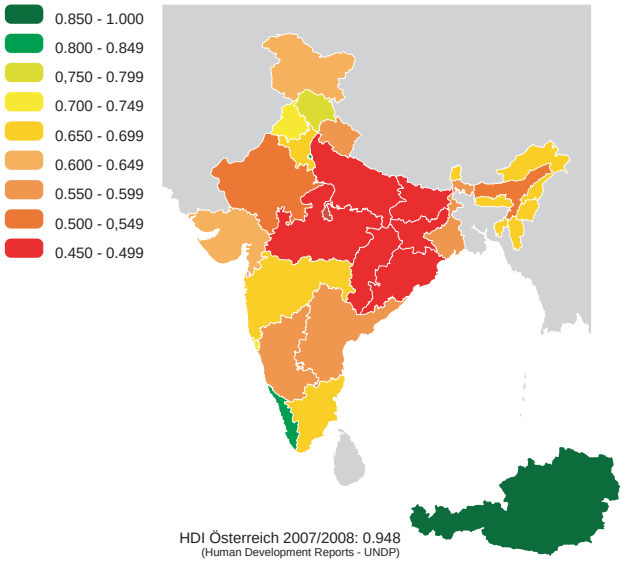


Poverty rate* in India by state
(Press Note on Poverty Estimates 2009-10, Government of India)
*Percentage of People living beyond the Tendulkar line, which is accepted by the Government of India.

1 cf. http://en.wikipedia.org/wiki/Poverty_in_India (13.10.2014)
2 cf. http://en.wikipedia.org/wiki/India_State_Hunger_Index (13.10.2014)
3 cf.”India – New Global Poverty Estimates”, World Bank

Human Development Index

The Human Development Index (HDI) is a statistic used to rank countries in terms of human development, based on life expectancy, educational level and income. In the 2013 Human Development Report by the United Nations Development Program (March 14, 2013), India was ranked 136 (medium human development) out of 186 countries (Austria e.g. was ranked 18th). There is also a ranking for the individual Indian states, based on 2007/08 data, revealing great inequality in human development within the country. HDIs reach from Kerala with 0.79 (high human development) to Chhattisgarh (low human development).[4]



Human Development Index in India
(National Human Development Report 2011, 2007/08 data)

Issues and Challenges

Child labour and Rural Exodus

Child labour is mainly found in rural areas, because the income of many farmer households is not enough to cover their basic needs. Often these Families not only have to sell their land, but also have to pawn their services to the Landlords to survive. This phenomenon is called “debt bondage” and is until today one of the greatest issues in poverty reduction. The bad living conditions in rural areas trigger a migration of people towards urban areas. This phenomenon is called “Rural Exodus”.

Unfortunately the metropolises of the country are already overloaded and unable to provide enough space and employment for the immigrants. This therefore leads directly to the next big issue:[5]

Informal Settlements and Urban Sprawl

According to a population census, in 2001, 6.5 Million people (54,1%) of Mumbai’s population lived in informal settlements. Many people, looking for work, can’t afford public transport, so their place of work has to be in striking distance to their habitation. In combination with the lack of social housing in certain areas, this results in uncontrollable urban sprawl; sometimes even if there were enough funds to intervene. Apparently many problems of India’s Metropolises originate from their informal settlements: malnutrition, hunger, lack of waste disposal and insufficient water supply causing higher child mortality and outbreaks of diseases. Social consequences such as alcoholism and crime in general are often a result of such living conditions.[6]

Population growth

Another major challenge is the high population growth rate, although demographers generally agree that this is a symptom rather than a cause of poverty. While services and industry have grown at double-digit figures, agriculture growth rate has dropped from 4.8% to 2%. About 60% of the population depends on agriculture whereas the contribution of agriculture to the GDP is only about 18%. The surplus of labourers in agriculture has caused many people to be jobless. Farmers are a large vote bank and use their votes to resist reallocation of land for higher-income industrial project.

Liberalisation Impact

In 1947 the average income in India was not much different from the average income in e.g. South Korea or Taiwan, but South Korea and Taiwan became developed countries by the 2000s. At the same time, India was left as one of the world’s poorer countries. India had to somehow manage and facilitate its resources and planning in such a way that the poverty ratio could be reduced. Some say the economic reforms that followed later in the early 1990s are responsible for the collapse of rural economies and the agrarian crisis currently underway. As journalist and Rural Affairs editor for The Hindu, P. Sainath describes in his reports on the rural economy in India, the level of inequality has risen to extraordinary levels, when at the same time hunger in India has reached its highest level in decades. He also points out that rural economies across India have collapsed, due to the neo-liberal policies of the government of India since the 1990s. The human cost of the liberalisation has been very high. The huge wave of farm suicides in Indian rural population from 1997 to 2007 totalled close to 200,000, according to

4 cf. http://en.wikipedia.org/wiki/List_of_Indian_states_and_territories_by_Human_Development_Index (13.10.2014)
5 cf. http://de.wikipedia.org/wiki/Indien (14.10.2014)
6 cf. http://de.wikipedia.org/wiki/Mumbai#Wohnsituation (14.10.2014)

official statistics. Commentators have accused the policies pursued by the government which, according to Sainath, resulted in a very high portion of rural households getting into the debt cycle, resulting in a very high number of farm suicides. Those who have taken their lives were deep in debt; peasant households in debt doubled in the first decade of the neoliberal economic reforms, from 26% of farm households to 48%. Meanwhile, India kept reducing investment in agriculture (which is a standard neoliberal procedure). Financial survival was being made more and more impossible for small farmers. As professor Utsa Patnaik, India's top economist on agriculture, has pointed out, the average poor family in 2007 had about 100 kg less food per year than it had in 1997.

Existing Strategies

Eradication of poverty in India is generally only considered to be a long-term goal. Poverty alleviation is expected to make better progress within the next 50 years than in the past, as a trickle-down effect of the growing middle class. Increasing stress on education, reservation of seats in government jobs and the increasing empowerment of women and the economically weaker sections of society, are also expected to contribute to the alleviation of poverty. The growth of the middle class, which was virtually non-existent when India became a free nation in August 1947, indicates that economic prosperity is indeed very impressive in India, but the distribution of wealth, as stated before, is not equal at all. Since the 1950s, the Indian government and non-governmental organisations have initiated several programmes to alleviate poverty, including subsidising food and other necessities, increasing access to loans, improving agricultural techniques and price supports and promoting education and family planning. These measures have helped eliminate famines, cut absolute poverty levels by more than half, and reduced illiteracy and malnutrition. The presence of a massive parallel economy in the form of black (hidden) money derived from foreign aid has also contributed to the slow tempo of poverty alleviation in India. Since the early 1950s, the government has initiated, sustained, and refined various planning schemes to help the poor gaining self-sufficiency in food production. Probably the most important initiative has been the supply of basic commodities, particularly food at controlled prices, available throughout the country, as the poor spend about 80% of their income on food. Many schemes however have not been very successful because the rate of poverty reduction at that time also lagged behind the rapid population growth rate. Nevertheless there were also some rather positive examples which are worth mentioning:

Integrated Childhood Development Service
One example for a governmental programme, which was set up to alleviate poverty, is the Integrated Childhood Development Service (ICDS). The Indian government came up with the ICDS in 1975 to combat the problem of malnutrition in the country. ICDS is the world's largest child development programme, but its effects on the problem in India are limited. This is because the programme failed to focus on children under 3, the group that should receive the most help from the ICDS; most growth retardation would have developed during the age of 2 and are mostly irreversible. It has been found that micronutrient deficiencies alone may cost India US$2.5 billion annually. Malnutrition can lead to children not being able to attend school or perform to their fullest potential, which in turn leads to a decrease in labour productivity, affecting India's economic growth as a whole. Despite the poor and unequal distribution of help within the country, the ICDS is still considered to be efficient in improving the health of the children. Statistics from UNICEF shows that the mortality rate of children under 5 has improved from 118 per 1000 live births in 1990 to 66 in the year 2009.[7]

Micro credits (e.g. Grameen-Bank)
The Grameen-bank, in English "Village bank", was founded in the year 1983 by the Bangladesh born economist Mohammad Yunus, against the establishment, to help the poor. The principle is easy: Those in need get financial support in form of micro credits. These tiny loans of only a few dollars are paid back in weekly rates and serve as seed capital for a small business like a chicken farm or carpentry. The payback rate is nearly 100%. Those who have already paid back a credit successfully, have the opportunity to get a building loan of up to 215 Dollar for the construction of a Grameen house. The Grameen house is a hundred thousand times proven, cheap and watertight building, carefully developed by the Grameen bank. The 20m²-house was designed to replace instable huts, which usually provide poor protection against the Monsoon and have high maintenance costs. The House is based on a standardized construction made of wood and concrete, protected by a corrugated metal roof, and is equipped with a simple latrine. Its simplicity is also its biggest strength. While there is no particular tech-

7 cf. http://en.wikipedia.org/wiki/Poverty_in_India (13.10.2014)

nical knowledge required for the mounting, it leaves a lot of space for the creativity of the inhabitants. Room layout, wall materials, window alignment etc. are chosen by the inhabitants. One distinctive feature of these building loans is that they are usually exclusively given to women, as they are more reliable. In 2006 Muhammad Yunus was awarded the Nobel Peace Prize.[8]

Micro credit crowd funding

A recent development is the emergence of micro credit crowd funding platforms. United Prosperity for example, is a non-profit web-based micro-credit organisation. Unlike most microcredit or person-to-person lending organisations, United Prosperity does not directly lend to the micro-entrepreneur, but instead the micro-loans are used to provide a guarantee to a local bank, which lends to the micro-entrepreneur. Typically the local bank will lend about twice the amount provided by the micro-lender's guarantee. This is the trick how they can provide greater leverage than traditional micro-credits. Another benefit of this approach is that the micro-entrepreneur develops a relationship and, most importantly, a credit history with their local bank, enabling the micro-entrepreneur to become independent of the micro-lenders in the long term.[9]

Poverty Development Goals

In the "Millennium Development Goals India Country Report" of 2005 the Government of India explained its intention and efforts to attain the eight UN Millennium Development Goals mentioned before. For each goal they developed a strategy with special programmes, commitments or regulations tackling the specific problem. Today in 2015, we can look back and evaluate whether those measures were fruitful or not; which of the eight targets were met and which have been missed. Below the eight goals are listed and coloured according to their state of implementation:

Goal 1: Eradicating extreme poverty and hunger (-50% by 2015)

Goal 2: Achieving universal primary education (ensure prim. edu. for every boy and girl by 2015)

Goal 3: Promoting gender equality and empower women (eliminate gender disparity in edu. by 2015)

Goal 4: Reducing child mortality (-66% by 2015)

Goal 5: Improving maternal health (maternal mortality -75% by 2015)

Goal 6: Combating HIV/AIDS, malaria and other diseases (halted by 2015 and reverse the spread)

Goal 7: Ensuring environmental sustainability (several targets, focus on drinking water/sanitation)

Goal 8: Developing a global partnership for development (trading, debt and poverty reduction) [10]

on track, moderately on track, off track

Summing up we can say, that at least on paper, there have been massive improvements on several fronts in the pursuit of eradication of poverty and on the way to a developed country. But there are still some severe problems which haven't been solved yet; still about 44,000 women are dying pregnancy related deaths every year and still every third child under the age of three years is underweight. Furthermore there are still 65.494.604* urban informal settlers that are living in areas officially notified as slums. And here for example we can see perfectly how delusive statistics can be, especially in times of major population growth: Now we know that extreme poverty has been cut by half since 1990, which seems quite impressive, right? A major achievement, no doubt! But now let's have a look at another statistic: Although extreme poverty was cut by half, the number of slum households increased by 37% within only one decade (2001-2011). Or in other words (if you want a more positive statement): The percentage of all slum households in relation to all urban households in India has declined by 1%; which is also true. I hope this demonstrates, that, after a closer look, most of the recently published positive poverty trends are primarily positive on the paper and have no appreciable positive impact on the life of the people. Having some rupees more or less in one's pocket seems not to make the difference. Money to make a living is not the one and only aspect relevant for a good life and empowerment...

"INDIA IS MODERATELY ON TRACK TO MEET MOST OF ITS 2015 MILLENNIUM DEVELOPMENT GOALS."

* newest data available: 2011

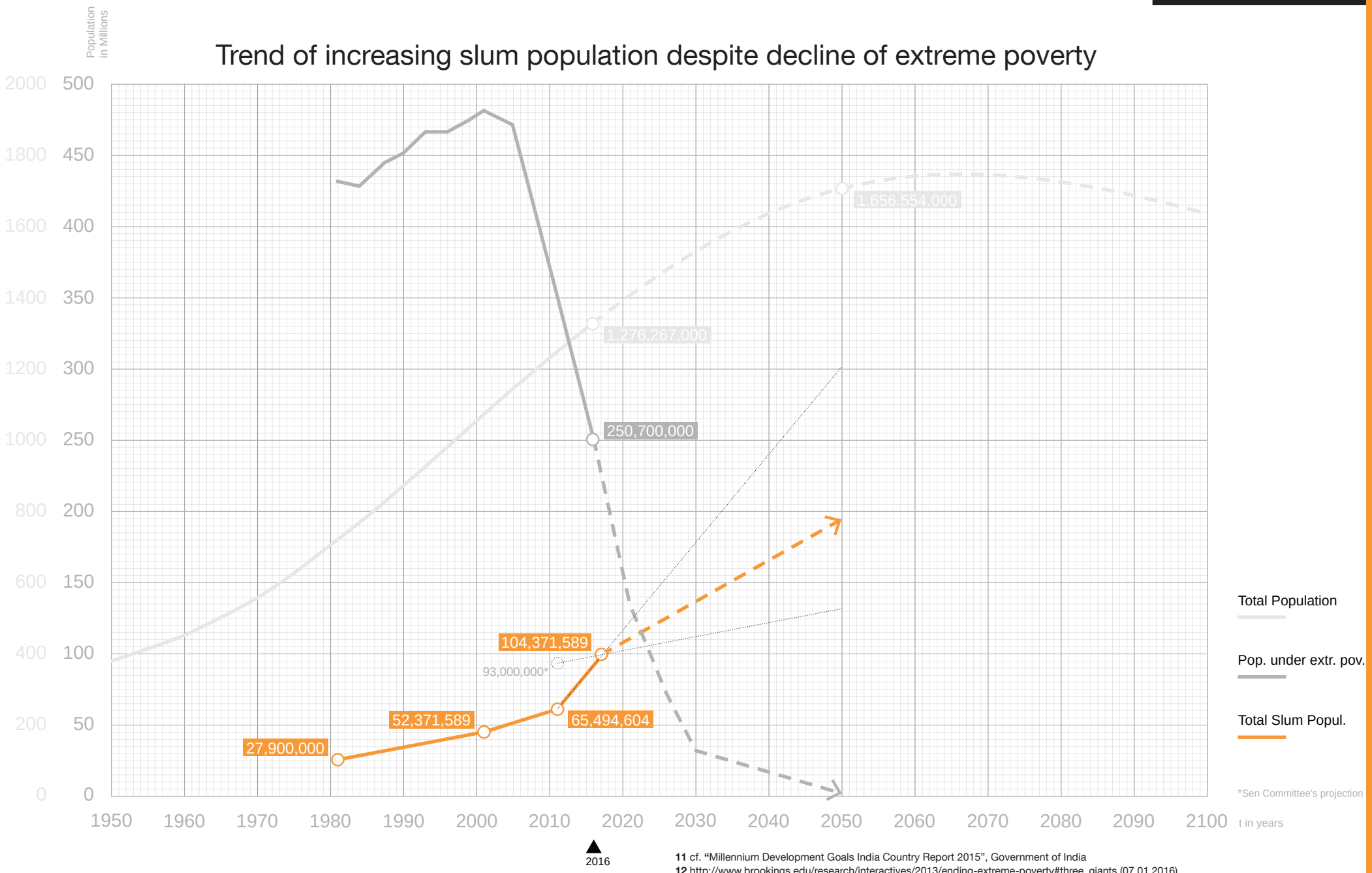
8 cf. archithese "Armut - Poverty", 2007

9 cf. http://en.wikipedia.org/wiki/United_Prosperity_(organisation) (07.01.2016)

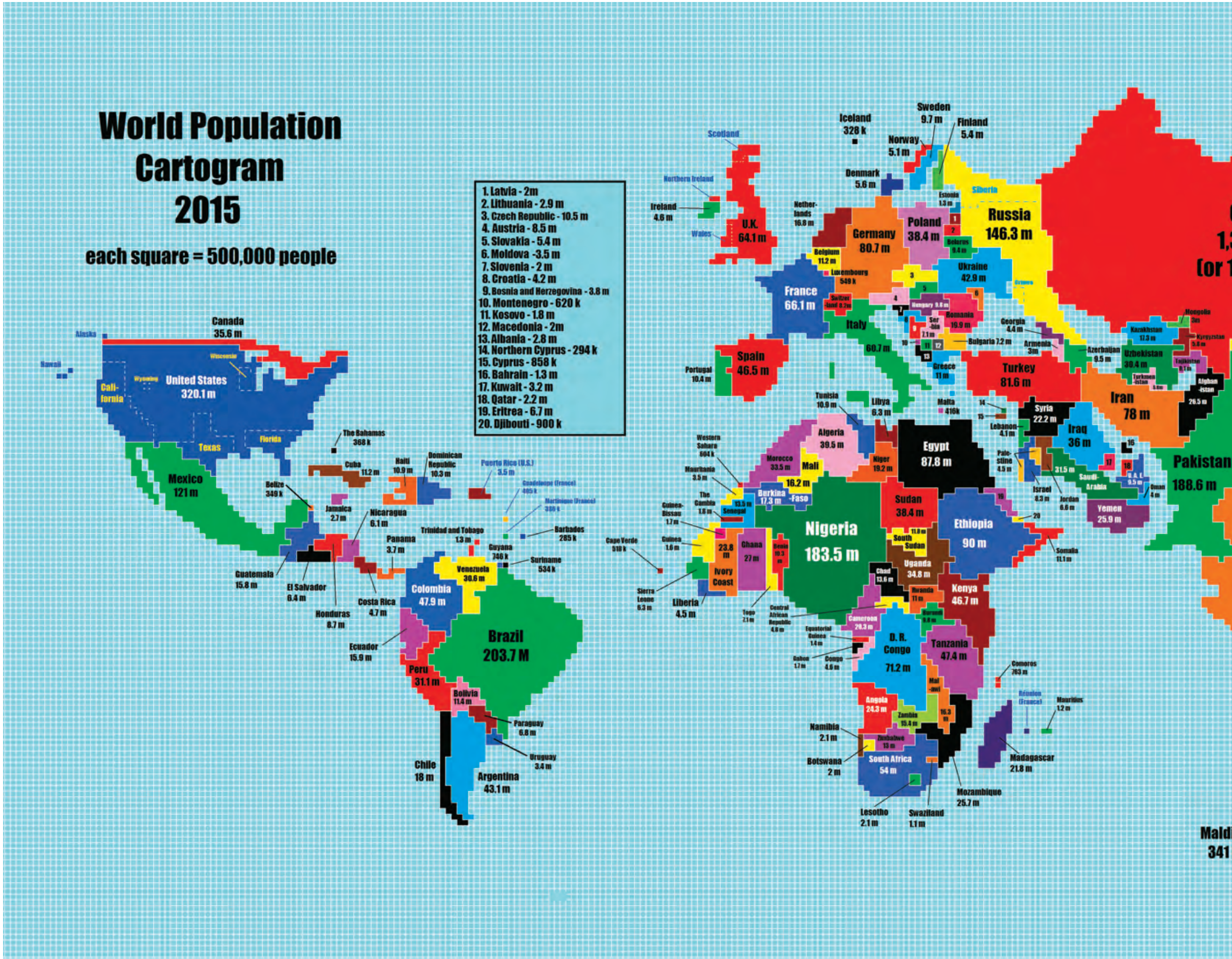
10 cf. "Millennium Development Goals India Country Report 2015", Government of India, 2015

KEY FIGURE

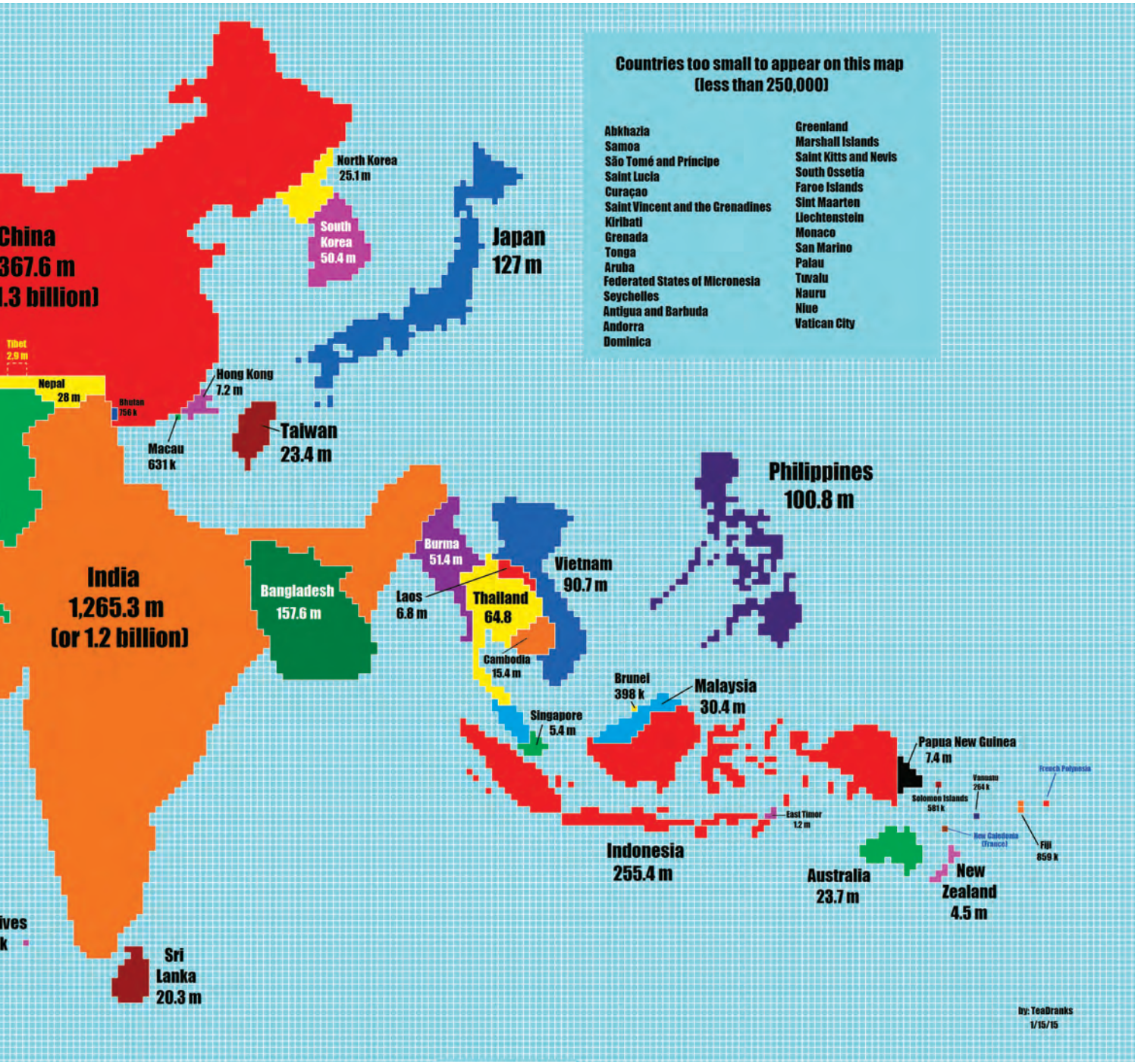
Trend of increasing slum population despite decline of extreme poverty



11 cf. "Millennium Development Goals India Country Report 2015", Government of India
12 http://www.brookings.edu/research/interactives/2013/ending-extreme-poverty#three_giants (07.01.2016)
13 "World Urbanization Prospects: The 2011 Revision", United Nations, New York
14 http://timesofindia.indiatimes.com/india/By-2017-Indias-slum-population-will-rise-to-104-million/articleshow/21927474.cms?referral=PM (07.01.2016)



World Population
Cartogram
2015
each square = 500,000 people
1. Latvia - 2m
2. Lithuania - 2.9 m
3. Czech Republic - 10.5 m
4. Austria - 8.5 m
5. Slovakia - 5.4 m
6. Moldova -3.5 m
7. Slovenia - 2 m
8. Croatia - 4.2 m
9. Bosnia and Herzegovina - 3.8 m
10. Montenegro - 620 k
11. Kosovo - 1.8 m
12. Macedonia - 2m
13. Albania - 2.8 m
14. Northern Cyprus - 294 k
15. Cyprus - 858 k
16. Bahrain - 1.3 m
17. Kuwait - 3.2 m
18. Qatar - 2.2 m
19. Eritrea - 6.7 m
20. Djibouti - 900 k
Canada
35.6 m
Alaska
Hawaii
California
Wyoming
United States
320.1 m
Wisconsin
Texas
Florida
Mexico
121 m
The Bahamas
368 k
Cuba
11.2 m
Haiti
10.9 m
Dominican Republic
10.3 m
Puerto Rico (U.S.)
3.5 m
Belize
340 k
Jamaica
2.7 m
Nicaragua
6.1 m
Panama
3.7 m
Trinidad and Tobago
1.3 m
Barbados
285 k
Guyana
746 k
Suriname
534 k
Guatemala
15.8 m
El Salvador
6.4 m
Honduras
8.7 m
Costa Rica
4.7 m
Venezuela
30.6 m
Colombia
47.9 m
Ecuador
15.9 m
Brazil
203.7 M
Peru
31.1 m
Bolivia
11.4 m
Paraguay
6.8 m
Uruguay
3.4 m
Chile
18 m
Argentina
43.1 m
Iceland
328 k
Sweden
9.7 m
Finland
5.4 m
Norway
5.1 m
Scotland
Northern Ireland
Ireland
4.6 m
Wales
U.K.
64.1 m
Denmark
5.6 m
Netherlands
16.8 m
Estonia
1.3 m
Siberia
Russia
146.3 m
Poland
38.4 m
Germany
80.7 m
Belarus
9.4 m
Belgium
11.2 m
Luxembourg
549 k
Ukraine
42.9 m
Crimea
France
66.1 m
Switzerland 8.2 m
Hungary 9.8 m
Romania
19.9 m
Serbia
7.1 m
Italy
60.7 m
Georgia
4.4 m
Bulgaria 7.2 m
Armenia
3m
Azerbaijan
9.5 m
Greece
11 m
Spain
46.5 m
Portugal
10.4 m
Turkey
81.6 m
Mongolia
3m
Kazakhstan
17.3 m
Kyrgyzstan
5.8 m
Uzbekistan
30.4 m
Tajikistan
8.1 m
Turkmenistan
5.5 m
Afghanistan
26.5 m
Iran
78 m
Tunisia
10.9 m
Libya
6.3 m
Malta
416k
Syria
22.2 m
Lebanon
4.1 m
Iraq
36 m
Algeria
39.5 m
Egypt
87.8 m
Palestine
4.5 m
Israel
8.3 m
Jordan
6.6 m
31.5 m
Saudi-Arabia
U.A.E.
9.5 m
Oman
4 m
Pakistan
188.6 m
Western Sahara
604 k
Morocco
33.5 m
Mali
16.2 m
Niger
19.2 m
Mauritania
3.5 m
Burkina-Faso
17.3 m
The Gambia
1.8 m
13.5 m
Senegal
Guinea-Bissau
1.7 m
Cape Verde
518 k
Guinea
Nigeria
183.5 m
Sudan
38.4 m
Yemen
25.9 m
Ethiopia
90 m
South Sudan
11.8 m
Somalia
11.1 m
Ghana
27 m
23.8 m
Ivory Coast
Benin
10.3 m
Sierra Leone
6.3 m
Liberia
4.5 m
Togo
7.1 m
Central African Republic
4.8 m
Chad
13.6 m
Uganda
34.8 m
Rwanda
11 m
Kenya
46.7 m
Cameroon
23.3 m
Burundi
Equatorial Guinea
1.4 m
Gabon
1.7 m
Congo
4.6 m
D. R. Congo
71.2 m
Tanzania
47.4 m
Comoros
783 k
Réunion (France)
Mauritius
1.2 m
Malawi
Angola
24.3 m
Zambia
15.4 m
16.3 m
Namibia
2.1 m
Zimbabwe
13 m
Botswana
2 m
South Africa
54 m
Madagascar
21.8 m
Mozambique
25.7 m
Lesotho
2.1 m
Swaziland
1.1 m
Maldi
341



"THE REASON WHY INDIA IS SO IMPORTANT."

1 http://i.imgur.com/1plsHRL.png (07.01.2016)

INDIA 2050. PROJECTIONS

Nevertheless, statistics can give us a rough idea for which direction a country is heading, as long as they are compared with each other. One chart alone is usually far too specific to show in which direction an entire society is developing; how their quality of life is in reality, or even how it will be in the future. But what other choice do we have? We have to deal with the jungle of partly contradicting statistics, in order to develop strategies to react to emerging future challenges. We have to ponder and conclude carefully.

So what's next? Despite strong economic growth and a large number of people being pulled out of extreme poverty on the paper, there is obviously still a major issue regarding the provision of appropriate living space for the urban poor. In fact the problem, despite all trickle down effects of the positive developments mentioned above, will become even worse! India's slum population is expected to increase to a total of 104 million by 2017.[1]

The Times Of India reported in Aug. 20th 2013:

"There are indications that as urbanization grows, and the projected share of urban households rises in the next two decades from the current 28% to 50% of India's population, the slums are only likely to grow exponentially."

From this point of view, the Indian strategy to achieve prosperity for all by massive investments into economy, constantly perpetuating economic growth, and hoping that the generated financial means will reach the people, seems quite cynical, as we saw that the real impact of massive economic upswing doesn't have a significant effect on peoples' housing and therefore living condition.

Many cities will have to be built to house the mass of people migrating to the urban areas. And this leads us over to the key failure in the conception of those future urban developments, which is looming already: These cities are designed for a putative future society; for an ideal society, which has left poverty behind and lives an orderly life in the formal city; a society which will most likely never exist. These cities are conceived for the best-case scenario. But as we already can assume, the line of arguments used by politics is fundamentally wrong. In this case, the built environment does not respond to the general economic upswing. Quite contrary, the urban landscape even seems to act rather antithetic.

The issue of housing the urban poor is not only an economic symptom. It is a highly complex subject influenced by many aspects, such as urbanization and globalization trends, economic liberalization, governmental policies, sociology and nonetheless architectural and urban planning concepts.

All in all, considering recent trends, we can conclude, that it is, despite the intention of the Indian government and all its efforts to go against it, very likely, that the currently projected urban environment of the future Indian city will not be "slum free" (a buzzword frequently used by the Indian government and the media). This perception shall be the starting point for an urban strategy proposal dealing with the emergence of informal settlements in future (smart) cities in India in a pre-emptive manner.

On the following pages, you can find diagrams, visualizing various relevant projections. These diagrams are supposed to give you a rough picture of what India will be like in the year 2050.

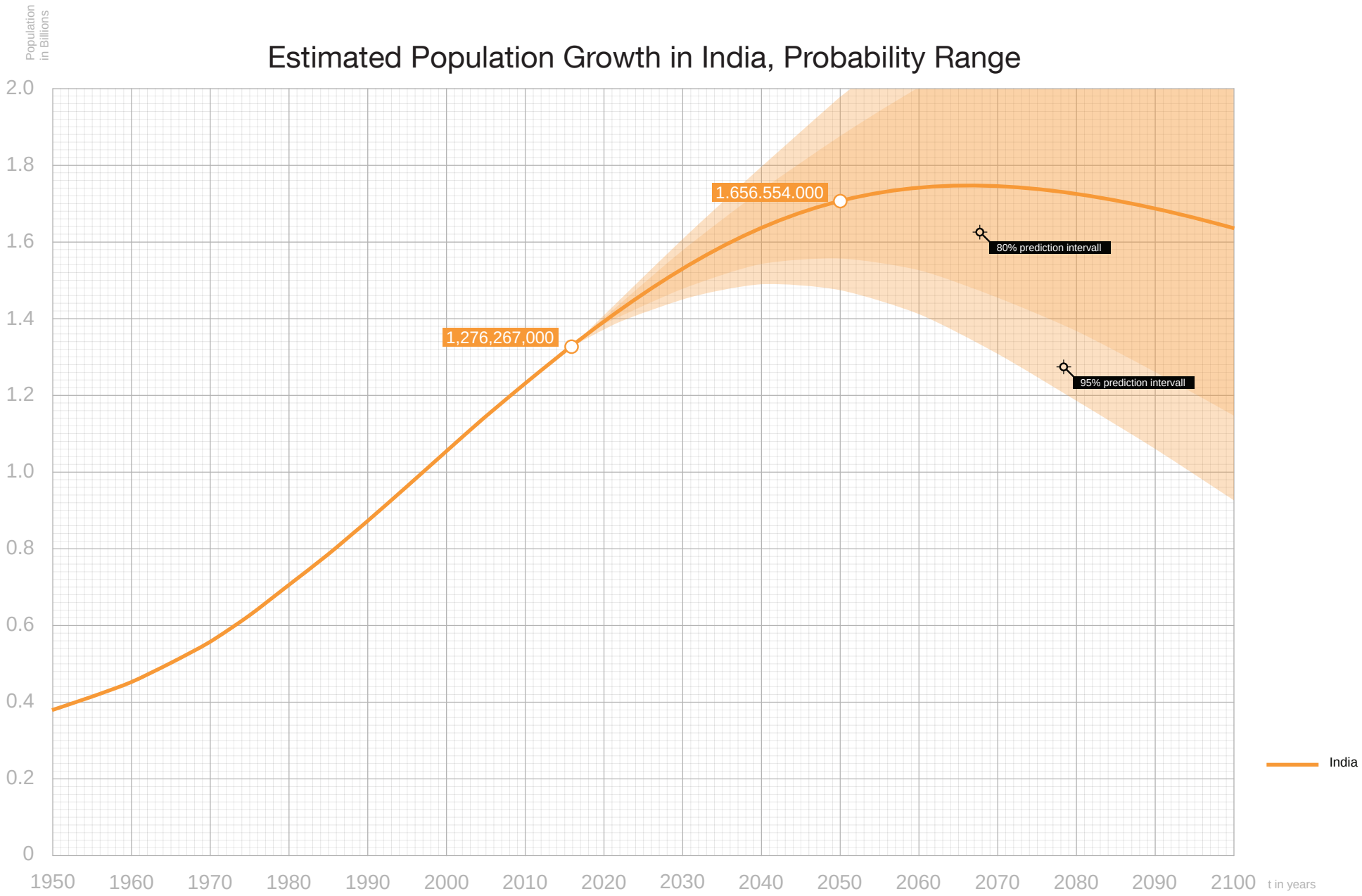
"INDIA'S SLUM POPULATION IS EXPECTED TO INCREASE TO A TOTAL OF 104 MILLION BY 2017."[1]

1 cf. http://timesofindia.indiatimes.com/india/By-2017-Indias-slum-population-will-rise-to-104-million/articleshow/21927474.cms?referral=PM2 (07.01.2016)

Reality. Children playing at the main square of an informal settlement near Delhi, India, 02.2014

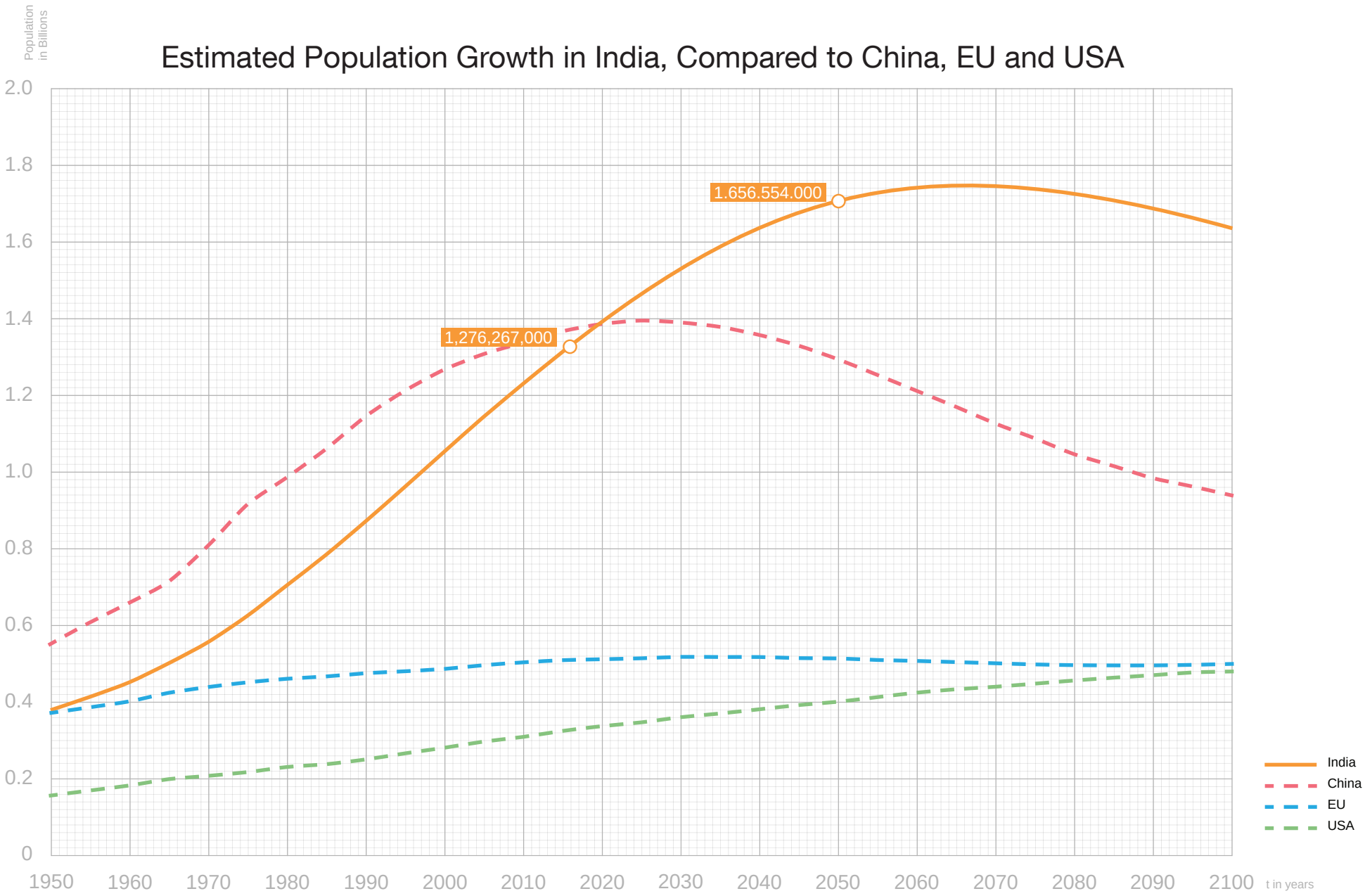
“UNTIL THE YEAR 2050 THE INDIAN POPULATION WILL GROW MOST LIKELY BY ABOUT 30%, FROM 1.28 TO 1.66 BILLION.” [2]

2 http://www.reuters.com/article/2015/07/29/us-global-population-idUSKCN0Q325K20150729 (07.01.2016)
3 http://esa.un.org/unpd/wpp/Graphs/ (07.01.2016)


Estimated Population Growth in India, Probability Range
Population in Billions
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
t in years
1,276,267,000
1.656.554.000
80% prediction intervall
95% prediction intervall
India

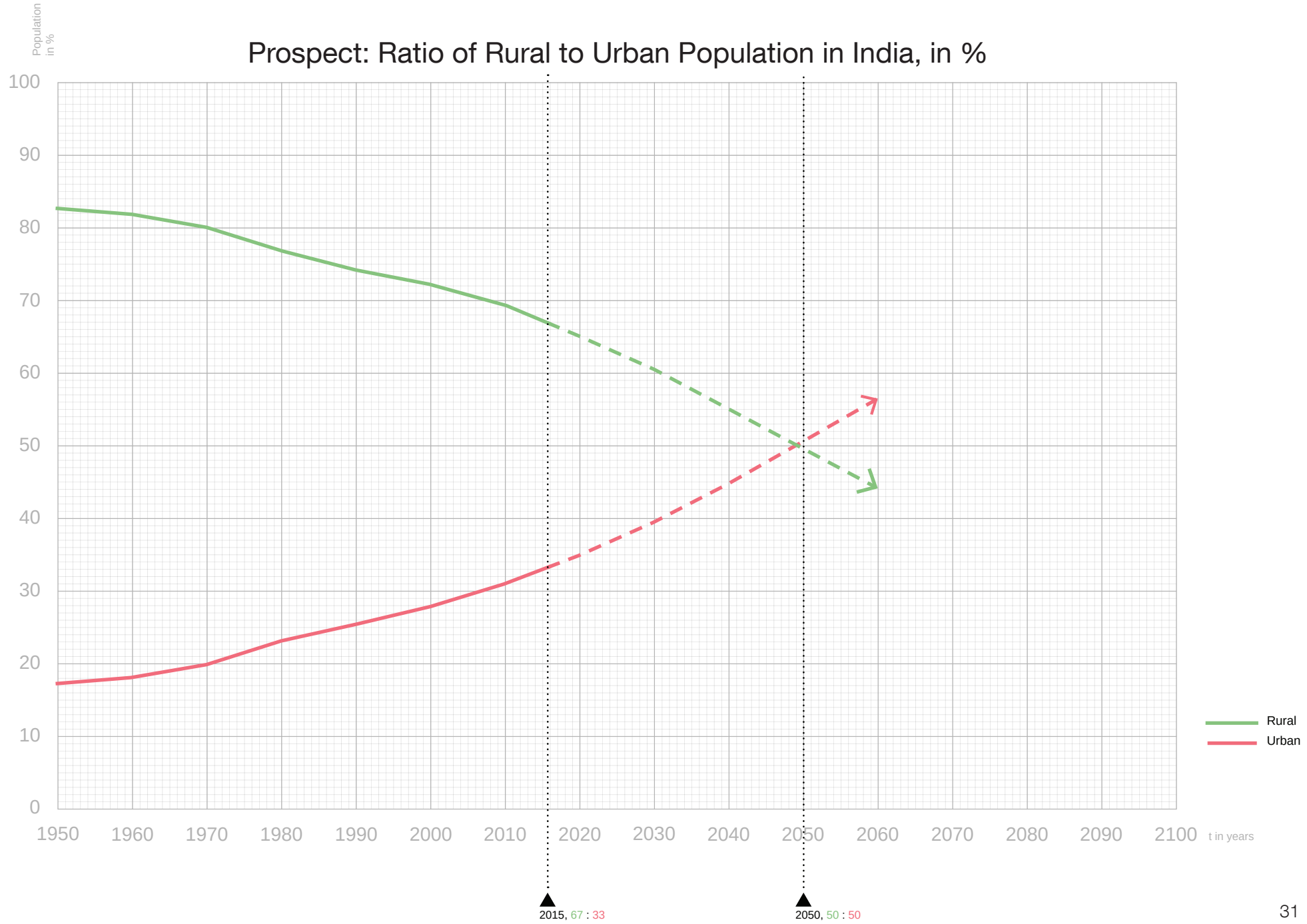
“ACCORDING TO THE UN, INDIA WILL OVERTAKE CHINA AND BECOME THE WORLD’S MOST POPULOUS COUNTRY BY 2022 - SIX YEARS SOONER THAN PREVIOUSLY FORECAST.”

4 https://www.imf.org/ (05.12.2015)
5 http://www.census.gov/population/international/ (05.12.2015)
6 http://esa.un.org/unpd/wpp/Graphs/ (05.12.2015)


Estimated Population Growth in India, Compared to China, EU and USA
Population in Billions
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
1.656.554.000
1,276,267,000
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
t in years
India
China
EU
USA

“TODAY ONE THIRD OF
THE INDIAN POPULATION
IS LIVING IN CITIES.
IN 2050 IT WILL BE HALF
OF THE POPULATION...”

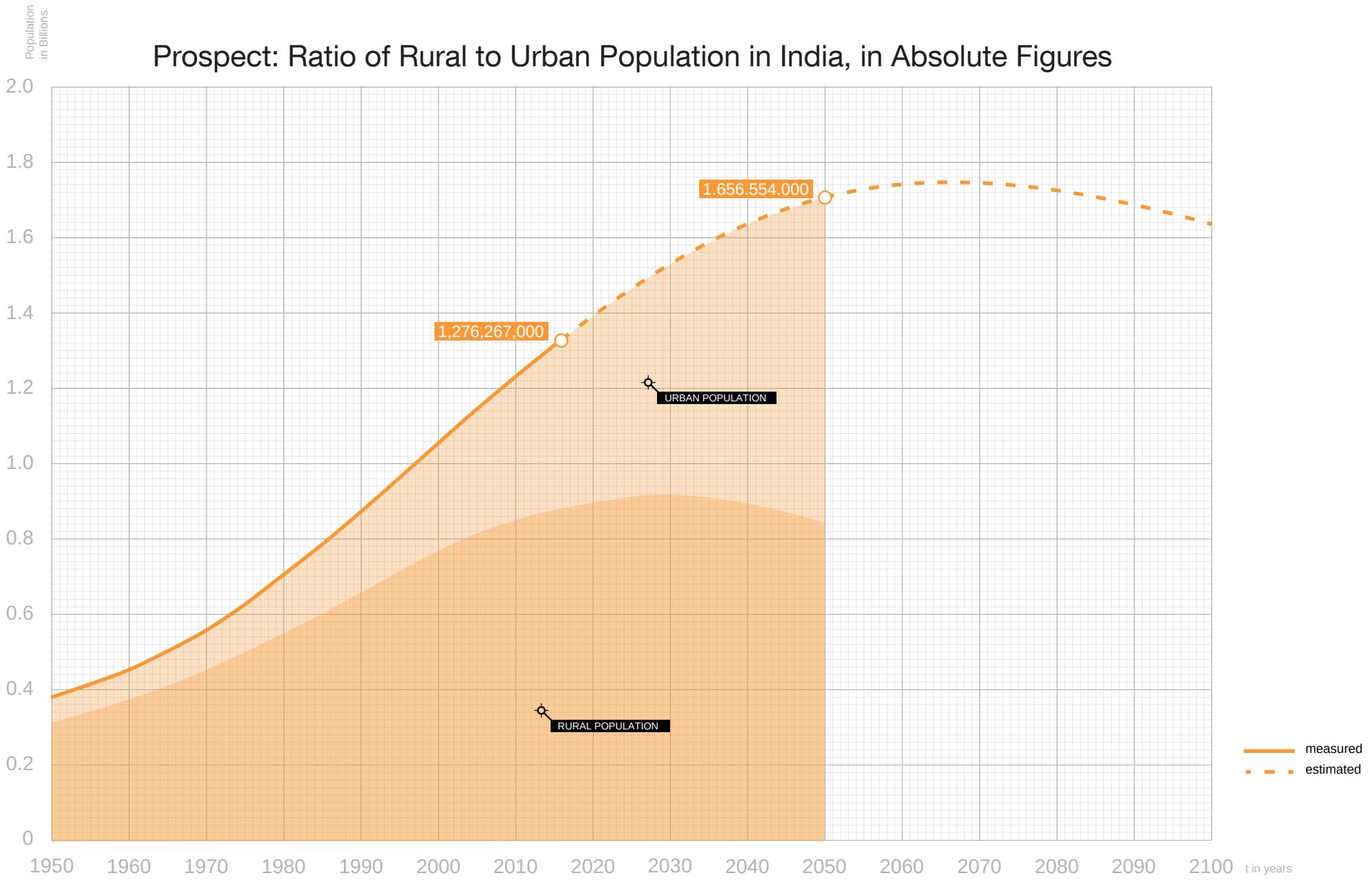
7 http://esa.un.org/unpd/wpp/Graphs/ (05.12.2015)


Prospect: Ratio of Rural to Urban Population in India, in %
Population in %
100
90
80
70
60
50
40
30
20
10
0
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
t in years
Rural
Urban
2015, 67 : 33
2050, 50 : 50

"... IN ABSOLUTE FIGURES, THIS MEANS INDIA'S URBAN POPULATION IS GOING TO DOUBLE."

"THE NUMBER OF PEOPLE LIVING IN CITIES WILL IN-CREASE FROM TODAYS 421 MILLION TO ABOUT 828 MILLION IN 2050."

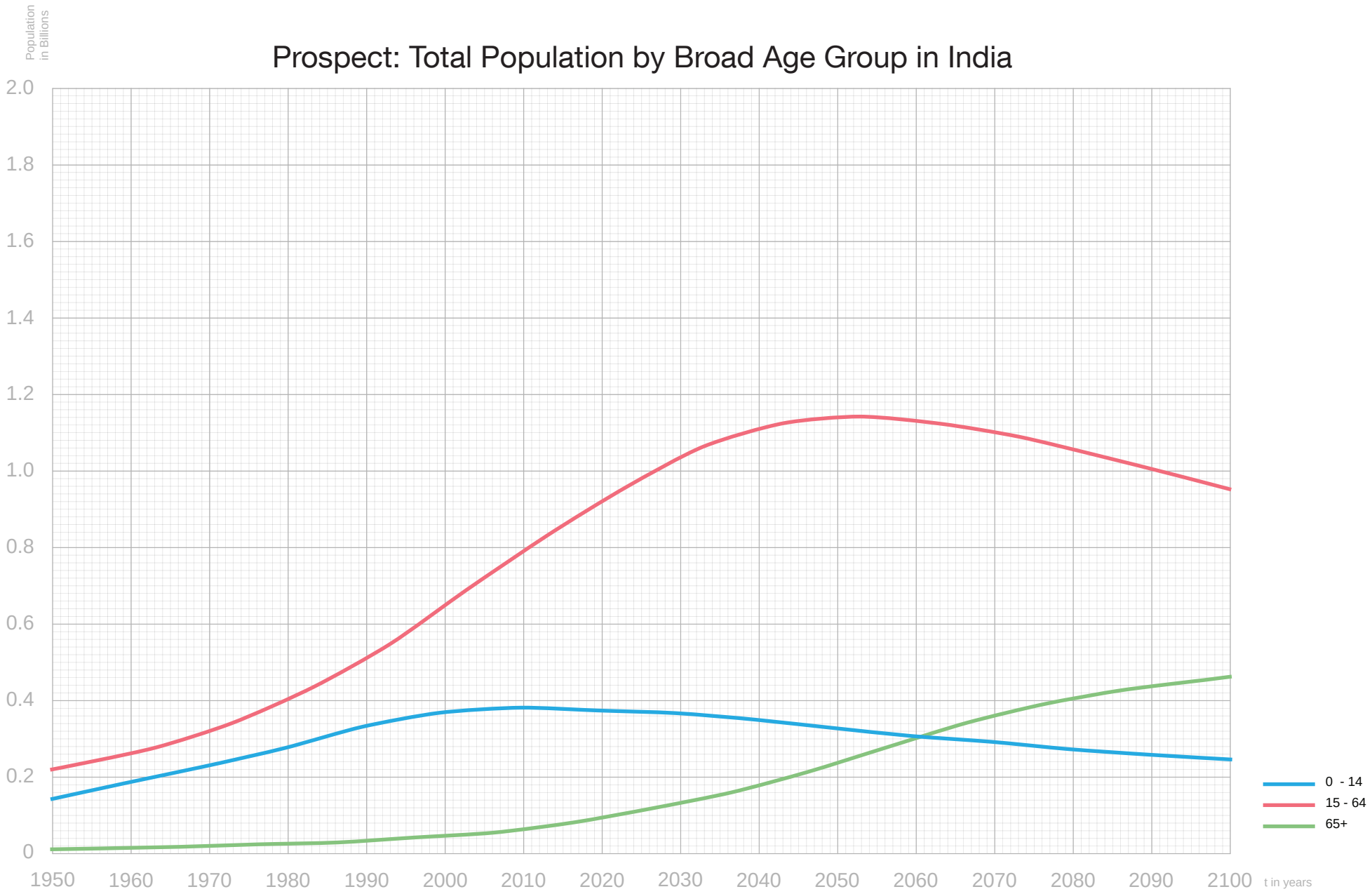
8 http://esa.un.org/unpd/wpp/Graphs/ (05.12.2015)


Prospect: Ratio of Rural to Urban Population in India, in Absolute Figures
Population in Billions
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
1,276,267,000
1.656.554.000
URBAN POPULATION
RURAL POPULATION
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
t in years
measured
estimated

“INDIA OF 2050 WILL HAVE A HUGE WORKFORCE: 67% WILL BE AGED BETWEEN 15 AND 64 YEARS.”

“A CHANCE, BUT ALSO A HUGE CHALLENGE IN TERMS OF PROVIDING ENOUGH JOBS IN TIMES OF INDUSTRIAL AUTOMATION AND INCREASING EFFICIENCY.”

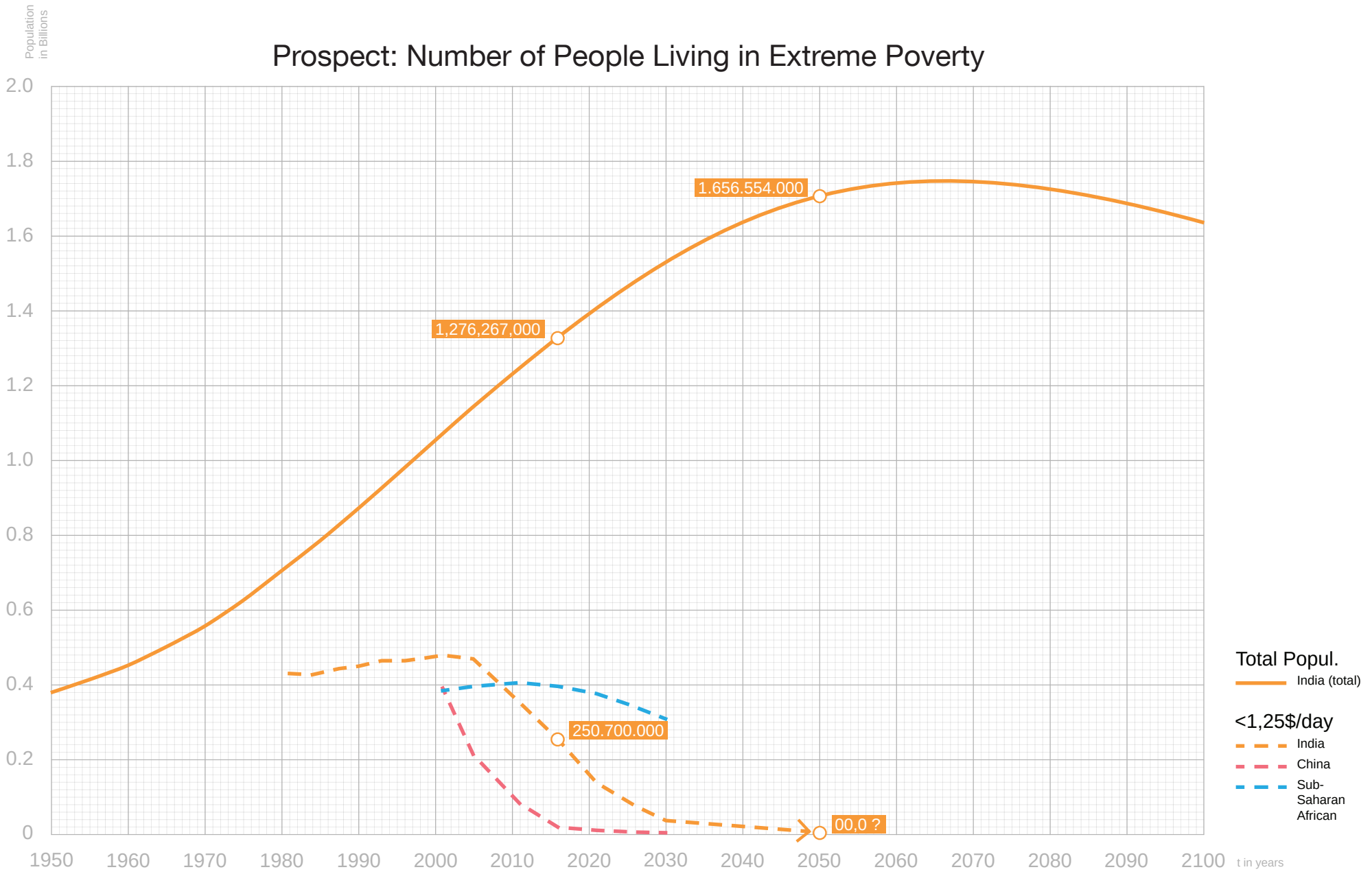
9 http://esa.un.org/unpd/wpp/Graphs/ (05.12.2015)


Prospect: Total Population by Broad Age Group in India
Population in Billions
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
t in years
0 - 14
15 - 64
65+

ESTIMATED DEVELOPMENT OF EXTREME POVERTY

“IN CONTRAST TO SUB-SAHARAN AFRICA, INDIA IS EXPECTED TO MAKE LARGE STEPS TOWARDS THE ERADICATION OF EXTREME POVERTY WITH-IN THE NEXT DECADES. (SO DOES CHINA)”

10 “World Urbanization Prospects: The 2011 Revision”, United Nations, New York, 2012
11 http://www.brookings.edu/research/interactives/2013/ending-extreme-poverty#three_giants (05.12.2015)

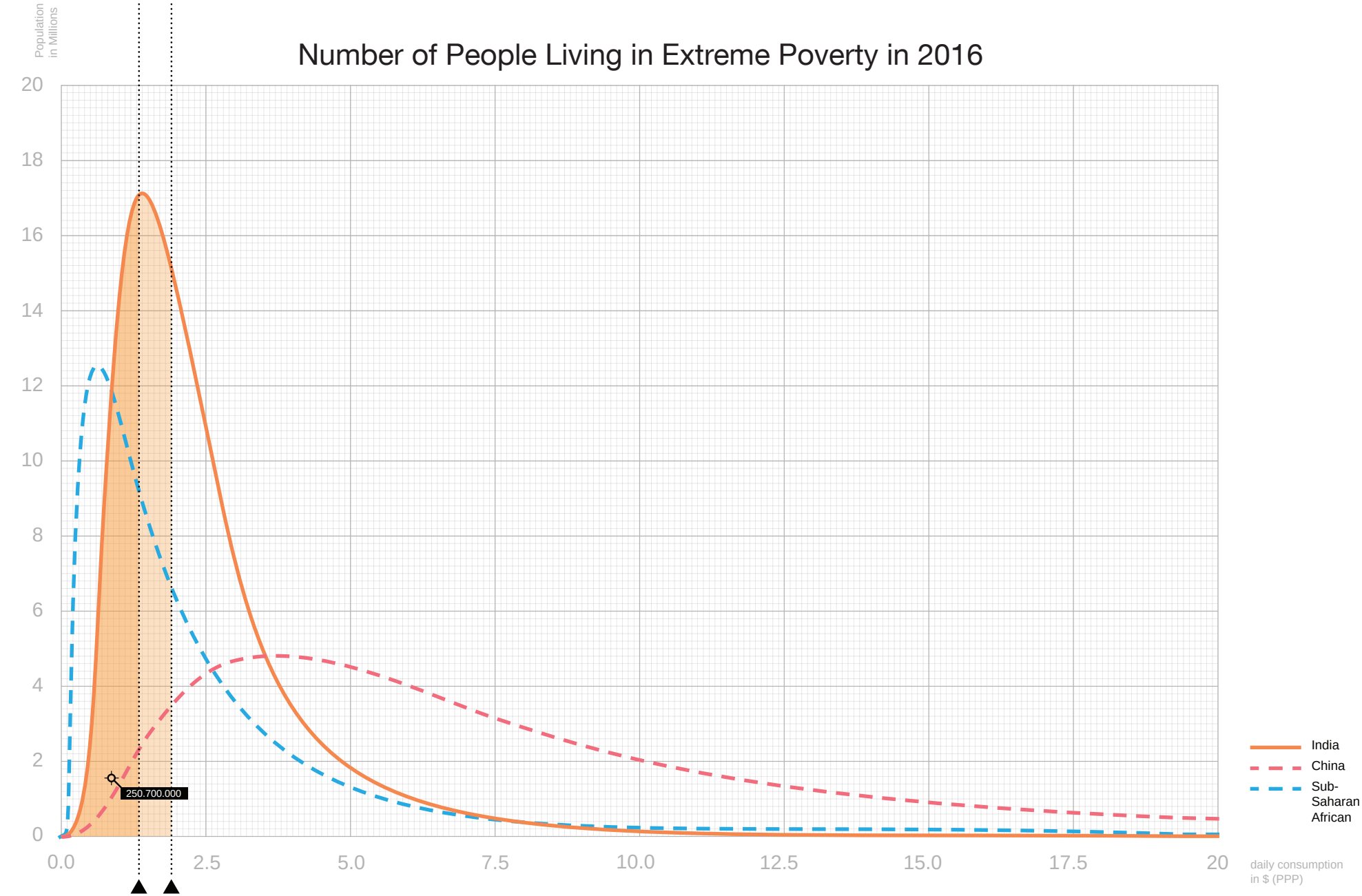

Prospect: Number of People Living in Extreme Poverty
Population in Billions
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
t in years
1.656.554.000
1,276,267,000
250.700.000
00,0 ?
Total Popul.
India (total)
<1,25$/day
India
China
Sub-Saharan African

EXTREME POVERTY TODAY, 2016

"TODAY APPROXIMATELY 250.7 MILLION PEOPLE IN INDIA ARE LIVING BELOW THE POVERTY LINE OF $1,25 PER DAY."

"RIGHTLY THE NUMBERS PUBLISHED BY THE WORLD BANK ARE HEAVILY CRITIZISED BY THE INDIAN GOVERNMENT, SAYING THE ACTUAL POVERTY RATE IS MUCH HIGHER."

12 http://www.brookings.edu/research/interactives/2013/ending-extreme-poverty#three_giants (05.12.2015)
13 "From poverty to empowerment: India's imperative for jobs, growth, and effective basic services", McKinsey Global Institute, February 2014
14 http://www.business-standard.com/article/economy-policy/world-bank-poverty-estimates-are-poor-says-government-115102100056_1.html (05.12.2015)



<1,25$ per day
POVERTY LINE

<1,875$
EMPOWERMENT LINE

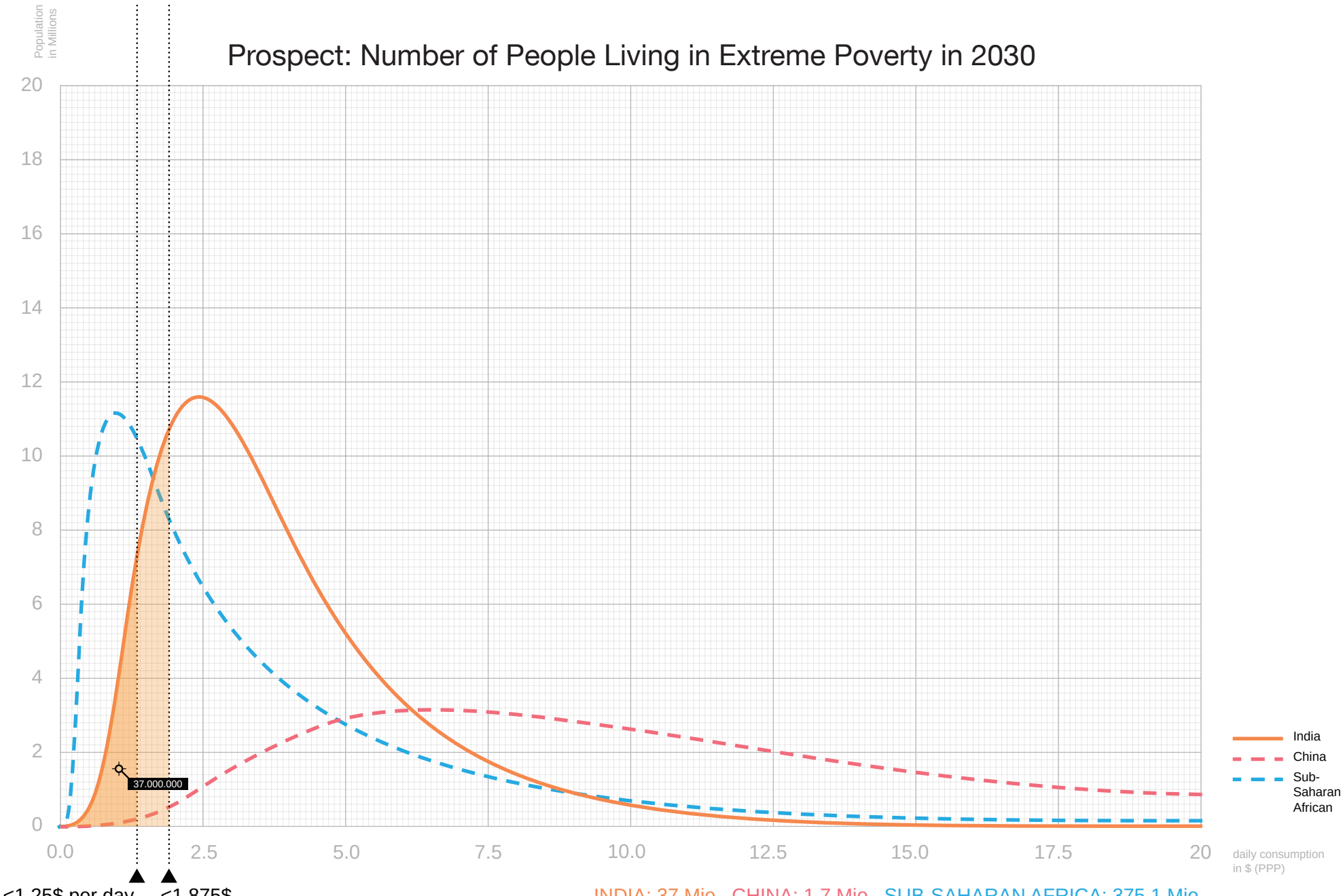
INDIA: 250.7 Mio., CHINA: 10.1 Mio., SUB-SAHARAN AFRICA: 396.4 Mio.

ESTIMATED EXTREME POVERTY, 2030

"...ACCORDING TO ESTIMATES THIS NUMBER WILL FALL TO 37.0 MILLION."

"THE SIGNIFICANCE OF THESE NUMBERS STANDING ALONE HAS TO BE QUESTIONED, AS A QUICK LOOK AT THE GRAPH REVEALS THAT THE PEAK OF THE CURVE MOVES JUST SLIGHTLY BEYOND THE POVERTY LINE."

15 http://www.brookings.edu/research/interactives/2013/ending-extreme-poverty#three_giants (05.12.2015)
16 "From poverty to empowerment: India's imperative for jobs, growth, and effective basic services", McKinsey Global Institute, February 2014

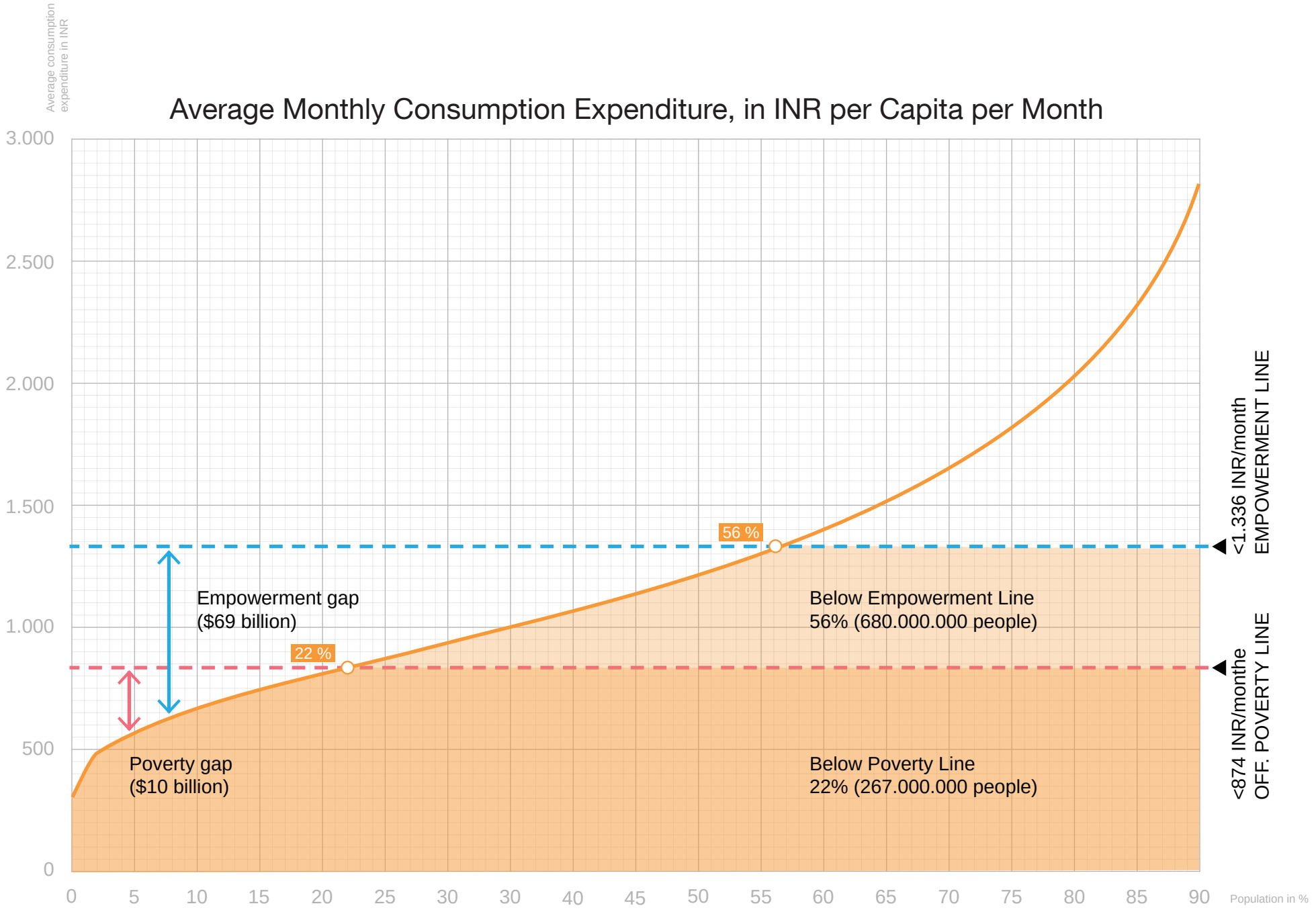

Prospect: Number of People Living in Extreme Poverty in 2030
Population in Millions
20
18
16
14
12
10
8
6
4
2
0
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20
daily consumption in $ (PPP)
37.000.000
India
China
Sub-Saharan African
<1,25$ per day
POVERTY LINE
<1,875$
EMPOWERMENT LINE
INDIA: 37 Mio., CHINA: 1.7 Mio., SUB-SAHARAN AFRICA: 375.1 Mio.

POVERTY GAP VS. EMPOWERMENT GAP

“IN A RECENT STUDY, RELEASED BY MCKINSEY, IT IS PROPOSED TO REPLACE THE POVERTY LINE, SET BY THE WORLD BANK, BY AN EMPOWERMENT LINE WHICH IS ABOUT 1.5 TIMES HIGHER.”

“ACCORDING TO THEM, LIVING A SELF-CONTAINED LIFE IS IMPOSSIBLE JUST BY MOVING BEYOND THE POVERTY LINE, BECAUSE THERE IS AN EMPOWERMENT GAP WHICH REMAINS TO BE OVERCOME.”

17 http://www.brookings.edu/research/interactives/2013/ending-extreme-poverty#three_giants (05.12.2015)
18 “From poverty to empowerment: India’s imperative for jobs, growth, and effective basic services”, McKinsey Global Institute, February 2014


Average consumption expenditure in INR
Average Monthly Consumption Expenditure, in INR per Capita per Month
3.000
2.500
2.000
1.500
1.000
500
0
0
5
10
15
20
25
30
30
40
45
50
55
60
65
70
75
80
85
90
Population in %
56 %
22 %
Empowerment gap
($69 billion)
Poverty gap
($10 billion)
Below Empowerment Line
56% (680.000.000 people)
Below Poverty Line
22% (267.000.000 people)
<1.336 INR/month
EMPOWERMENT LINE
<874 INR/monthe
OFF. POVERTY LINE

CHAPTER II
Learning from the past

CITY RULES. CHARACTERISTICS OF THE INDIAN CITY

Before the creation of an urban strategy for cities in foreign countries, it is necessary to be aware of operating within a different socio-economic and cultural context. It is crucial to identify the changed requirements of urban planning resulting from differences in climate, cultural habits and lifestyle. Therefore it makes sense to examine the local building tradition and typologies of the particular region. In the case of the designated area of focus, the most characteristic urban building typology is the so called “Pol House”, which is typical of urban centres in Gujarat, and especially of Ahmedabad.

Pol housing

The historic city centre of Ahmedabad* is defined by an urban pattern , structured by its fragmentation into three different scales of community-based settlement: the neighbourhood ‘Pur’, the sub neighborhood ‘Pol’ and the single ‘Pol house’. The Pol pattern dates back to around 1738 during Mughal-Maratha rule (1738-1753) in Ahmedabad and has its origins in the rural areas of northern Gujarat. The historic old town of Ahmedabad was populated by a large merchant community living in various community settlements following different religions. As a result of the the communal riots of 1714 and the civil disorder of the 18th century, the houses were from then on organised in dense clusters typically consisting of a set of dead end streets entered only through a single protected gateway. As mentioned before, multiple such settlements (Pols) formed a neighbourhood, and all neighbourhoods (Purs) together constituted the entire fortified historic old town. The neighbourhoods as well as the individual Pols were acting as self sufficient units within their own urban structure, which gave the city its unique urban pattern. Each Pol was socially and architecturally homogenous and provided a territory for the interaction, co-operation and interdependence of its inhabitants. Some Pols were also places of work. Artisans used to work inside the Pol, but sold their products outside on the thoroughfares. At its essence, a Pol is a micro neighbourhood linked by a network of small streets, side lanes and open community spaces with shrines and a bird house (Chabutaro). The character of the streetscape within the Pol is strongly defined by “Otlas”, small veranda-like transitional spaces connecting the individual house to the street.

Historically, the neighbourhood was based on cultural homogeneity, rather than economic status. Each Pol was inhabited by a specific community, caste or occupational group and each house was a single family unit. Within a Pol, everyone knew each other. The families took part in Pol councils and attended weddings and funeral ceremonies of other families from the same Pol. On the one hand this social system required a certain adherence to behavioural norms, but on the other hand the families got back a feeling of social and physical security as well as a sense of belonging and place in the broader society. The substance of the social nature of Pols lies within the Otlas. The street comes alive at dawn with washing, cleaning and water filling activities taking place on the front Otla and street edges, where washing places (Chowkdi), water taps and drainage connections are placed. Typical Otla activities include: washing clothes and other belongings, filling water, brushing teeth, reading newspapers, drinking tea or, popular with younger kids, using it as a playground. During festivals and weddings, the Otlas are adorned with sand paintings (Rangoli) and symbolic decorations, many of which are considered to be fortunate. While establishing a coherent social character for a neighbourhood, the Otla also has the ability to compensate harsh climatic effects. Due to its high degree of shading throughout the day, the Otla is one of the most comfortable urban spaces.

The urban fabric of the historic city centre in Ahmedabad (Photo: architecturez)

The construction method of the Pol houses is also similar to the houses in the towns of northern Gujarat. They are usually two- to four-stories high, and share side walls with their neighbours. Sharing long walls while exposing narrow end walls is part of its successful climate strategy. The exposed facades are oriented towards narrow streets which tend to shade the house facade

most of the day. Furthermore, the upper floors feature overhanging balconies and windows, casting a complete shadow on the streets below and maintaining a comfortable atmosphere. The orientation of the street facades becomes important during the winter since the houses with south facing exposures can open shutters and let sun into the upper rooms.
The typical Pol house is made of bricks and mortar. The massive walls are supported by timber structures, which are typically ornamented with wooden carvings. The unique Pol strategy of cloaking the sun-exposed wall with wooden details, provides a shield between incident solar radiation and the thermal mass of the house.
Entering the house, there is some free space right behind the main entrance, used to put things like traditional cots etc., followed by a patio (Chowk) with a series of semi-open spaces and rooms organized around it. The floor of the patio is tiled and drained via earth or a water tank. The floor heats up through the season, but the daily washing and cleaning habits of the household counteracts the solar radiation by providing sufficient evaporative cooling. Also characteristic is the central hall providing a fireplace (Chulha) with a chimney, which allows to cook in sitting position. The clustering as well as the selected materials and building methods make these houses earthquake resistant. They are partially made of light weight materials like wood which is an advantage during earthquakes as the quake force is proportional to the mass of the structure. The large flat bricks, used in the Pol houses, are helpful in resisting earthquakes as they are stable against overturning. The bonding material used to join the brick work is a mixture of mud and cow-dung or lime, which allows a certain degree of plasticity in the wall. Pin connections at the top and bottom of columns, enable them to move slightly, which has the advantage of significantly reducing lateral forces during earthquakes. The bases of columns and doorframes are made of stone.

"THREE SCALES OF COMMUNITY-BASED SETTLEMENT: THE NEIGHBOURHOOD 'PUR', THE SUB NEIGHBOURHOOD 'POL' AND THE INDIVIDUAL HOUSE. "

Due to its hot climate with average outdoor temperatures between 20°C and 34°C, the metropolitan area of Ahmedabad is considered to have summer all year long. The hottest month is May, with peak temperatures rising up to an intolerable 42°C, while the coldest month is January with an average day temperature of 20°C and lowest temperatures of 10-14°C during the night. For most part of the year Ahmedabad is hot and dry, with tropical rains for only three months from August to September.[1] In a climate like Ahmedabad, where the direct and diffused solar radiation is found to be very high all year round, shade is considered to be the most important aspect for urban design. This is why there is currently a strong academic interest in the Pol and its remarkable climatic properties. Some Researchers are trying to find inspiration within the historic typology in order to develop a residential cluster which can be used as a model for future developments of reducing the energy consumption values in the housing sector. The results of technical research show that, even at a latitude of 22.42°N with a remarkably high incident solar radiation throughout the year, the streets of the Pols remain shaded and provide outdoor comfort. In a survey done in Ahmedabad, it was observed that over 72% of the people standing in the shade felt comfortable outdoors at a temperature as high as 31°C even with very little air movement. In general it can be said that, in hot climates a shaded street is always preferred over a street exposed to direct solar radiation even if temperatures were lower by a degree or two. Technical analysis showed that at a time when the

Plan of a pol (by Jon Lang)

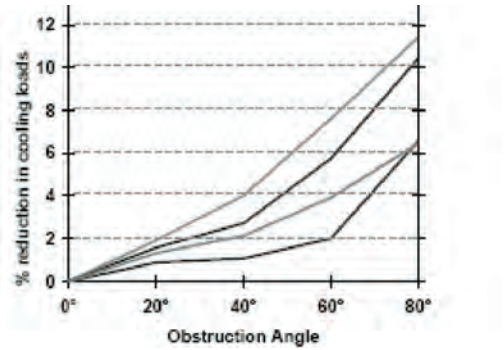
1 cf. http://architectureindevelopment.org/project.php?id=492 (14.04.2015)

unobstructed incident solar radiation was around 4800Wh/m2 a street in the old town of Ahmedabad was able to obstruct more than 50% of the direct radiation. Further investigations indicate that there is a morphology-inherent hierarchy of micro-environments lying within the Pols, helping a pedestrian to gradually transit from the completely shaded inner street to the partially exposed street and finally to the more exposed main road. It turned out that, while outdoor shade by built environment is determined mainly by street morphology, canyon, geometry and orientation, pedestrian comfort depends on street hierarchy. Simulations showed how street orientation and street canyon are affecting the percentage of shading on a street. This data has been tabulated and categorized into three different levels of shaded streets, representing three street hierarchies. In Table 1 we can see for example that a N-S oriented street with a height/width ratio of 1.2 and

	obstruction angle 50°, H/W ratio 1.2	obstruction angle 60°H/W ratio 1.7	obstruction angle 70° H/W ratio 2.6	obstruction angle 80° H/W ratio 5.7
N-S	74% shaded	81% shaded	87% shaded	94% shaded
E-W	52% shaded	61% shaded	71% shaded	82% shaded
NW-SE NE-SW	68% shaded	78% shaded	84% shaded	93% shaded
Street Hierarchy		main road	secondary	inner street

Table 1: Street hierarchy based on degree of shading which is a function of street canyon and street orientation (by Kanika Agarwal)

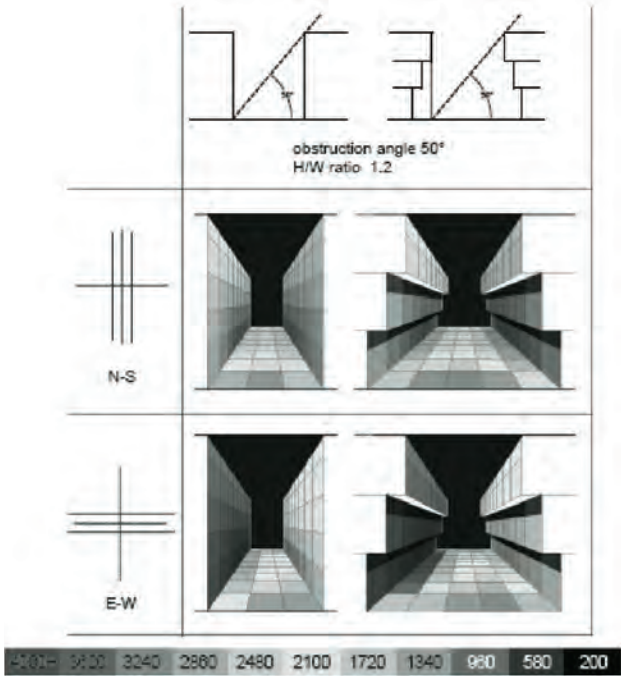
an E-W oriented street with a height/width ratio of 2.6 are shaded similarly strong. While densely shaded narrow streets and compactness are thermally beneficial for in- and outdoor comfort, these properties are suspected to have negative effects on the indoor environment, generating extremely low lighting levels. This was audited by comparing cooling loads and lighting levels that would occur indoors in different urban situations. The idea was to have a better understanding of user's comfort by bringing together the indoor and outdoor comfort criteria to create an efficient urban residential model maintaining the thermal performance and yet improving the day lighting and ventilation performance. Four orientations and four street canyons were tested in



Effect of street canyon and street orientation on internal cooling loads. (by Kanika Agarwal)

order to find out the impact of the Street orientation and street canyon on the indoor environment. It was found out that: The difference in cooling loads between different orientations becomes smaller as the obstruction angle increases. Independent of orientation, the cooling loads do not show considerable variation beyond an obstruction angle of 60°. For this reason, the orientation of a deep and narrow street is not important.

Changing the street geometry from planar facade to recessed facade decreases the amount of radiation received along the edges of the street and effectively reduces the solar exposure of the building envelope by self-shading. It allows a wider street with the same amount of lighting levels at the centre of the canyon. Thermal simulations indicated that changing the geometry is clearly more effective in E-W streets. (N-S: -10%*, E-W: -16%*)



Incident Solar radiation received on street of different geometries. (by Kanika Agarwal)

The principles of the Pol have come together and developed, through centuries of organic evolution. A set of design conditions could be derived from Pol observation which could be reinterpreted in a way not resembling the Pol itself, but featuring the same characteristic attributes. To maintain for example the performance criteria of each street, street canyon proportions were derived.[2]

to achieve,		70% shaded	to	90% shaded
when,	Street Width	12m to 8m	8m to 4m	4m to 1m
then progressively,	H/W Ratio (for all streets except E-W)	1.2 to 1.6	1.7 to 2.5	2.6 to 5.7
and	H/W Ratio (for E-W)	2.6 to 3.5	3.5 to 5.7	5.7

Street shading, (by Kanika Agarwal: http://www.plea2009.arc.ulaval.ca/Papers/1.CHALLENGE/1.2%20City/POSTER/1-2-22-PLEA2009Quebec.pdf, p. 1f., 21.09.2015)

Today, Ahmedabad is experiencing a rapid rate of urbanization, which puts an enormous pressure on the walled city. Many of the Pols were demolished when new roads were laid out and existing roads widened. However, even today over 100 of the formerly ~360 Pols are still existing in the historic part of the city, putting the city on the tentative list of UNESCO's world heritage cities.[3]

Parallel realities

But, as mentioned at the beginning of this chapter, it is not (only) the built environment that makes the "Indian city". A main feature that distinguishes the Indian city from the typical western city as we know it is how the city is used; the enormous life on the streets. For its inhabitants the public realm seems to be an extension of their living room, in contrast to the western city. To this effect, a general rule is that with growing wealth usually the quality of the public realm as well as the degree of regulation and control is growing. Simultaneously everyday life is shifted gradually to the privacy of one's home with growing comfort and m² per capita. Referring to this, India, as a newly industrializing nation, is also a divided nation. Parts of the population have managed to jump onto the train of capitalism and gained substantial wealth, while large parts fell by the wayside. The ones who had access to the educational system and made their social rise are leading a Western influenced life on the standard of an industrialized nation, while many of the others are still leading a lifestyle that could be characterized as pre-industrial; And both groups are moving to the cities due to so-called push- and pull- effects. Generally, successful cities are laid-out to attract a skilled workforce, in order to be productive and generate wealth. They function like magnets for well-educated and ambitious people, promising amenities and job opportunities. But these push and pull factors are also attracting the rural poor. Resigning their unprofitable jobs in the agricultural sector, they are moving to the cities in search for better jobs. Having no adequate education for more sophisticated businesses, many of them are earning their living by offering simple services to wealthier people, working as housekeepers, liftboy or shoeshine boys. What develops is a remarkable symbiosis, accompanied by persistent stories, real or not, about rising real estate prices in proximity to informal settlements, triggered by their high level of services. There seems to be a rule that says: Geographical proximity to the upper class guarantees survival for the urban poor (former rural poor). Vice versa the presence of the urban poor assures a high standard of services and cheap labour for the wealthy. The interesting and really peculiar aspect about this is, that although these two social layers are living such different lives at such different standards, these parallel realities are locally interwoven, side by side, confronted with each other day by day; within the metropolises. This of course has an enormous impact on the built environment. Walking around the next corner might feel like time traveling. The Indian cityscape, often claimed to be the mirror of the respective society and its economic system, is typically a conglomerate of both, formal as well as informal elements. The formal elements representing the one part of society, the informal elements representing the other part of society; (In Mumbai for example this ratio is about 1:1.) "Informal elements" not only in the sense of built environment, but also in terms of informal economy and informal ways of living in general, represented by street vendors, rickshaw drivers and craftsmen who don't need a deed for their business. This vibrancy on the streets of the Indian city, intensified by density and climate is the equivalent to a social stratum that simply doesn't exist anymore within our industrialized affluent society.

Public space: a Western idea

Furthermore there is the assumption that the liveliness on India's streets is a direct result of a different perception, an "Indian perception", of the public realm in general. While in the western culture, we are assuming that our own premise is our "territory" and everything else doesn't belong to us, the Indian point of view seems to be something like: everything belongs to me, except the property of someone else. As we know, architecture influences how we experience the public space of a city in various ways. It determines how we move through the city, how this movement is captured visually and acoustically, how it can change through objects and landmarks, parks, buildings, billboards. All these elements, whether planned or unplanned, their physical appearance and perception, distance and proximity, all these things are part of what is called urban life.

2 cf. http://www.plea2009.arc.ulaval.ca/Papers/1.CHALLENGE/1.2%20City/POSTER/1-2-22-PLEA2009Quebec.pdf, p. 1f. (21.09.2015)
3 cf. http://architectureindevelopment.org/project.php?id=492 (14.04.2015)
* cooling load reduction for ground and first floor.

But is there a consciously cultivated sense for this area outside our house called the public realm? Are we all recognizing intuitively, how the city is planned and how it's supposed to be used? Or is there really an Indian Identification with the public realm; A feeling of unrestraint and adoption, totally different than the norms of western public life?

In his article "Auf dem Weg zu einem hässlichen Indien", architect and author Gautam Bhatia suggests to have a look at the bedraggled Nehru Place in Delhi. Nehru Place was conceived an elevated plaza with arcades and pedestrian access to shops and offices. The open fronts should remind of the great old European squares, like San Marco or Piazza Navona. People were supposed to meet within these places, surrounded by clean modernist architecture and open air cafes with street musicians. An ideal open space was created, according to the notion of the western middle class. But was there a discrepancy between the ideal and reality or was the concept of Nehru Place a fail from the beginning? However, lastly all built structures share the same fate he says: "How disgusting, raffish and miserable and spiritless Nehru Place may be, it is subject of a typical Indian phenomenon, you can observe every day in every Indian city. If you leave ANY building uncontrolled and consequently free for adoption, be it Taj Mahal, Connaught Place or the Victoria Memorial, you can lean back and wait. Wait for one week, one month, or even one year. People will start to occupy each and every vacant space available: Paan-Shops on windowsills, Copyshops in niches for fire-extinguishers, restaurants in windowless basements, kitchens under staircases. Drying laundry on street barricades, people sleeping on the sidewalks, offices transform balconies into working space. Unrestrained, the urban Indian occupies everything within the public realm. That the public space belongs to nobody is a strange western idea; that it has to be maintained and preserved by everyone, a totally foreign concept."

"THAT THE PUBLIC SPACE BELONGS TO NOBODY IS A STRANGE WESTERN IDEA; THAT IT HAS TO BE MAINTAINED AND PRESERVED BY EVERYONE, A TOTALLY FOREIGN CONCEPT." [4]

Occupative urbanism

This characterization of the Indian city also matches my impressions, as well as what Solomon Benjamin & Bhuvaneshwari Raman described as "occupative urbanism", within their article "Okkupativer Urbanismus - Die Stadt der Nutzer". They state that the foregrounding of the impact of megaprojects, like e.g. the currently emerging Special Investment Regions, in urban and social science disguises the real fights occurring within the cities because of more and more growing capitalistic utilization logics. Those people, excluded from the blessings of global capitalism, are labeled marginalized victims and their (political) activities are reduced to a mere strategy of survival. Such a perspective of marginality, misconceives the nature of the city itself, whose terrain allows for complex social and cultural relationships towards ground and soil and economy, they say. From their point of view, power concentrates within the hands of large scale entrepreneurs and the state, but it is not closed hermetically:

"There are cracks and loopholes, making the spheres of influence of power, and the fights resulting out of them, less stable and predictable than one would expect. Out of this results the "fragility" of the city plan, being the planner's worst nightmare, endangering the master plans in service of globalization, as well as the rationalistic plan of the progressive activists, on the quest for Equality."

About 80 % of the urban land is populated in an unplanned manner and is part of complex and subversive acquirement processes. For many politicians and planners these areas are simply considered "slums". But an incremental evolution and a structure of multiple ownership, allows for the development of an economic network of small-scale home-factories, called "tool houses", in which living and working spaces are merged. A new analysis shows that the bigger part of the added economic value and nearly all employment relationships within these areas are based on that kind of economic urbanism. The seemingly chaotic ownership and utilization conditions as well as the absence of planning, are forming frame conditions which are radically valorizing the land, at the expense of high finance.

4 archplus 185 "Indischer Inselurbanismus", 2007, p. 90
5 archplus 185 "Indischer Inselurbanismus", 2007, p. 89f. ,98

Incoherence

The oft-enunciated incoherence of the Indian city, is the result of long development. Rapid population growth, the growth of city centres, chronic unemployment and the tough economic situation have influenced the built environment during the last fifty years. The growing pressure on urban property, because of the growing urbanization is leading to uncontrolledly sprawling city centres, giving a new scale to public space and urban architecture:

"I don't know, why I started to hate the city. Whenever I leave my house, I step into a horrific scene. Wherever you look, you encounter moments of despair – more and more hopeless people, trying to get hold of any space they can get: sidewalks for sleeping, railway tracks for relieving oneself, demolished bungalows out of which apartments are originating, servant chambers rented by students, garages, rented by doctors. Walls moving more and more together, scaling down houses to apartments and gardens to verandas, Markets spreading on sidewalks, and sidewalks trimming streets. And there's a growing gap between those people occupying the same space: parking lots, reserved for hotels, migrant families in sewer drains, watchdogs and high walls, security services and BMWs. Apartments in industrial swamps, advertisement-blemished office facades, farm houses without farm or any relation to the rural land, baroque villas without a connection to Rome. Is it so surprising when we are so disgusted with the places we created for ourselves?"[5]
(Gautam Bathia)

Old Delhi, India, 02.2014
(photo by Lena Kohlmayr)

A szene at the fringe of Dharavi, Mumbai, illustrates the excessive, yet typical manifestation of the aspects mentioned before ...

(paraparallel realities) Statistically most people on this picture are migrants, trying to find their place within the urban economy.

(occupative urbanism) A typical urban gap, where property rights are blurry; occupied, but not preserved. If we look close enough, we can assume that many people on this chaotic picture are doing something productive. They are part of what has to be recognized as an alternative form of urban economy, an informal economy.

(incoherence) Formal and informal city are precisely separated by the railway tracks .

Dharavi, Mumbai, 02.2014

FORMALITY, INFORMALITY, SEMI-INFORMALITY

In January 2005 officials in Mumbai caused an international stir pushing forward with a very controversial slum-clearance scheme. Inspired by Shanghai, the scheme aimed on the demolition of squatter communities around the city in order to transform Mumbai into a city open for development. The responsible politicians didn't care where the 300,000 people evicted would go – as long as it was outside city limits.

Later that year Zimbabwe's President Robert Mugabe followed Mumbai's lead and initiated "Operation Murambatsvina" – Operation Drive Out Trash. Police and soldiers ejected 700,000 people from their informal homes in Harare and Bulawayo, the country's two largest cities. Citizens were left to sleep outside in the middle of winter, others trucked to the countryside and left with a warning that they would be killed if they returned to the city.

In December 2005 the Nigerian government evicted thousands and destroyed their homes in Lagos and Abuja. "These were not shanties or shacks. These were concrete and brick houses that people had laboured mightily to build. But their sin, according to authorities, was that they did not get proper planning approval. So the homes had to go and the people were forced onto the street", writes Robert Neuwirth in his book "Shadow Cities, A Billion Squatters, A new urban World" (Routledge, 2004) and describes very well the hardships informal dwellers are facing in cities all over the world. But nevertheless newcomers are still seeking their future in the world's cities inexorably. While there are about 1 billion squatters in the world today, every year nearly 70 million people are leaving their rural homes to move to the cities. That's about 1.4 million people a week, 200,000 a day, 8,000 an hour, or 130 every minute. The migration is not likely to stop: By 2030, there will be 2 billion squatters and by the mid-point of this century, there will be 3 billion squatters – more than 1/3 of the world population. According to the United Nations, the world's cities must build 35 million homes a year to meet the demand on urban housing space. That's 96,150 homes a day, 4,000 an hour, 66 a minute, one every second. Although the UN doesn't even believe this could happen, this would only maintain the equilibrium. It would not provide housing for the 1 billion informal dwellers already existing today. So the UN has recommended a stripped down approach to prevent the formation of huge new informal settlements all over the globe: The world's cities should build homes for 670 million people within the next 15 years. This, the UN estimates, would cost $294 billion. (XIII) However the problem of course involves more than money. Usually developers as well as local and national leaders have no interest to build for the poor. (The exception proves the rule.) Squatters are neglected and disrespected by governments, politicians, the press, much of the public and often even by themselves. In addition design paradigms and urban planning often exclude the poor from appropriate sites and new urban dwellers usually can't take advantage of financial mechanisms of subsidized social housing programs.A defective housing market, poor urban management and lagging infrastructure are creating a bottleneck. It is the failing housing sector and the wrong government policies that have forced migrants in developing countries to turn to the informal sector. Although the reasons why people are pushed into the informal sector are similar all over the world, the ways of settling can be very different: There are those we are used to in the industrialized nations, who occupy abandoned buildings. There are those who erect cabins in remote areas, farming land they don't own. And there are those whose invasions are organized by a political outfit, like the "Movement of the Landless Workers" in rural Brazil. The majority of the world's one billion informal dwellers though are simply people who come to the city in search for a

"BY 2030, THERE WILL BE 2 BILLION SQUATTERS."

Dharavi, Mumbai (02.2014)

job and an affordable place to live. Unable to find an appropriate place on the private market, they build it for themselves on land that is not theirs.

Although we are facing an unprecedented urbanization in absolute figures, massive migration from rural regions to urban centres is not new. In fact this has been going on for thousands of years and the informal has always been part of our cities.[1] The emergence of urban informal settlements has always been considered a byproduct of urbanisation driven by economic and political changes (usually associated with industrialisation). What may be new today is the re-emergence of urban informality as a way of life at this moment of globalisation and liberalisation, characterised by higher growth rates and the global scale, compared to informal urbanisation back then in now developed countries.[2, 3] However, history shows that, as soon as migrants came to the cities, many of them became squatters. In ancient Rome for example, despite large government investment in public works, squatters took over streets, occupied fountains, and erected simple lean-tos, called Tugurias, which were tucked up against existing buildings. They were audacious and provocative, but there were so many of them that the authorities couldn't keep up removing them. And it has been like this in almost every city: London, Paris, and even New York, the real estate city par excellence, which was a squatter metropolis until the early years of the twentieth century. In fact the word 'squatter' is an American term, originating in New England around the time of the revolutionary war as a popular term for people who built their homes on land they didn't own. James Madison who later became fourth president of the United States was the first one to use the term in 1788.

"BY THE MID-POINT OF THIS CENTURY, THERE WILL BE 3 BILLION SQUATTERS."

As informal settlements can be found all over the globe and are part of the culture and history of the respective nation, it is no surprise that every country has its very own term for its squatter communities in its own language. In Brazil they are called Favela, in Kenya Kijiji, in India Johpadpatti, and in Turkey Gecekondu. From the Aashiwa'i areas of Cairo to the Barriadas of Lima, the Kampongs of Kuala Lumpur, the Mudukku of Colombo, and the Penghu or straw huts of Shanghai in the 1930s, most languages have specific and even poetic names for their squatter communities. In English language however there has come to be one dominant term: slum. In their global report on human settlements "The Challenge of Slums" the term Slum is described by UN-Habitat as "a heavily populated urban area characterized by substandard housing and squalor".

This definition refers to the essential characteristics of a slum: high density, low standard of housing (structure and services), and "squalor". The first two criteria are physical and spatial, while the third is social and behavioural. The well-established operational definition of a slum describes a slum as an area that consists of households that lack one or more of the following five conditions:

Property and Ownership

When informal settlers feel secure in their homes, they build, invest, and prosper; And they don't need a title deed to do so. Squatters in Turkey and Brazil have erected permanent buildings without title deeds. And in India they have created whole neighbourhoods while knowing that their land is not theirs. (21) The world's informal dwellers offer a different way of looking at land. Instead of treating it as an economic value, they live according to a more ancient notion: the idea that every person has a natural right, simply because of being born, to have a home, a place, a location in the world. Their way of dealing with land offers the possibility of a more even-handed city and a more just world. [4]

"The true founder of civil society was the first man who, having enclosed a piece of land, thought of saying, "This is mine," and came across people simple enough to believe him. How many crimes, wars, murders, and how much misery and horror the human race might have been spared if someone had pulled up the stakes or field in the ditch, and cried out to his fellows: "Beware of listening this charlatan. You are lost if you forget that fruits of the earth belong to all and that the earth itself belongs to no one." Jean-Jacques Rousseau (in discourse on the Origin of Inequality, 1755) [5]

1 cf. Robert Neuwirth: Shadow Cities, A Billion Squatters, A new urban World, 2004, p. XII, XIV, 9ff.
2 cf. David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015 , p. 1-3
3 cf. Michelle Provoost: New Towns for the 21st Century - the Planned vs. the Unplanned City, 2010, p. 12, 25
4 cf. Robert Neuwirth: Shadow Cities, A Billion Squatters, A new urban World, 2004, p. 21f.
5 Robert Neuwirth: Shadow Cities, A Billion Squatters, A new urban World, 2004, p. 285

1. adequate access to safe water

2. adequate access to sanitation and other infra structure

3. adequate structural quality of housing

4. no overcrowding

5. secure residential status [6]

The term “slum” is loaded with emotional values: decay, dirt, and disease; danger, despair, and degradation; criminality, horror, abuse and fear. Obviously it is a totalizing term with a negative connotation. Still it is the generally accepted term for squatter communities in India (and also Kenya)[7] What originates out of this dilemma is a certain abashment or awkwardness, among researchers and authors, first and foremost within the academic discourse, addressing the topic of such “slums”. Striving for political correctness, the word “slum” is all too often replaced by the much more scientific sounding word “informal settlement” (or “spontaneous settlement”). The terms “slum” and “informal settlement” are not necessarily denominating the same thing though: A slum can either be formal or informal. Furthermore it must be stated that the term “informal settlement” tells nothing about the physical or spatial condition of a settlement. It derives from research in favelas that began in the 1970s in Latin America, but is also applied to comparable urban areas in Asia, Africa and the Middle East.[8] Today there is still no single prevailing definition of the term “informal settlement”. According to the OECD, to mention one, informal settlements are defined as:

“INFORMAL SETTLEMENTS WILL SOON BECOME THE DOMINANT FORM OF URBANIZATION IN MOST DEVELOPING COUNTRIES”

1. areas where groups of housing units have been constructed on land that the occupants have no legal claim to, or occupy illegally;

2. unplanned settlements and areas where housing is not in compliance with current planning and building regulations (unauthorized housing).[9]

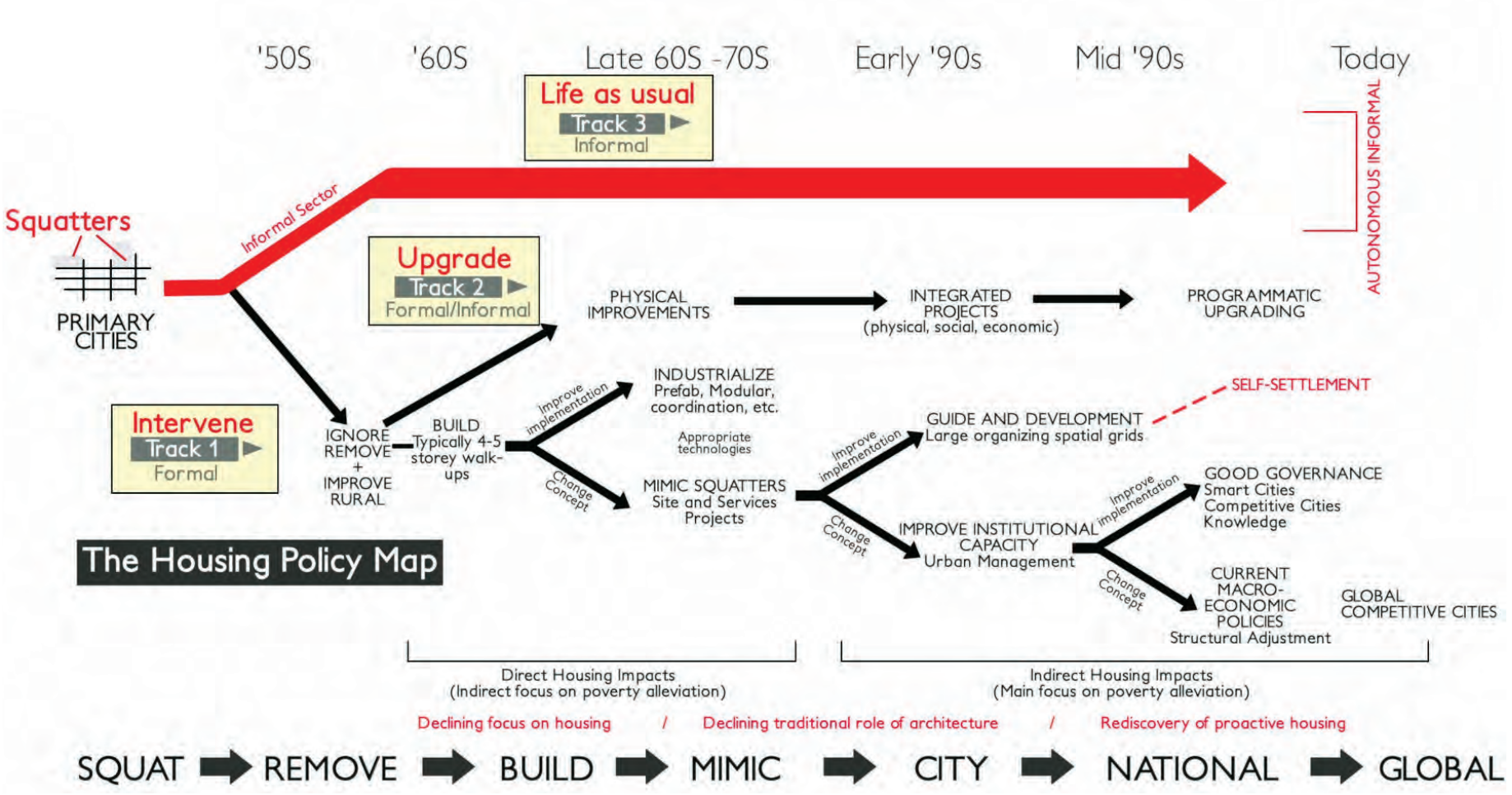
Operating within the stress field of formal and informal settlement, it’s essential to be aware of the fundamental difference between those two approaches, which lies within the sequential arrangement of the settlement process itself: Formal settlements are created according to the following sequential arrangement (Top down): At the beginning there are legally binding land-use plans / lay-out-plans. The plots are subdivided into individual lots and the required infrastructure is being established. The lots are sold on the real estate market and entered in the title register. The houses are being constructed according to the effective norms, and finally the residents move in. In the process of informal settling the order is typically reversed (Bottom up). Usually the informal dwellers come first, then the house is being constructed, and in the very end the construction of infrastructure (electricity first, then water) and the legalization process follow.[10]

Practically the foundation of a new informal settlement (also called invasion), can happen in a way shown in the following example: The first phase can be described as “test phase” in which the settlers are testing the reaction of the local authorities. In this case, usually only tenantless land is occupied. Then the erection of makeshift barracks follows. In case barracks are demolished by the police, they are reconstructed in the following night. This game usually continues until the local authorities give up and tolerate the settlers. As the risk of eviction decreases, the phase of upgrading can begin. The number of “invaders” can reach up to several hundred or even thousands of individuals.[11]

As there are many hybrid strategies to tackle the problem of marginal settlement emergence, trying to mimic the “natural” incremental evolution of informal settlements, and sometimes even mixing top down and bottom-up strategies, it can easily become hard to tell what is the right term to describe a given neighbourhood. Some built projects may look and function exactly like informal self-built settlements, but in fact they are volitional. They are planned and legal. To find the adequate term for a given project can depend only on the legal status or other invisible stipulations and can possibly not be seen in terms of physical attributes. The borders are

6 cf. The Challenge of Slums – Global report on human settlements, UN Habitat, London, 2003, p. 18
7 cf. Robert Neuwirth: Shadow Cities, A Billion Squatters, A new urban World, 2004, p. 11f.,16
8 cf. Michelle Provoost: New Towns for the 21st Century - the Planned vs. the Unplanned City, 2010, p. 12
9 https://stats.oecd.org/glossary/detail.asp?ID=1351 (07.01.2016)
10 cf. Eckhart Ribbeck: “Die informelle Moderne. “, 2002, p. 68
11 cf. “Planet of Slums”, Mike Davis, 2006, Berlin, p. 42

How housing policy changed over time



http://unhabitat.org/incremental-housing-the-new-site-services-reinhard-goethert-massachusetts-institute-of-technology/ (07.01.2016)

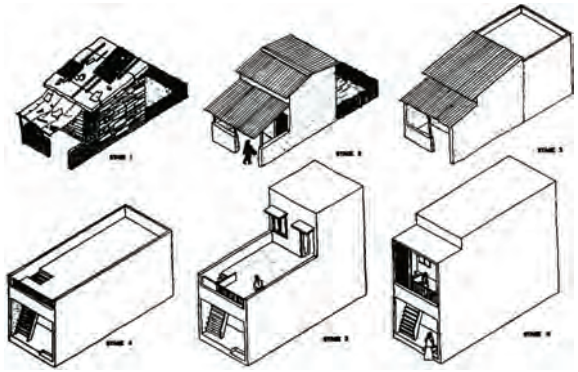
blurry, and so is terminology. A grey area between the informal city (the unplanned city) and the formal city (planned city) has evolved. A city planned to a certain (varying) extent, but with attributes deeply characteristic for informal bottom-up processes like the underlying self-build process; formal but yet informal. Semi-informal? But how does this come?

In fact informal builders are providing the bigger part of affordable housing world wide. Long considered as poor and unable to house themselves, over time their resultant informal housing generally matched higher income standards. People who started out with nothing ended up with an upper middle class multi-storey building. For professionals it became apparent to mimic this successful behaviour and even try to improve the process. So the underlying incremental informal housing process was adopted into government programs. These programs were modelled simply on how people lived and provided a new proactive alternative to the common practice – in other words: "before people squat, we lay out a development and let them build using their own energy." These so-called 'site and services',-schemes focused on housing and land development and they embraced the process as the key. This all happened in the early 1970s, at the point of time when the Club of Rome published its book "The limits to Growth" and the general public recognized the issue of population growth. At that time there were big concerns that the cities would not be able to house all the people migrating from the rural areas and there was a general fear that squatters could arise and people would have to live on the streets perhaps. But then the topic suddenly died out. Today the same issues have come up again, but they have become more acute: According to projections the world population is going to double within the next 20 years and therefore the occupied area will triple. What also has changed since the 1970s is that environmental problems have come over and above, which has led to a growing environmental awareness. Since back then, there have been several fundamental policy shifts within the field of affordable housing. Over centuries governments have tried to remove and eradicate squatters but it did not work as we can see today.

Within the 1950s politicians passed large scale formal housing schemes. The result were multi-storey (mostly four-storey) houses that can be seen everywhere in the world. Those turned out to be too expensive and too slow in construction though.

(note: The Indian government currently announced the "housing for all" scheme, with the goal to build 200,000 houses for the urban poor until the year 2022, the 75th anniversary of Indian Independence. There is no doubt that this scheme is well-intentioned, but it could easily mean a backslide to the 1950s, where similar schemes proofed as ineffective. In my opinion, the biggest disadvantage of such formal EWS-schemes compared to informal strategies, is that informal dwellings are emerging, and providing living space right there where it's needed, at the time when it's needed and at the extent it's needed. No formal EWS-scheme is capable of doing these three things in such a pinpoint manner. In fact usually it is very difficult to identify an existing housing deficit, often simply due to a lack of reliable data. As a result quantification of the housing demands in a specific location is often fierce speculation.[12]) So having realized that the mere provision of large quantities of formal housing is no capable measure, John F. C. Turner came up with his two books "Housing by people" and "Freedom to build" and finally bridged the gap between informal settlement and low income housing. "He said what we need to do is: do what people do already but do it better and help them." This was the next big shift in concept and the birth hour of the "site and services"-principle: "Under a variety of types and variations, "Sites-and-Services" schemes are the provision of plots of land, either on ownership or land lease tenure, along with a bare minimum of essential infrastructure needed for habitation." [13] About 7,000 shelter units were within the first large scale site and services scheme created, designed by Christopher Charles Benninger in 1972 in Arambakkum, Chennai (India). But this approach didn't stop the growing informal housing sector. More than ever, there was a necessity for improvement of existing squatter areas, and so the whole notion of upgrading projects began concurrently.

"INFORMAL DWELLINGS ARE PROVIDING LIVING SPACE, RIGHT THERE WHERE IT'S NEEDED, AT THE TIME WHEN IT'S NEEDED AND AT THE EXTENT IT'S NEEDED ..."



Upgrading process of an informal housing unit
http://collections.infocollections.org/ukedu/collect/ukedu/index/assoc/h1584e/p37.gif
(07.01.2015)

In a conventional site and services design project by professionals, there were three basic kinds of starter houses:

1. empty lot with services (for people with no money),

2. small houses with services (people with money),

3. in-between starter core (most favoured) with one room, water and sewer

Today's "site and services" projects are still "pay as you go" (no mortgages, buy a brick every day) but over time a whole range of starter options have developed and they got renamed to "incremental housing projects". The solutions are reaching from a field with only a toilet, over only a roof or half house, up to multi storey (4-, 5-, 6-storey) incremental housing. The trick is, to put many people into one spot, so that infrastructure becomes affordable. This has also been the basic reason for building walk-up apartments in the past. According to Reinhard Goethert, director of SIGUS (Special Interest Group in Urban Settlements at MIT) and secretarial for the Global University Consortium Exploring Incremental Housing, the goal of conceiving such projects should be to find a "happy middle ground" between control for the public authorities and flexibility for the inhabitants. And yes, there are several successful projects where this "happy middle ground" was found already: In the Baseline Road Project in Colombo, Sri Lanka, for example, people started with simple roofs in the 1970s and today you can't tell the difference from a functioning formal neighbourhood. Within incremental housing projects, not only the single house, but also the pattern of the settlement grows over time. These urban layouts have also changed since the 1970s. The first site and services projects were full projects, with hundreds or sometimes thousands of core houses in a layout that would be upgraded step by step. Today there is a tendency towards having only a very raw framework, which marks another major change in concept. This minimal site and service-approach runs by the name of "proactive incremental housing strategy" and basically says: "Ok, go ahead. Squat if you like. But squat legally!" The question for the cities now is: What is the least we need to do, to control and guide growth? The solution could be to only provide the main street/infrastructure grid as well as a protocol of settlement to help people to settle responsibly. Reinhard Goethert suggests that the site and services projects of the near future will increasingly make use of the informal sector. He calls this the concept of "the Good Squatter" – "If you squat, do it well" – squat so that the city can come in afterwards, they can give you title, build the roads, layout the properties, and you can become part of the city network. "What this needs of course is the political will and the insight that extreme challenges like unprecedented population growth and urbanization might need unconventional measures on the part of the authorities. The job of the professional planners would be to design the guidelines for the settlers and to figure out how to make them actually follow them. Researchers at MIT for example see great chances in the fact that today nearly every settler has a smart phone, which makes it much easier to reach them and help them to build and also evaluate the condition of their houses.[14] Also other experts like for example Jörg Stollmann, Professor of Architecture and Urban design at TU Berlin, conclude that it makes sense to allow settlers to participate in the design and growth of their neighbourhoods, not just in terms of housing but also for communal facilities, public space and infrastructure water and transport: "Instead of trying to regulate and plan all developments

"... NO FORMAL SOCIAL HOUSING SCHEME IS CAPABLE OF DOING THESE THREE THINGS IN SUCH A PINPOINT MANNER."

12 cf. David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015 , p. 15
13 cf. http://www.gdrc.org/uem/squatters/s-and-s.html
14 cf. http://unhabitat.org/incremental-housing-the-new-site-services-reinhard-goethert-massachusetts-institute-of-technology/

top-down, a smaller set of rules could help orchestrate the self-organizing powers of the inhabitants. He proposes to apply a strategy based on a mutual agreement between the neighbourhood community and the authorities."

Similar recommendations regarding a synthesis of informal forces and the need for planning are made by architect Ekim Tan in her paper "Interweaving the formal and the informal." Tan's research is aimed at developing an urban planning process that includes a role for self-organization. In order to discover the different ways of interaction between planning and self-organization, she investigated and compared spatial and social adaptations during the development of two very different cities: self-organized Gulensu in Istanbul, Turkey and Almere-Haven in the Netherlands. She recognized a surprising trend whereby the two cities appear to be converging on some kind of ideological middle ground: "It seems that while Istanbul begins to break up her self-organizing city-making culture, the Netherlands aims to break up the dominant role of the central housing production. The two fundamentally distinct city-making cultures seem to romanticize their contrasting planning models." This example perfectly highlights the complexity of the global discourse on housing policies. Just in the same moment as the professional Western planners do believe that they are looking beyond their own nose embracing informal strategies, somewhere else they are heading exactly for the opposite direction. It shows that it is a never-ending debate about which approach generates a better city: the top-down or the bottom-up, the planned or the non-planned, the formal or the informal; and that there is no single solution that is the real deal. The actual circumstances suggest that a mixed approach is the way to go, rather than an absolute system.

Concluding this overview, I want to show that the formal as well as the informal city can be found in one and the same relatively nearby and unexpected location, where they can be compared and perhaps be allowed to interact. In Copenhagen in the early 1970s the basis was laid for two districts (Urbanplanen and Christiania), which have evolved as planned and unplanned polar opposites, as the "The New Town and The Free Town". The anarcho-socialist enclave Christiania was founded in the same year (1971) as the prefab public housing tower blocks of Urbanplanen were finished. The high-rise buildings of Urbanplanen were developed top down from scratch along the building crane tracks while the picturesque Christiania developed slowly, bottom up, within the confines of former military barracks and was completely self-organized. Nevertheless they are both non-typical towns; ghettos of, in the one case immigrants and in the other of "freaks". Thirty years later, a government policy to normalize both districts was initiated (2001). Christiania is supposed to become more normal, more regulated and to be brought within "the system", while the multicultural Urbanplanen is supposed to become varied and more integrated: "Occupying an attractive plot in the centre of Copenhagen, close to water and green space, but outside market forces, Christiania's collectivist ownership is a thorn in the side of the government. Likewise, Urbanplanen's social democratic housing allotted to the unresourceful and immigrants (on welfare), is not the favourite cup of tea of liberalists and conservatives." Despite

Upgrading process in Mathare Valle, Nairobi
http://incrementalhouse.blogspot.co.at (07.01.2016)

their unmistakable differences, the planned and unplanned city have one quality in common: They have both managed to outstrip the homogeneous welfare state image and to accommodate a new sort of urban community that is globalized and multicultural: “In this process, Urbanplanen and Christiania are not opposite utopias, but real places (heterotopias) with the ability to absorb difference without neutralizing it.” As we see, the recent interest in the informal city among academics is by no means only limited to planners operating in the global south. Also in Western Europe, but in particular in the Netherlands, the disadvantages of New Towns and rigid modernist and Western planning culture have recently led to calls for the involvement of residents and other stakeholders, for doing away with rules and regulations, and sometimes even for doing away with planning per se. Planned cities are regarded as dull and monotonous and some even call the modernist planning paradigm of the twentieth century: “the biggest planning debacle in human history.” [15]

Housing programs in Europe during the early years of the industrial revolution and Haussmann’s interventions in Paris, set precedents for such urban operations aiming to sanitize, beautify and streamline the city. What all those initiatives had in common was the desire to establish different morphological and performative conditions than those embedded in informal growth. They introduced planned and designed top-down solutions and replaced the culturally driven mode of city making. This approach reached its epoch in the mid twentieth century, when the modernist movement attempted to resolve urban problems on a global scale. By the end of the second millennia its principles were adopted as standard practice around the world. The modernist ideas challenged the performance and morphology of the traditional/unplanned city, which for thousands of years had shaped urban history. Modernists argued that the cities had become chaotic and dysfunctional. They believed that the traditional city was unable to accommodate the latest technological achievements or address increasing population demands. Soon the modernist prototypes easily adapted worldwide, since the principles of engineered functionality overruled the variance of place and culture. Cultural and local idiosyncrasies were conditions that permeated the traditional city. The new approach, propagated in particular by CIAM (Congrès Internationaux d’Architecture Moderne), aimed to improve the cities’ efficiency by organizing them in mono-functional areas regulated by zoning. Those were supposed to avoid the conflicts of incongruent urban uses, such as residential and industrial zones. “The predominantly piecemeal, mixed-use, and self-constructed urban fabric, which constituted the DNA of the traditional crisis, would be replaced by planned, highly controlled and highly speculative real-estate-driven operations.“ Modern principles favoured the expansion of the cities from older city cores into rural landscape, with urban patterns highly dependent on vehicular mobility. In the industrialized world, modern development quickly surpassed the traditional city in area and population. In the developing world, however, the modern principles shaped only the formal areas where the more affluent classed lived and worked. These changes affected the performance of the entire city, given that the informal areas are highly dependent on the formal ones. As the cities grew, people realised that the modern city as a paradigm of formal, functional and managerial organization had many disadvantages, particularly when it came to providing adequate shelter for the urban poor. “In his 1991 dissertation, Principles, Rules and Urban Form: The Case of Venezuela, Oscar Grauer finds that planning and zoning, as well as modern urban patterns and architectural solutions, originated in the industrial world. In developing countries the introduction of modernist paradigms excluded the urban poor from the benefits of the modern lifestyle”, David Gouverneur states. The modern planning paradigm fostered segregation and was relying on a real-estate-driven model to which the poor did not have access.

As a reaction, governments have tested a wide variety of different social housing programs reaching from: low- and mid- to high-rise schemes, inner city to peripheral, mixed use districts to productive and transformative housing units, on flat to mountainous terrain, repetitive to various, large to small scale; using different methods of implementation such as: land banking, different modalities of financing and subsidies, public-private-partnership, ownership or leasing of units or parcels. Some initiatives are centralized others are community-driven built by cooperative enterprises or developers. But what all of them usually have in common, is a strong focus on quantity of units instead of quality of the human living-scenario. Initial pedestrian friendly urban renewal operations like e.g. Karl Brunner’s “Urbanización El Silencio” (1941-1945) in Caracas were soon followed by a wide array of CIAM principles inspired programs, creating urban islands at the cities’ outskirts, in which residents soon experienced general decay, high levels of violence and a bad public transportation system.[16] In the 1950s large-scale relocation projects such as the “23 de Enero” district in Caracas ended in a disaster, as described by Sim-

15 cf. Michelle Provoost: New Towns for the 21st Century - the Planned vs. the Unplanned City, 2010, p. 10, 26f.
16 cf. David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015 , p. 13f., 261

one Rots in his article “The Squatted New Town”. [17] Some residents of 23 de Enero decided to pass their units on to wealthier groups and continued to squat in-between the modernist mega-slabs, returning to their rural life which they were used to.
Still, as population grows authorities plan ahead, envision how the city will evolve in an orderly manner, estimate land uses and set up mobility systems. These quantity-oriented plans are generic by nature and differ hardly from those introduced decades ago, carried out by a professional elite educated in foreign countries. The applied building codes were not always relevant or applicable in the particular context, because the used models reflected in legal documents regulating the expansion of boundaries, planning and legal exercises contradict the socio-economic reality as well as the spatial and functional requirements of the urban poor. Gouverneur writes in his book Planning and Design for Future Informal Settlements, Routledge, 2015: “The central failure of formal urban planning in serving marginalized social groups are the following:

- unequal land-ownership distribution

- radical land value shift

- lack of access to the financial market (real-estate market)”

Instead of trying to encounter the challenge of informal urbanism with the provision of social housing, which turned out to be too expensive for both, the state and the urban poor, Gouverneur suggests, policy-makers should create managerial frameworks, allowing low income settlers to self construct healthy habitats and make use of the immense quantities of human capital. (note: Exactly this is what the Indian government still misses to do with it’s current housing policies: Mobilizing the sheer endless human manpower to tackle the affordable housing challenge.) “Comparing most formal social housing programmes to the evolution of the informal settlement, it is evident that over time the self-constructed housing stock not only outnumbers formal construction, but also achieves dimensions and qualitative conditions that surpass those of the formal housing projects”(David Gouverneur)

What the urban poor require he says is:

- basic infrastructure

- communal services

- urban amenities

- access to jobs

What basically means there should be less investment in housing units and more investment in the public realm.

Today’s reclaimed admiration of the historical “organic” city (which is to certain extent the equivalent to the informal city in the undeveloped world) in the fields of architecture and urban design is reflected in contemporary housing developments where the master plan assigns every building a different facade, resulting in quasi-organically evolved street fronts. In informal settlements, the Western critic finds the very opposite of ”our” kind of planning. They are seen as unplanned and seem to have grown of their own accord, to be a natural phenomenon rather than a man made, artificial construct. “In the wake of the sense of wonder the West has conceived for the beauty of the slums, which spread over hill and dale like organic fabric, one often hears the slum praised as a social construct. Briefly, what this amounts to is that the people in these slums may be poor, but nonetheless they are very happy.“ They have one another, the social structures are strong, and the alienation and loneliness of modern life have yet to be felt there. In fact there’s a whole range of positive characteristics, making the informal city promising for sustainable future city planning, such as:

- high density

- compactness

- pedestrian friendliness

- social cohesiveness

- capability of incorporating mixed uses at neigh bourhood scale

- low energy consumption

- relatively low production of solid waste, compared to formal cities[18]

The real or imagined failure of the modernist planning project has led some people to dismiss the regulated top-down planning of the formal city as obsolete and to embrace its opposite, the informal

Aerial view: formal vs. informal city, Pune, 02.2014
(photo by Lena Kohlmayr)

city. The current popularity of informal conditions (economic, social, physical) also finds its expression in the international policy of large institutions like the World Bank. We can find the recent celebration of urban informality in a whole spectrum of policy positions. From the World Bank's agenda of enabling informal urban development to the newfound enthusiasm for self-helping strategies of the urban poor, there is a growing consensus on the benefits of harnessing the efficiencies of urban informality. This attitude is also reflected in the writings of American journalist Robert Neuwirth. In his book "Shadow Cities", he quotes with approval one inhabitant of Southland, a small shantytown on the western side of Nairobi, Kenya, who declares that he would never want to live in the "formal" city again because according to him it offered something no legal neighbourhood could offer: freedom: [19] "This place is very addictive, " he said, "it's a simple life, but nobody is restricting you, nobody is controlling what you do. Once you have stayed here, you cannot go back." He meant back beyond that mountain of trash, back in the legal city of legal buildings with leases and legal rights. After having stayed himself several years in informal settlements on four continents, Neuwirth describes them as "thriving centers of ingenuity and innovation", praising the inventiveness people apply to the business of survival and the ingenious solutions they develop for their daily problems. Dharavi, one of the largest informal communities of Asia, located in Mumbai, for example is a combination of shantytown and high-rise squatter neighbourhood, famous for its active informal economy and its exports around the world. Textile and leather factories, showrooms, recycling and upcycling businesses as well as pottery workshops, wholesalers and retailers can be found in the maze of narrow streets. Although there are no sewers and no garbage pickup, there are large numbers of food businesses. The produced sweets or spices are commonly sold at some of the city's upscale stores and hotels. Local leaders estimate that there are about 10,000 small scale house industries, 5,000 small printing businesses, 1,000 businesses related to the clothing industry with more than 50 sewing machines and perhaps 3,000 with fewer than 50 machines. Although it's impossible to know exactly, since all of these businesses are technically illegal, and therefore don't report income or pay taxes. The total turnover of all these firms is estimated to amount to $ 1 million a day. A bed in a shared room in Dharavi by the way costs about 600 rupees per month (30 years ago only 10 rupees), while a meal costs about 700 to 800 rupees (30 years ago 70 to 80 rupees).[20] Neuwirth's vivid descriptions and his admiration for the ingenuity and innovation he encountered dare us to rethink our notion of community, poverty and the shape of 21st-century cities. Our challenge, Neuwirth says, isn't to end poverty or control populations, but engage and empower the residents in these "cities of tomorrow".

"IF APPROPRIATELY GUIDED, THE INFORMAL CITY CAN MAKE SIGNIFICANT CONTRIBUTIONS TO SUSTAINABLE URBAN LIFE."

Leading experts in the field of the informal city are Alfredo Brillembourg and Hubert Klumpner with their Urban Think Tank practice in Caracas, Venezuela. In their contribution to the book "New Towns for the 21st Century - the Planned vs. the Unplanned City", they describe the importance of the study of favela condition as follows: "It was once believed that plans needed to be drawn as a blueprint; this belief is obviously not true: there are no blueprints in the barrios, favelas, bidonvilles, etc. In general, the conditions of the new towns and cities that we see in the Western world are the exceptions; the rule is what is going on in the rest of the world". Although the favelas strike outsiders as chaotic, the high density of such an environment actually demands a correspondingly high degree of organization. It may look informal and unplanned, but in reality there are clear patterns and rules. They

17 cf. Michelle Provoost: New Towns for the 21st Century - the Planned vs. the Unplanned City, 2010, p. 27
18 cf. David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015, p. 9, 15f., 262ff.
19 cf. Michelle Provoost: New Towns for the 21st Century - the Planned vs. the Unplanned City, 2010, p. 12f.
20 cf. Robert Neuwirth: Shadow Cities, A Billion Squatters, A new urban World, 2004, p. 6, 122f.

are not the same rules as in the official city and official planning; this is a form of proto-planning. As we see it is the process of self-organization and the alternative way in which space is produced, why architectural professionals are interested in informal settlements. These are the key elements of the informal city that could inspire future urban planning. What also appeals the architectural community is of course the picturesque imagery of the informal city. The living conditions may leave much to be desired, may even be shocking, but nevertheless it would be difficult to ignore the beauty of these agglomerations, with their narrow paths winding their way up the hillside and their variegated and small-scale roofscape that is reminiscent of the medieval city. Viewed in this light, it seems as if everyone could find a reason for romanticizing the informal city, but it is a superficial romanticism and because of its one-dimensionality it misses the mark.

Patchwork of self-build housing types, https://incrementalcity.wordpress.com/2012/09/18/unthinking-housing-for-the-urban-poor/ (07.01.2016)

Based on his experience with UN Habitat, where the subject of slums has been on the agenda for about thirty years now, Claudio Acioly Jr. lists the reasons why the informal city may satisfy some visual ideal, but is certainly no ideal living environment: “Research shows that slum dwellers die earlier, experience more hunger, have less education, have fewer chances of employment and suffer more ill health than the rest of the urban population. In some countries urban slum dwellers are far worse off than their brothers and sisters in the rural areas.” (25)[21] In general informal settlements are associated with poverty, drugs, violence and unhealthy housing conditions. Cultural and mental barriers are often stronger than formal and morphological obstacles. Surveys in Rio de Janeiro for example showed that residency within a Favela represents an even stronger stigma than e.g. skin colour, which in turn has a big impact on the employment situation. The average income of a person living in a Favela is significantly lower than the income of a person living in the formal city with the same education.

“If it turns out during a job interview that the applicant’s address is located within a Favela, the interview usually ends”, says Janice Perlman, Founder and President of the Mega-cities Project.[22]

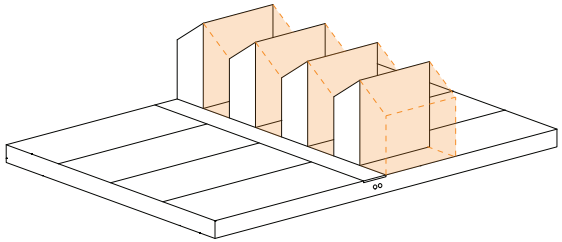
In return, formal citizens usually have hardly any access to informal areas. In the best-case scenario, both the formal and the informal cities co-exist, but rarely interact.In some cases, like in Kenya or India, this lack of contact is deeply rooted in the heritage of colonialism in which exclusion and segregation of marginalized groups was originally volitional. Mixing Asians and Europeans was frowned upon during the 300 years of British control of the country. Low-income people who flocked to the city to work in factories were housed in so-called chawls: apartment blocks where each family had one small room that functioned as kitchen, bedroom, and living area. Major firms usually built chawls near their factory compounds, but as migration to the cities continued and factories closed, even the overstuffed chawls were not an option for new arrivals anymore. (Muslims and Hindus also used to live separated.)[23] The inequality within the city occupation stayed the same after gaining independence. In most cases there is no motivation among the informal dwellers to leave their settlement because of flourishing social and emotional bounds in their self-constructed neighbourhoods. Often cultural patterns that stem from pre-colonial customs or recent rural origins are also playing a certain roll. While many nations, as mentioned above, encounter the informal settlement-challenge either with force, formal housing provision or just by ignoring it, some nations today are dealing with it in a more creative and proactive way. In cities with growing acceptance and political support, like in Caracas for example, where improvements came in the pre-election period, older informal communities were legalized, residents gained a stronger level of political participation, and so it happened that officials revised the planning laws in order to acknowledge informal settlements as an alternative mode of urbanization.

According to David Gouverneur, it is crucial for the success of an informal urban area to take non residents there; to change their perception and appreciation of the “other city”. It is important to produce a hybrid urban system with shared values:

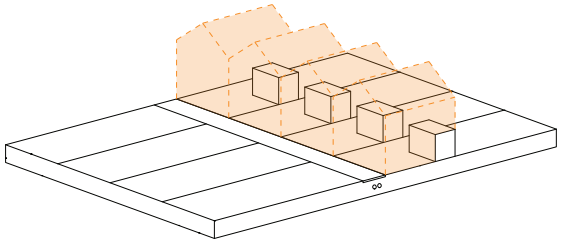
21 cf. Michelle Provoost: New Towns for the 21st Century - the Planned vs. the Unplanned City, 2010, p. 14, 25
22 http://unhabitat.org/urban-informality-marginal-or-mainstream-janice-perlman-the-megacities-project/
23 cf. Robert Neuwirth: Shadow Cities, A Billion Squatters, A new urban World, 2004, p. 131
24 Robert Neuwirth: Shadow Cities, A Billion Squatters, A new urban World, 2004, p. 110
25 David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015, p. 3ff., 263f

“We can envision a future of cities that favour social mixing, a combination of uses and public transport, in formal as well as informal cities. These cities would offer a rich system of public spaces for socializing, and civic engagement, while demonstrating commitment to environmental excellence. If appropriately guided, the informal city can make significant contributions to sustainable urban life, impacting large cities of the developing world in a positive way.”[25]

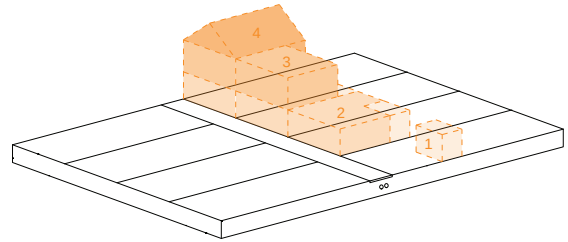
INCREMENTAL HOUSING PROTOTYPES



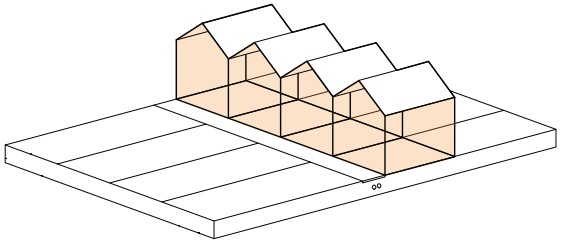
The minimal apartment (half-a-house approach)



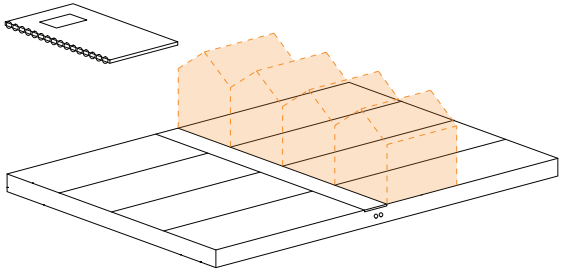
The starter core



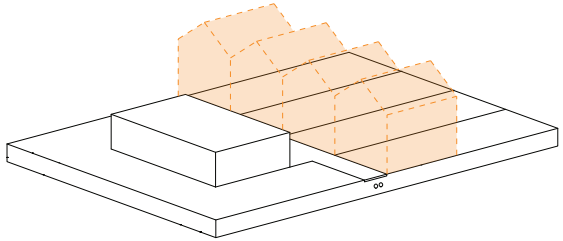
The modular (construction) system



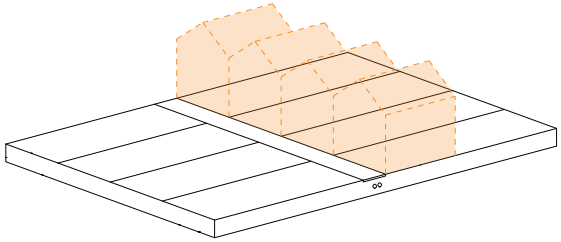
The predefined framework approach



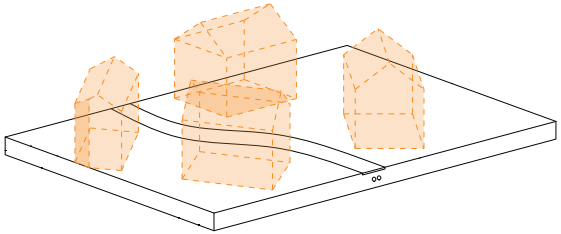
The good squatter (full toolset / guided)



The catalyst (community center approach)



Site and service, literally



'Self settlement', liberal development plan + building code

MIX

Combination of different approaches

ELEMENTAL, QUINTA MONROY

Location:
Sold Pedro Prado, Iquique, Chile

Planners:
Alejandro Aravena, Alfonso Montero, Tomas Cortese, Emilio de la Cerda,

Timetable:
2003-2004

Costs:
Total construction costs US$740.000 ex. VAT,
per unit (approx.) US$7.500 ex. VAT. incl. cost of land

Floor space index (density):
1.2

Site area
5.000m²

Gross floor area:
5.859m²

Open spaces:
400m² approx.

Number of floors:
3

Habitable floor area:
2743m² (initial), 6.620m² (final)

Units:
93 apartments á 72 m² (27 m² initial + 45m²)

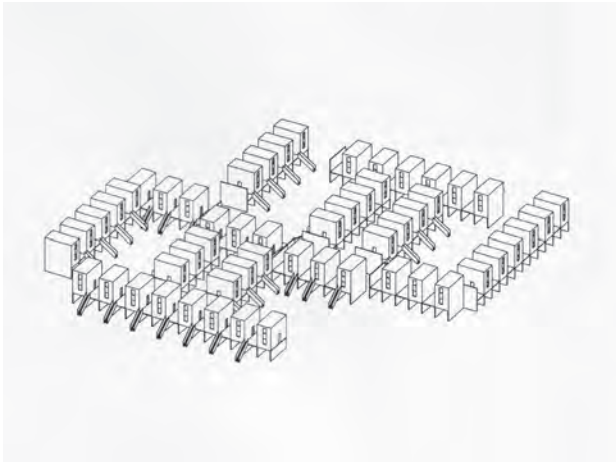
Photo: http://www.archdaily.com/10775/quinta-monroy-elemental/50102df128ba0d4222000ff7-quinta-monroy-elemental-image (07.01.2016)

The Chilean “elemental” project series is maybe THE most published and well known incremental housing project of the last decade already. Nevertheless it shall also be portrayed briefly within the following abstract, in order to try to draw an emblematical picture of the contemporary discourse in the field of low cost housing strategies.

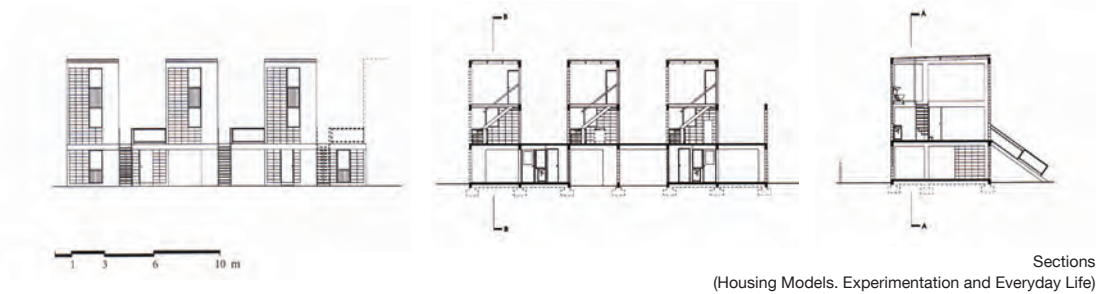
The Elemental “do tank”, founded by Alejandro Aravena as a joint venture with the Chilean oil company Copec and Santiago’s Pontificia Universidad Catolica de Chile,[1] creates basic expendable homes for the very poor. The idea behind the project is to lead lowest income families into a path of incremental prosperity by providing only “half a house” for them. The government subsidizes the first half of every dwelling with US$7.200, thus covering at least the financing of the required infrastructure, framing and the building lot. The other half is completed only in structure and is handed over to the residents for self-building. Despite high property values, they purchase inner-city areas if necessary, in order to leave the families within their accustomed socio-economic environment instead of displacing them to the periphery. The aim is to create a stable social milieu as well as a solid market value for the property.

In Quinta Monroy, the first built project of this kind which was started in 2003, 100 families settled in the same 5,000 m² site they had illegally occupied for the last 30 years. The site is located in the center of Iquique, a city in the Chilean desert. All the starter-units were completed within a period of only a few weeks. The arrangement of clearly ordered groups of houses around courtyards facilitates self-administration and allows the government to save maintenance costs. The row-house itself consists of two stacked apartments of approximately 30m², each of them capable of doubling up the original floor area to 72m², without a loss of amenities. The simple and robust concrete structure (reinforced concrete and exposed concrete blocks), is earthquake-resistant according to the local building regulations and the seismic condition of the area. The genesis of the Quinta Monroy development can be divided into five periods:[2]

Site plan
(Housing Models. Experimentation and Everyday Life)



Axonometry
(Housing Models. Experimentation and Everyday Life)



Sections
(Housing Models. Experimentation and Everyday Life)

1 cf. archplus 211/212 “Think Global Build Social”, 2013 p. 127
2 cf. Oliver Elser and Michael Rieper: Housing Models. Experimentation and Everyday Life, Wien, 2008, p. 118

Before and after upgrading
https://www.studyblue.com/notes/note/n/arc-001-study-guide-2010-11-ncarb/deck/9736673 (07.01.2016)

"THE REPETITIVE BLOCK SEEMS TO STIMULATE THE DIVERSITY..."

Phase 1 "Pre-Elemental":
The "Pre-Elemental"-phase is represented by the former settlement; a labyrinth of informal clusters, suffering from severe security issues, located within the prospective building site. The settlement provided basic shelter for approximately one hundred families whose incomes ranged from about US$20 to US$100.

Phase 2 "Removal":
The Removal of the initial informal settlement began in December 2003 with the temporary resettlement of the inhabitants (mostly to the neighboring settlement). Although the original settlement was one homogeneous agglomerate of informal dwellings, it was now split by the project into four discrete units, each one organized around an independent court. "It is our concern to guarantee that the Elemental housing groups shall not require collective maintenance fees; it is for this reason that we have avoided typologies based on communal devices, such as communal stairs or corridor," states the architect, adding that: "groupings of 20 to 30 families are ideal from the point of view of administration since higher numbers are more prone to conflicts as the neighbors lose touch with one another." At a social level, unlike traditional housing policies where the state itself assigned urban domiciles to the families who registered in social housing programs, the client interacted with the design team throughout the whole development process. This guaranteed the preservation of well-established family bonds within the new properties.

Phase 3 "Foundation":
By December 2004, the properties were handed over to the prospective owners. At this point Quinta Monroy changed its name and became "Violeta Parra Condominium". With this phase also the building participation started, with the inhabitants expanding their dwellings according to previously defined areas, allowing them to double the size of their units for only another US$1,000. Together the inhabitants now also implemented the fencing of each cluster, as well as the outdoor paving. With this Phase, Quinta Monroy completed the evolution from an illegal shantytown to a legal condominium, subsequently turning from a stigmatized neighborhood into an emergent (lower) middle class one.

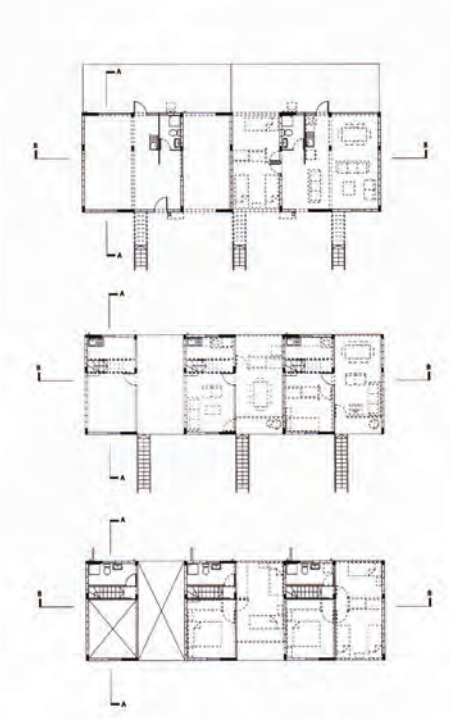
Phase 4 "After a few years"
Within this phase many of the architect's predictions were confirmed. The decision to use repetitive blocks, has effectively managed to stimulate the diversity of expression and use of different materials supplied by the settlers. Like a well-resolved collage, these unplanned elements are successfully creating new (urban) identities. This also applies to the interiors. "It is easier for us to concentrate on the scheme's structural aspects rather than defining

ornamental or decorative elements for which we are not suitable designers," states Aravena. It is true that chaotic growth could result in overcrowding, but, as pointed out by Aravena, it is just as possible that instead of overcrowding their homes, those inhabitants who can afford it may rather choose to sell their dwellings in order to seek a larger house elsewhere. Home ownership usually represents the greatest accumulation of capital ever amassed by a single family. This capital has to increase in value to enable the owners to climb up the social ladder and enter part of the middle class. This is one of the fundamental ambitions of the Elemental project. And indeed, According to Aravena, the Quinta Monroy project already successfully managed the intended transition into the middle class housing market. In 2009 the homes in the Quinta Monroy estate reached an average market value of US$20,000, which is about three times their construction cost. This can be seen as a great success, as this increase in value has a strong social impact on these families. Besides the financial uplift, the awareness of owning a piece of property has a stabilizing effect, in terms of becoming more settled and taking on responsibility for themselves and their environment.

"... OF EXPRESSION WITHIN THE SELF-ADDING PROCESS."

Phase 5 "Post-Elemental"

Although generally recognized as a highly successful scheme, there are some unforeseen trends appearing in the aftermath of the initial phases that are important to note. First of all, Quinta Monroy seems to have no future as a unified condominium complex, as the individual communities tend to actively seek full autonomy and develop into different directions. While the inhabitants of the southeast court, fronting onto the Pedro Prado Street, are trying to keep their life as private as possible, life within the southwest court, fronting onto Galvarino Street, in contrast is characterized by collective action. Ironically, within the first court the most building activity can be observed, while the second one has little to show in this respect. This collective destiny however seems to stem from strategic decisions mastered at the level of urban morphology. Furthermore the fact that the initial budget had no provision for external works except for very basic operations, such as leveling, had some negative effects on the project. Due to this financial shortfall it happened that some ground-floor homes are facing a half-sunken court as their only mediation with a busy street. In addition, paving and fences share very poor material and design standards and conflicts between the care of cars and the care of individual gardens lurk everywhere where attempts of planting have been made.



Floorplans
(Housing Models. Experimentation and Everyday Life)

Both are competing for space within the same areas. Nevertheless, two distinctive trends can be observed: While some groups clearly embraced the ideal of the square, making their court primarily a social space, there are other groups tending to turn their court into a parking lot.[3] Elemental's approach, however represents a paradigm shift in social housing construction. It is a move away from the outdated perception of the ingenious architect as the creator of beautiful, freestanding sculptures, towards a more extensive picture of today's architect; the architect as a mediator of social, technological and political processes. Meanwhile Elemental's incremental residences have been publicized around the world.The project demonstrates a faith in the structural plainness of the design but nevertheless the confident acceptance of the unpredictable, chaotic adaptations that the residents themselves will undertake. In the meantime, new housing estates have been planned in other Chilean cities, including Antofagasta, Renca Temuco, Valparaiso, Lo Espejo, Lo Barnechea, Pudahuel, La Pintana, Tocopilla, Racagua and Constitución, making a total of 1,750 housing units. Furthermore the concept has twice been successfully exported to Monterrey, Mexico (70 units) and Paraisópolis, Brazil (120 unit).[4]

3 cf. Oliver Elser and Michael Rieper: Housing Models. Experimentation and Everyday Life, Wien, 2008, p. 119f
4 cf. archplus 211/212 "Think Global Build Social", 2013 p. 127f

ARANYA TOWNSHIP, INDORE

Location:
Indore, India

Client:
Indore Development Authority, Indore, India

Architects:
Vastu-Shilpa Foundation. B. V. Doshi

Land area:
89 ha (total)

Number of plots:
6500

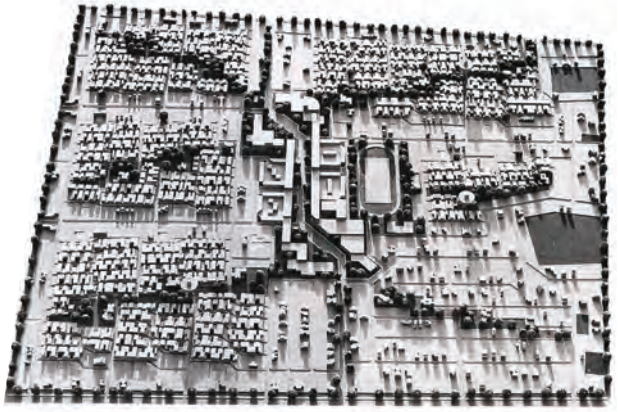
Population (projected):
40.000 (initial)
65.000 (final)

Planning:
1982

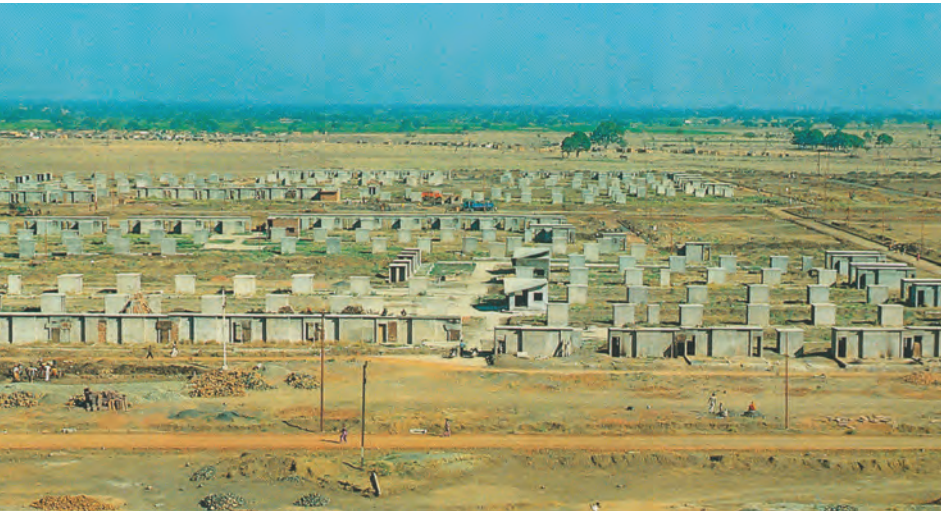
Photo: http://www.architectureindevelopment.org/images/projectmain-images/401/c1/Aranya%20Indore,%20Main%20Image.png (07.01.2016)

"PEOPLE CONTINUE TO LIVE, WORK AND PLAY WITHIN EASY WALKING DISTANCES."

Aranya township model
(Mimar - Architecture in Development 28, 1988)



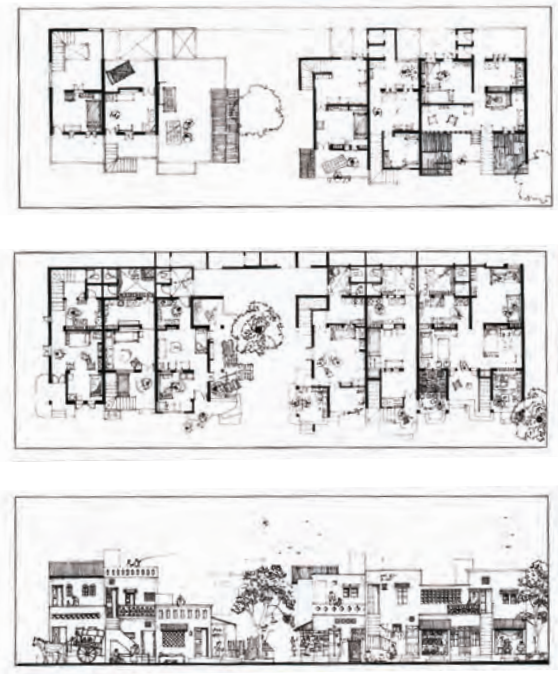
The Aranya housing project is located on the Bombay-Agra highway, about 6 kilometers outside of the Indore city centre (India). The project represents in many ways a 'classic' architectural approach to create low-cost dwellings for the poor in a large-scale. The professional designers responded to the public client with a fully elaborated project, based on the idea of the 'sites and services'-concept, but including 'models' for future dwellers such as housing-typologies, suggested materials and modular steps for implementation, searching a middle ground, between a house 'with no rooms' (sites-services) and totally non-participatory, public housing schemes by architects alone. The project was set up to meet the acute shortage of EWS-housing and ancillary facilities. It can be seen as a full stand-alone township accommodating a population of approximately 40,000 people. It consists of about 7,000 housing units in various income categories, but predominantly EWS (economically weaker section), and includes all the necessary social, welfare, economic and infrastructure amenities. As the mere provision of dwellings does not necessarily ensure a stable and active community with the capacity and the means to grow, a series of governmental and private agencies is needed additionally to provide an environment of financial security, that encourages inhabitants to take root. Training centres and material banks have to be established to teach easy construction and assembly methods and feed the extensive building activities in the early stages. Ideally, the self-help spirit has to be encouraged in such a way that the internal economy of the settlement is boosted, says B.V. Doshi To raise surplus capital, upper income plots were integrated into the scheme and sold at a profit. A part of this surplus was used to cross-subsidise the EWS-plots to bring them within the loan repayment capacity of the recipients. The residue can go into a revolving fund to assist the EWS construction, set up material banks and finance similar developments in the future. The initial capital was provided by the World Bank, until the revenue flowed in from the sale of the plots. In long term, however, the project was designed to be self-viable. It comprises of about 6,500 plots, ranging from 35m² (EWS housing) to 457m² (high income groups). Additionally there are also larger plots for multi-storey flats. Of the 6,500 plots, 65% are allocated to the EWS "site and services"-category. These plots are fully serviced and feature a basic building, core containing a toilet, wash and one room, which can be extended by the occupants at their own pace and with their own resources. "The objective of the scheme



Field with starter cores (Mimar - Architecture in Development 28, 1988)

is to provide housing, community and commercial facilities, primarily for the economically weaker section (EWS) but within a socially balanced matrix of middle and higher income groups." Regading the objective of creating a corporate community feeling, the streetscape was of great importance for the planners. According to them, a well designed street can forge a collection of individual households into an interactive group. To achieve this, the street has to obtain a unique identity on human scale with spaces for group activities. As the impact of the motor-car has yet to be felt here, people continue to live, work, and play within easy walking distances. In principle an Indian city can be interpreted as a collection of cross-linked, but almost self-contained sub-communities or 'villages'; and this is also how new towns should be set up. Aranya's gross township area of about 100 hectares, including open spaces and peripheral roads, is designed for an initial population of about 40,000 people which will probably rise to 65,000. This makes a gross density of 400 rising to 650 persons per hectare. *Densities of over 1,000 persons per hectare in the congested inner cities of India are obviously too high, but nevertheless typical.* According to studies, housing and infrastructure costs optimise at densities between 300 to 600 persons per hectare. The road area of the project is about 21% (plus 1.5% for pedestrian walkways and squares) of the net planning area and compares very favourably with the target set by the World Bank. Considering that in the EWS areas high road areas are consumed due to the small plot sizes, the overall efficiency of the road adopted patterns is clearly demonstrated. Furthermore, open spaces make about 8% of the planning area *(Indian planning norms: 8% to 10%)* and 3.5% are commercial areas *(in Indian towns usually: 2% to 4%)*, which are distributed along a wide spectrum of economic activities. The share of overall marketable area, which is usually difficult to increase beyond 60%, is over 68%. This efficiency has been achieved by optimising the road networks and encouraging multiple uses of the open spaces.

Regarding the concept of self-viability, at the end of the day, a substantial surplus of 11.7 million rupees had been generated against the investment of 57.2 million rupees *(based on 1982 prices).* This has been achieved by locating the commercial facilities as well as the upper income plots in the areas which would reach the maximum sale prices. Furthermore, the EWS sale price was subsided by 35% on average, again from the profits of the sale of upper income plots. The monthly loan repayment of the EWS plots was graded, reaching from Rs. 25 *(for families earning Rs. 200 per month)* to Rs. 87 *(for families earning Rs 400 per month)* (13 rupees was 1 $US) Grassroot research suggests that the monthly income of the EWS groups is underestimated in the national statistics as they do not take into account the incomes from the informal sector and the practice of subletting dwellings. These factors also generate additional income and contribute to the acceleration of the upgrading process from the basic cores to the

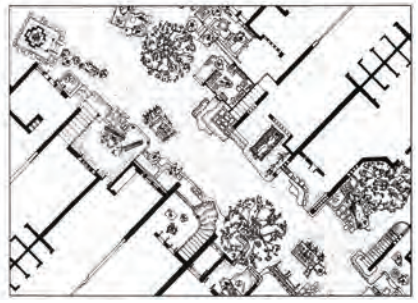


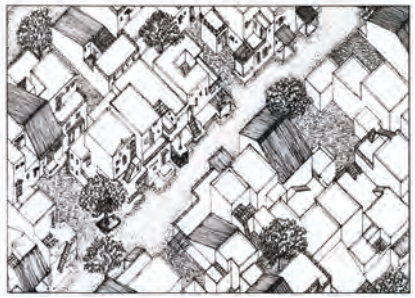
Floor plan and street section
(Mimar - Architecture in Development 28, 1988)

final dwellings. In the end, one of the most important findings is, that water supply and sanitation (namely service core and supporting infrastructure) constitute the largest cost components of such developments and are therefore becoming prime targets for efficient design. The methods developed for streamlining the services are of prime importance. If the efficiency demonstrated in this project was repeated throughout India, the impact on the national budget allocated to low-cost housing could be significant.[5]

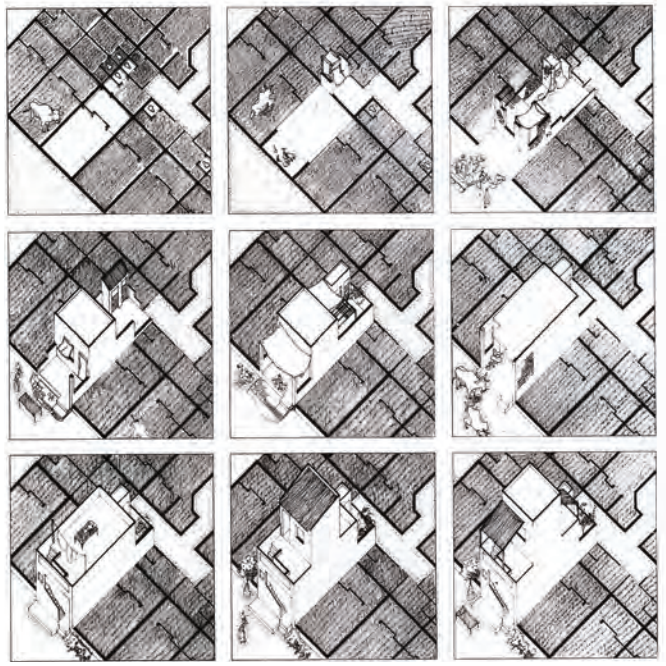
"HOUSING AND INFRASTRUCTURE COSTS OPTIMISE AT DENSITIES OF 300 TO 600 PERSONS PER HECTARE."

"WATER SUPPLY AND SANITATION CONSTITUTE THE LARGEST COST COMPONENTS OF SUCH DEVELOPMENTS."





Drawings of typical street scape
(Mimar - Architecture in Development 28, 1988)



Drawings showing the progressive growth of the dwellings
(Mimar - Architecture in Development 28, 1988)

5 cf. Mimar - Architecture in Development 28, 1988, p. 24ff.

WOHNREGAL, HAMBURG

Project:
DIY Multifamily Housing

Client:
PRIMUS Developments

Architects:
BeL Associates

Location:
Hamburg, Germany

Date:
2012 (Structure)
since 2013 (Settlers)

Residential Units:
12

Unit size:
30 - 150 m²

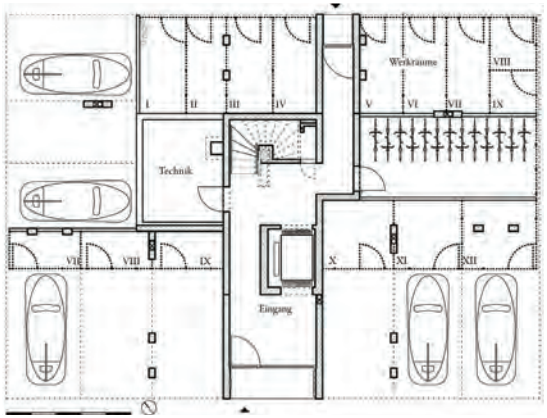
Plot size:
965m²

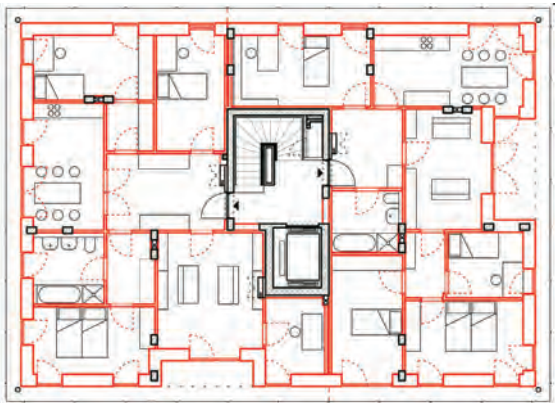
Total floor area:
1670m²

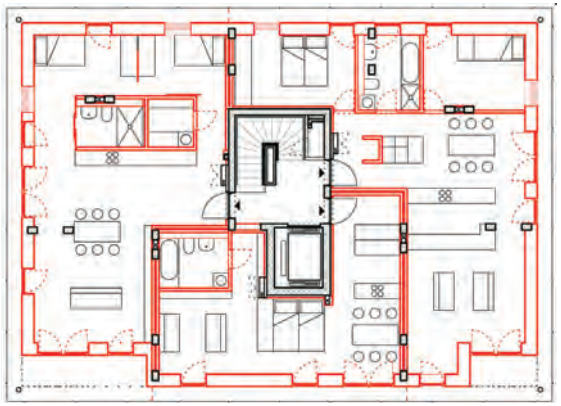
Building costs:
2,200 €/m²

Funding:
PPP

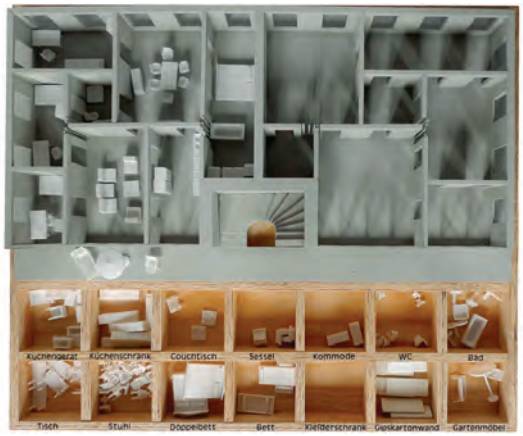
http://www.bel.cx/cx_Projektseiten/projects.html (07.01.2016)







Floor plans
http://www.iba-hamburg.de/fileadmin/Mediathek/Whitepaper/130612_Grundbau_und_Siedler.pdf (07.01.2016)



Model kit
http://www.iba-hamburg.de/fileadmin/Mediathek/Whitepaper/130612_Grundbau_und_Siedler.pdf (07.01.2016)

The experimental housing project 'Grundbau und Siedler' by the Cologne-based firm BeL was completed in early 2013 as part of the Internationale Bauausstellung Hamburg (IBA). The aim of the project was to enable lower income families to attain their own housing property. The concept is simple: At the centre of the plan stands a five-storey concrete rack based on the concept of Le Corbusier's 1914 Domino House. Each floor contains three apartments of up to 150 square meters in size, making for twelve residential units in total, which has approved to be an advantageous size for multi-storey residential buildings; economically feasible for the investor, yet easily manageable. This basic concrete structure, the so called "Grundbau" consisting of load-bearing columns and slabs, superordinated technical installations, staircase and elevator, is provided, but the settlers are then to complete the remaining construction of their individual units on their own. Each unit comes with a construction kit including building materials and a well-organized 196-page, instruction manual, prepared by the architects, offering detailed explanations of the final DIY-stages of construction, as well as indication of construction works requiring certification.
In advisory sessions, the architects gave instructions to the ad-hoc builders and discussed the desired layout of the apartments. With models in the scale 1:50 residents were able to try out different floor plans and adapt them to their individual needs.[6, 7] However, those who didn't want to stick to the recommended outfit and configurations, could just as well ignore them and were free to improvise. Due to the flexible construction system of the "Grundbau", there are hardly any restrictions regarding the desired floor plan. Different sizes of dwelling units and covered outdoor areas are possible within the structure. Not even the wet-rooms or kitchens are determined. The floor plan of the apartment complies solely with the needs of the dweller. To allow

6 cf. archplus 211/212 "Think Global Build Social", 2013, p. 136ff.
7 Think Global, Build Social! – Architecture for a Better World / Exhibition: AZ W Vienna 15. 03. – 30. 6. 2014

this high level of flexibility, the building had to be equipped with 50% more vertical utility shafts than usual.

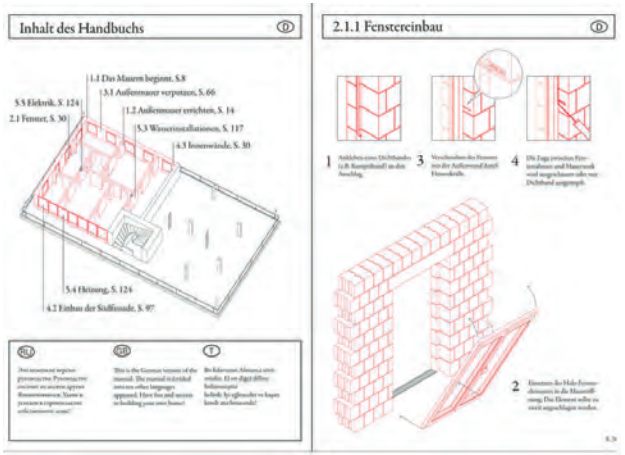
According to the architects, the applied DIY implementation allows for a theoretical reduction of costs up to 25% of the construction. But relying on residents for the final stages of construction, not only reduces costs; it also lowers the importance of the architect, who provides little more than a reinforced concrete skeleton of five open floors. The ground floor of this concrete rack is left empty, except for a house service connection room and a staircase entrance, and therefore provides enough space for parking and for workshops, where residents can prepare construction materials before bringing them up to the upper levels on the elevator. The exterior space is also ready for occupation. The outside areas are not sealed, yet drivable and therefore neutral and flexible. The utilisation of these areas is to be negotiated by the settlers themselves. As the provided in-situ concrete skeleton is not insulated, every settler himself is responsible for insulating his individual dwelling unit on his own also. The slabs are equipped with a circumferential railing, featuring grommets allowing to fix safety nets between the slabs. This simple provision, allows for construction work without scaffolds, at any time. Also other building elements such as the staircase and the elevator are dimensioned considering necessary material transport. On every floor, the staircase walls provide four potential apartment entrances (of which usually one is walled up). The interior fitting of the 3.20m high levels is done completely with lightweight building blocks, while external walls are made of 48cm brickwork, for which no additional insulation is needed. Basically the remaining construction works, that are supposed to be done by the settlers themselves are conceived as simple as possible. Additionally to the provided instruction manual, a professional construction worker visits the site regularly, to demonstrate basic workflows and to give additional advice. Experience with first settlers shows that the complete interior fitting of one dwelling unit can be achieved within only three months, assuming two people working every weekend.

"FOR THE ORIGINAL TARGET MARKET OF DISADVANTAGED IMMIGRANTS, THE PRICE REMAINED TOO HIGH..."

This style of do-it yourself architecture generates a high demand for building materials, which local building supply stores can provide. Innovative financing models and pre-assembled material packages promote long term customer relationships and sales. Instead of acting for freedom and independence, the concept focuses on providing affordable living space to a middle class that finds itself under increasing financial pressure. Within the "Grundbau and Siedler" concept, the Grundbau amounts to 50%, the material costs for the interior work to 24% and the personal contribution of the settlers to 20% of the total value.

Rendering
http://www.iba-hamburg.de/fileadmin/Mediathek/Whitepaper/130612_Grundbau_und_Siedler.pdf (07.01.2016)

For a price of around 2,200 euro per square meter, which is still quite affordable for Hamburg, the architects were able to find potential buyers, mainly from the German middle class. As the concept remained too expensive for the original target market of disadvantaged immigrants, it failed from that point of view. Despite initial hopes, the variation in apartment layouts also remained minimal. Two basic favorite floor plans appeared: the first one, a connected sequence of rooms with neither entryway nor hallway and the other one, a large, multi-purpose space with a separate, smaller private area. What the concept also involved, was



Handbook http://www.iba-hamburg.de/fileadmin/Mediathek/Whitepaper/130612_Grundbau_und_Siedler.pdf (07.01.2016)

that it allowed every settler to customize his unit according to his own taste. Therefore, battens could be added onto the outer surface of the exterior walls, to facilitate the installation of e.g. individual facade elements or plants. But in contrast to other incremental housing projects like for example elemental, the users here handed the design of the exterior facades entirely over to the architects: no personal touch was desired. The prospective residents were actually rather surprised by the calls for participation. It seems that the new owners simply wanted to live in a normal, plastered house, not in half-finished concrete barracks as shown in early renderings. Despite the objectively disappointing development of the project from experimental to rather ordinary, the architects Anne-Julchen Bernhardt and Jörg Leeser say that they learned a lot from the experience within this kind of building process. "On the one hand", they say, "they were forced to abandon much of their conventional understanding of their role, while on the other hand, they understand much better which aspects of a project the users really want to determine themselves and which they would rather leave to the architects." Furthermore, according to them, there is still potential to lower the end-costs for the user of €2,500/m² (down to an absolute minimum of €2,300/m²) by for example optimizing the column grid, which would result in less flexibility or reducing the cost intensive insulation when applied in warmer regions. The architects state, they would like to continue developing this kind of project, but with a larger number of units and a higher level of prefabrication to enable more efficient project management.

"IN THE END, 'GRUNDBAU UND SIEDLER' TURNED FROM AN EXPERIMENTAL TO A RATHER ORDINARY PROJECT."

Summing up, we can conclude, that there are three things required for the success of such a self-build process: professional instruction in theory (construction manual), practical support (demonstrations) and application of construction materials that are easy to handle. The experiment of bringing the concept of an affordable domino-system, which is able to multiply available building areas, to Germany and adapting it to the given climatic and legal frame conditions is remarkable and precious. Everything it needs, because of its simplicity, is, a cheap site, an Investor or property developers' association to establish the "Grundbau" and partners or a community structure to support the settlers during the self-build process. Although the project partly failed and there are indications that Germany is not the right place for such a concept of stacked self-build apartments, it seems however to be very promising and much more effective in warmer regions, such as India for example. [8, 9, 10]

Photography of the built project
http://www.iba-hamburg.de/fileadmin/Mediathek/Whitepaper/130612_Grundbau_und_Siedler.pdf (07.01.2016)

8 cf. archplus 211/212 "Think Global Build Social", 2013
9 Think Global, Build Social! – Architecture for a Better World / Exhibition: AZ W Vienna 15. 03. – 30. 6. 2014
10 cf. http://www.iba-hamburg.de/fileadmin/Mediathek/Whitepaper/130612_Grundbau_und_Siedler.pdf (07.01.2016), p. 5ff.

HOW CITIES GROW. WHEN NEW TOWNS GO OFF TARGET

"The building of a New Town is in many respects the ultimate political act. Governments, developers and planners join forces to create out of nothing a brand new community, based on the latest scientific models of social and economic behaviour, and using architecture and urban design as symbolic vehicles for the power of the state to build the perfect environment for its citizens.", writes Michelle Provoost critically in the conference volume *New Towns for the 21st Century - the Planned vs. the Unplanned City*.

Having started out with high ideals, the reality of such projects is often quite sobering, even disappointing. Many New Towns have not fulfilled the economic task they were built for. Their inhabitants have not coalesced into the communities foreseen by the planners and their architectural design has not withstood the test of time. Whichever way one looks at it, one thing is clear: When countries as disparate as China, India, the United Arab Emirates or Great Britain decide to build dozens, even hundreds of New Towns for the 21st century, politics becomes part of the story. New Towns and politics are not only closely interrelated, they are condemned to one another. The purely formal 20th century city planning we are familiar with, has resulted in cities that many critics now consider over-determined. In all their model-like perfection, they have proved to be quite vulnerable. "They are too much the embodiment of an idea, too much the product of one system, too much a reflection of one moment in time and too inflexible." However, the introduction of a certain degree of 'unplannedness' could probably improve this situation. The relation between formal planning and the unpredictable transformation of the city by its residents is a very pressing topic at a time when people are coming to understand that not all of the current urbanization pressure, can be absorbed by pure formal planning. But how can non-professional agents be involved in the process in a credible way? Therefore it makes sense to look for instruments and methods in the slightly older New Towns that have already developed beyond their original plan, and in the informal city where self-organization is the main driver of urban production. Without romantisising or idealising conditions in the informal city, it seems to be worth trying to find out what lessons can be learned from it.

Informal structures at the outskirts of Chandigarh (02.2014)

What exactly is a New Town?
Unlike most cities in the world, which evolved gradually, such as the typical 'historical' or 'organic' city, the New Town is founded through a political act and is being built according to a master plan drawn up by professionals. An urban community is established from scratch. But after that common starting point, there are enormous variations. At one end of the spectrum there are the grid cities which, within the established lines of infrastructure, plots and zoning, adopt a liberal attitude with respect to the urban filling of the grid. At the other end there are the comprehensively designed modernist cities in which every detail is worked out in advance; from the large scale down to the design of the residential environment and the individual dwelling, from public space to the economic and social structure. In the twentieth century, when urban planning and urban design were professionalized, there was a general trend towards a more comprehensive character of city planning, in both the physical and the socio-economic sense. *Chandigarh* and *Brasilia*, represent the high points of this development; cities that were completely designed, right down to the architectural details, as a model of a universal perfectibility.
However, the visionary character of a design sometimes conflicts with the reality of a local culture, existing social structures or housing traditions. Sometimes there is too much wishful thinking and too much social engineering that does not resonate with the resident of the new city. Another factor that is difficult to anticipate is time: One of the biggest dilemmas in city planning is that, when a city is designed design, we have no other choice than using today's data for the city of tomorrow. Naturally, ev-

ery designer tries to take this into account, but in reality this is impossible. A war, an economic boom, financial cutbacks, a colony that gains independence ora factory that closes down or opens - these are all variables that are impossible to anticipate.
All in all there are only a few new cities that, after a some decades, have turned out as the designer had hoped. Is it inevitable that the design of a New Town always lags behind reality, or are the “infringements” of the original design the salvation of the New Towns? Examples of this can be seen in many non-Western cities where the rigid zoning that banishes vitality and commercial enterprise from the residential areas of many modernist cities is undermined by bottom-up initiatives set up by residents. Legally or (usually) illegally, all kinds of parties participate in the development of the city and make their influence felt. The number of parties grows, interactions and wishes emerge, the city becomes diversified and multi-layered, in short, a situation develops that resembles the way the historical or organic city evolved.

The New Towns of Ghana, Tanzania, Pakistan or Venezuela have developed idiosyncratically on the basis of the original masterplan, but they now bear no resemblance to that plan. Thanks to the basic level of designed and built infrastructure these cities often feature favourable living conditions compared to the unplanned cities in the same countries. (In European New Towns these tendencies to adapt and adopt the planned city occur only sporadically. Here it is still the big housing associations, local authorities or development companies that hold sway of the New Towns; which are generally not highly rated. They have a negative image, are associated with cheap, small dwellings and are regarded as ghettos or dismissed as dull. There are only very few exceptions to this rule.)

The Twin Phenomenon
As we see, the informal city is intimately linked to the rise of the formal city; not only regarding economic aspects (the informal economy) but also the city as a physical structure. The establishment of a New Town in developing countries is nearly always a government project in which a formal framework for the physical, economic and social structures is provided by professionals. In hot climate zones such a formal project gives almost always rise to a parallel world in which an informal version of those structures is created. The magnetic pull of the city, with its industry and commerce, leads to increased migration that the formal city is usually unable to accommodate in a timely or adequate manner. The photographer Edward Popko noticed this mechanism back in the 1970s and concluded: “Urban growth is the result of a hunger-dictated ‘push’ from the country rather than an economic ‘pull’ from the city. The city has created the illusion of providing jobs and opportunities for all. Although many immigrants do not find work and remain, the benefits often tend to be more social than economic, and thus the only initial change for the immigrant is an urbanization of his poverty.”


Common practice in New Towns: Suppression of informal activities.
Demolition of informal structures in DLF-City, a satellite city at the outskirts of Delhi (02.2014)

Facing these realities, many urban poor resort to illegal means of finding a place to stay for themselves and their families. They become squatters. Not only are New Towns never built for the poorest of the poor, they are also never built for the right number of people. The standard bearer of formal, modernist New Towns, Brasilia (Lucio Costa, 1957), for example, shows all too clearly what this can lead to: While the centre of Brasilia is a pristine composition of orthogonal blocks, large numbers of informal settlements have sprung up on the citie’s outskirts. Also the informal city of Aishaman, on the edge of Tema New Town, Ghana, (C.A.Doxiadis, 1960) is now home to more people than Tema itself. New migrants usually begin their housing career in the informal city. If they rise up the social ladder, they often aspire to relocate to the formal New Town where living conditions are deemed to be better. Typically every formal city in the developing world organizes its informal counterpart. “The planned and the unplanned, the formal and the informal, are twin phenomena rather than opposite poles.”[1]

Even within the confines of the strictly regimented soviet city, there have always been traces of the self-organized city. The city of Tolyatti e.g., where

1 cf. New Towns for the 21st Century - the Planned vs. the Unplanned City, Michelle Provoost, 2010, p. 9 ff.
2 cf. New Towns for the 21st Century - the Planned vs. the Unplanned City, Michelle Provoost, 2010, p. 20

planned and real city centre did not coincide, is only one of many such examples. Architect and urban planner Andrey Ivanov writes, that self-organization in those cities exists, side-by-side with developers' architecture but it flourishes in the face of opposition. This was the case under communism, but the situation is the same today. "There is an almost absolute neglect of the self-organizing component of urban formation and a continued absence of a mature, self-sustaining urban citizenship". The official planners have not learned much: they continue to ignore the way the city actually functions and to take no account of it in their plans. The planned and the unplanned really are parallel worlds here, which nonetheless belong to one and the same city.[2]

Deni Ruggeri, from Cornell University, writes in his paper (p.92) on Zingonia, an Italian New Town of the 1960s, "To this day, the lack of stewardship continues to be a fundamental flaw, which many people consider to be the key failure of Zingonia as a place. Physical planning is but one of the components of a strong place identity. Good planning and design should be concerned with the long-term resilience of communities, which include the presence of a democratic governance structure and processes able to address the challenge of an uncertain and ever-evolving future. It is for this reason that the construction of New Towns is an inadequate solution for today's urbanization problem in poor countries, however logical it may seem. Especially in countries where migration and urbanization is greatest, the formal (institutional and organizational) framework necessary for realizing large projects like a city is totally inadequate. This is why however many New Towns are sitting on drawing boards, around the world informal cities are growing faster than the formal. There is a great temptation for architects to try to 'design away' the problems of the slums and many construction projects are undertaken with the aim of improving housing and living conditions in the informal city."[3]

Capitalist Planning

Instead of explaining the decline and unpopularity of the post-war New Towns in terms of flaws in the design, Tahil Kaminer, from TU Delft, blames it on the transformation from an industrial to a post-industrial society that began in the 1970s; "In essence, the new towns succeeded in satisfying many of the demands posed to planning and architecture by the society of the 1950s.; the demands for spontaneity, vitality and creativity which disqualified the new towns came to the fore only later, expressing the social transformation underway." Spontaneity and individuality were the issues which The Plan not only overlooked, but, in fact, desired to limit. The modernist post-war New Towns are linked to the planned Keynesian economy, Kaminer explains: When Milton Friedman's monetarism appeared in the 1980s, The Plan had to trim its sails and the planners' powers were curtailed. He argues that, informal settlements are usually the by-product of rapid economic growth on the capitalist model. This is true not only today in the developing countries, but also in the 19th-century London where in Dickens' time the slums were omnipresent. Furthermore, according to Kaminer, the capitalist economy is inherent in the informal city, while the planned economy is inherent in the formal city. However, in reality especially in non-Western nations, it is usual for a planned economic system to produce a planned city which then proceeds to grow in an informal, self-organised way. This can happen, if the formal system fails to channel the economic forces that it releases. The cities of Tema in Ghana or Islamabad in Pakistan are examples of this. As mentioned before, the formal and the informal city are twin phenomena; they occur within a single political-economic system. This undoubtedly stems from the fact that pure systems are very rare: In most countries there is a mix of capitalism and planned economy. From Kaminer's point of view, the form of the city derives from the structure of society itself: "Urban development, including the presence or absence of order and the formation of specific urban morphologies is directly related to the economic system. The relation here is more than associative: informality is not a condition which can be associated with free mar-

The poor are also following the magnetic pull of the Cyber City.
Scene on a traffic island in DLF Cyber City, Gurgaon (02.2014)

3 cf. New Towns for the 21st Century - the Planned vs. the Unplanned City, Michelle Provoost, 2010, p. 25

4 cf. New Towns for the 21st Century - the Planned vs. the Unplanned City, Michelle Provoost, 2010, p. 15 ff.

ket, but is in fact a condition created by free market speculation; the formal city, in contrast, is created by highly regulated and centralized economy. The urban environment internalises in the development of its own form and structure the fundamental socio-economic premise of society at a given time. Therefore the question facing us is not about a planner's preference, but about the structure of society itself'. The more a town or district propagates a particular ideology, the more vulnerable it is when there is a political change and the ideology is replaced by a different one. Victor Gruen's masterplan for Tehran during the regime of the Shah is a perfect example for that. The best American and European architects and landscape designers were commissioned to build new districts, landscape parks, universities, palaces, monuments and hospitals. But after the fall of the Shah this (by European standards) grandiose plan fell foul of the new Khomeini regime: "The Gruen plan, with its regulations worked out down to the most minute detail, and its precise management of open space, building density, separation of functions, greenery, infrastructure and landscape, was thoroughly despised on ideological grounds." What to do with a plan that can be interpreted as a monument to the reviled Shah? "The authorities chose to destroy the plan by maintaining its outlines, but granting everybody the right to exceed regulations and break Gruen's rules, thus effectively cannibalising the original plan. Tehran turned into a chaotic, hustling and bustling city instead of becoming the Western ideal of the well-organized and rationally designed city, which Gruen and the Shah had envisioned."[4]

Roadside, DLF Cyber City, Gurgaon (02.2014)

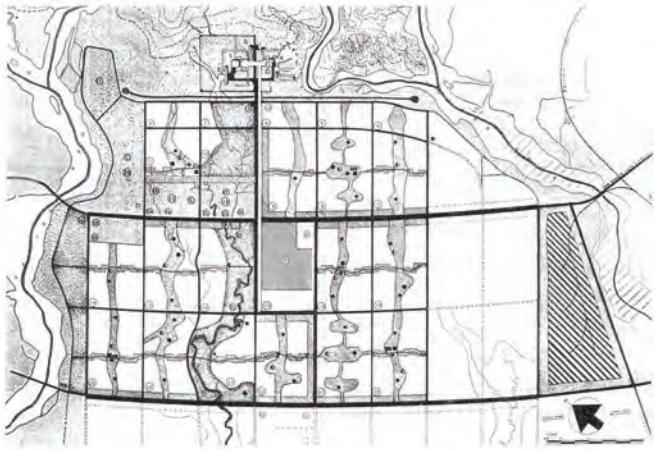
CHANDIGARH

Chandigarh (India), Le Corbusier with Jane Drew, Maxwell Fry and Pierre Jeanneret, 1951-1962

In Chandigarh Le Corbusier applied the principles of the Charta of Athens:

- the division of the city into its four main functions of housing, working, recovery and circulation
- the division into autonomous sectors
- and a 7-step hierarchy of the street system.

While taking over the conception of the master plan and the design of the capitol, Pierre Jeanneret, Jane Drew and Maxwell Fry were working on the remaining tasks, such as the planning of the residential settlements. The residential sectors were separated according to income classes and were able to accommodate 500 as well as 20000 inhabitants. Allegedly Le Corbusier had the vision that also the poorest inhabitants of Chandigarh should have access to all the amenities and services the city was offering. But, like in most other Indian cities, there was a lack of affordable living space. This lack lead to the growth of a “shadow city” at the fringe of the master plan. Today about one fifth of the population lives in informal settlements, another fifth in resettlement camps on the outskirts of the city.[5] “Almost forty thousand slum-dwellers have been resettled yet their rate of growth is causing a serious concern to the planners and administrators. The five villages Buterla, Badheri, Bijwada, Burail, and Attawa, which were retained in the Second Phase of Chandigarh’s development, are also creating deteriorating environmental conditions in the city. This was not part of the Master Plan but somehow has stubbornly survived. These villages are now the hub of unplanned activities, and house a particular stratum of society.”[6]

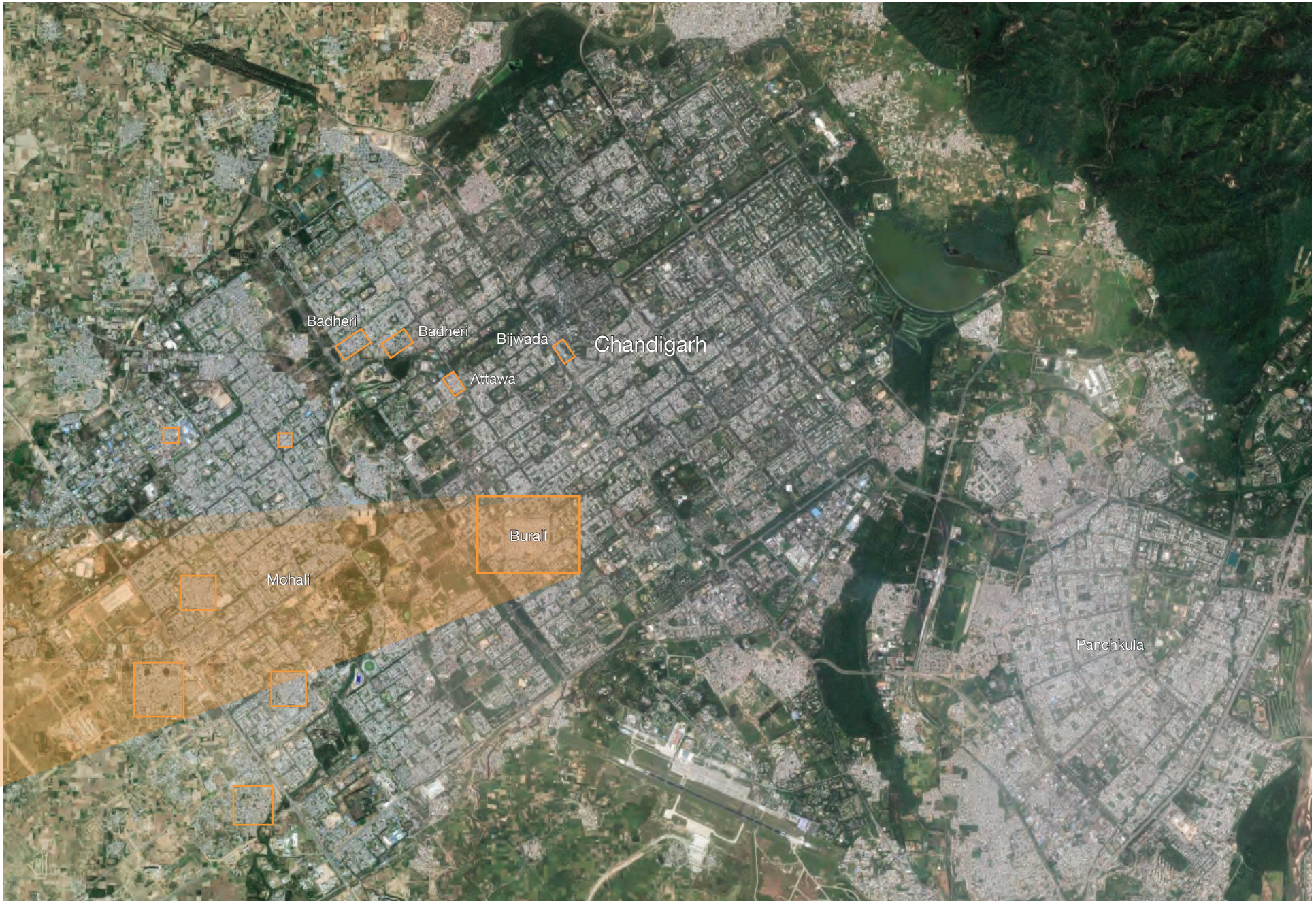


Draft plan, Chandigarh master plan
(https://classconnection.s3.amazonaws.com/968/flashcards/1564968/jpg/14_page_251338758548300.jpg, 07.01.2016)

“RETAINED VILLAGES ARE NOW THE HUB OF UNPLANNED ACTIVITIES”

Sangeet Sharma

Burail, one of the villages devoured by the Chandigarh master plan.
(Photo: Google maps, 07.01.2016)



Chandigarh, with the villages embedded within its actual master plan and its two extensions: Panchkula and Mohali
(Photo: Google maps, 07.01.2016)

5 cf. archplus 185 “Indischer Inselurbanismus”, 2007, p. 30ff.
6 Sangeet Sharma: Corb’s Capitol - A journey through Chandigarh Architecture, 2009, p. 183ff.

BRASILIA

Brasilia (Brazil), Lúcio Costa, Oscar Niemeyer, 1922-1960

Brasilia is the federal capital of Brazil and seat of government of the Distrito Federal do Brasil (Federal District), whose population has developed rapidly within the last fifty years. While it accommodated only about 36,000 people in 1950, there lived nearly 82 times as many (2,946,635) in the year 2012.

Today, mostly people of the middle and upper class are living within the city boundaries of Brasilia. For the workers who came from the North-East of Brazil to erect the city, however, there was no place scheduled; and so it is today: The bigger part of today's poorer population lives in satellite towns set well apart from the actual city, in areas which had originally been reserved for industries.[7]

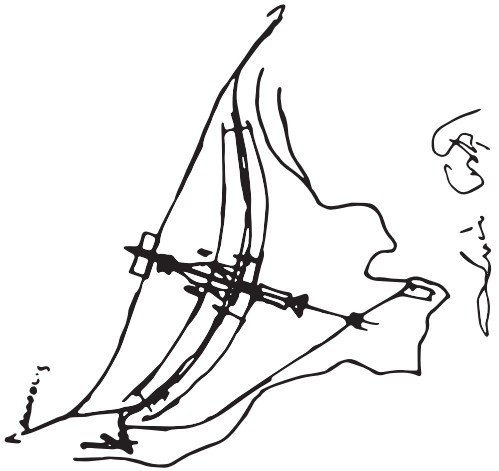
These satellite towns include the cities of Gama, Ceilândia, Taguatinga, Núcleo Bandeirante, Sobradinho, and Planaltina. All of them, with the exception of Gama and Sobradinho were not planned.[8]

Life in these satellite cities, however, is characterized by high rates of unemployment, alcohol and drug consume as well as rising crime rates.

The initially celebrated New Town of Brasilia resulted in social and residential segregation. This is why even Oscar Niemeyer himself admitted in an interview in 2001:

"THIS EXPERIMENT WAS NOT SUCCESSFUL."

Oscar Niemeyer[9]



Plano Piloto, Sketch of the original Brasilia master plan
(http://veredes.es/blog/wp-content/uploads/2012/03/
Brasilia-Primeros-Trazos.jpg, 07.01.2016)

Aerial image of Ceilândia, one of Brasilia's satellite cities. Population in 2009: 332,000
(Photo: Google maps, 31.03.2014)

Brasilia and Ceilândia (Photo: Google maps, 07.01.2016)

7 https://de.wikipedia.org/wiki/Brasilia#Einwohnerentwicklung (07.01.2016)
8 en.wikipedia.org/wiki/Brasilia (07.01.2016)
9 https://de.wikipedia.org/wiki/Brasilia#Einwohnerentwicklung (07.01.2016)

ROURKELA

The double life of an Indian New Town

While the concept of the modernist city has gotten into discredit in Europe and is being demolished in many places, the New Town-models have sometimes become reinterpreted in many third world countries, to which they have been exported after WW2. One of these cities is Rourkela. Rourkela was co-financed in the 1950s by the German government and planned by the Krupp Company. It was the first and one of the most ambitious foreign aid projects of the German post war period. In August 1953 the Indian government commissioned Alfred Krupp to plan a high tech steel plant including a working-class city for 100.000 inhabitants. Officially, the construction of steel cities was part of Jawaharla Nehru's plan to push industrialisation further, by triggering the economy in the underdeveloped regions of India. In fact, the question how exactly regional economic growth could be stimulated, including the local community into the planning, remained open. So at the end of the day, the city was designed as an over-dimensioned industrial residential centre, ignoring the native inhabitants. 32 Villages were demolished and 13000 inhabitants were relocated for the construction of the new city. Although the Adivasi, who are listed as scheduled tribe, were engaged in the construction of the city, they had no chance to get a job in the steel plant afterwards, because better qualified steel workers from all over India were preferred. In 1954 the building engineer Konrad Steiler was commissioned with the planning of the city. After the young Oswald Matthias Ungers left the team due to disparities with Steiler, the young architect Werner Bäcker, who should later become Stadtbaudirektor of Köln, had to develop a master plan for the residential town. The basic idea of Steiler's and Bäcker's design was the separation of functions by using the existing hills. The working class quarter was divided into 20 sectors, of which each one accommodated 5000 workers, their families as well as the service personal in bungalows. Each sector featured all basic facilities needed for everyday life, such as schools, playgrounds, shops, recreational green space. All sectors were aligned with a four track ring road which connected the residential areas with the steel plant. The city centre was divided into sectors of recreation, administration and Culture and was supposed to be a specious car free and green area. The whole city was designed according to the principles of Bäcker's Professor Otto Ernst Schweizer's Model of the "Ideal City" (Idealstadt), which should allow the unobstructed floating of the urban crowds. Only the large building typologies, with which Schweizer intended to achieve a structured city in which a maximum of green space is preserved, where replaced by scattered bungalows, which gave the whole city a rather suburban touch. But Rourkela developed totally different than its planners had envisioned. Already during its construction, people from all over India came to Rourkela. Many of them were searching for jobs in the steel plant, but mostly without success. And because only workers were allowed to live in the new town, those migrants who didn't find a job set up settlements outside the cities territory of jurisdiction, along the railway tracks and the main roads connecting to the hinterland. During the years a so called shadow city emerged, totally unplanned and out of control. Dense small houses, colourful shops, dusty billboards, mazy electric cables aligned to along overcrowded streets, filled with bikes, rickshaws, people and animals.

Today this shadow city accommodates four times as many inhabitants as the actual planned city and serves as the service centre for the whole region. In 1963 it had already became so large, that it became an administrative unit with its own administration and planning. The shadow city (civil township) is the antithesis of the adjacent planned steel city. It is a vibrant, mixed use, dense urban fabric, while the planned working-class city has more the character of a silent suburb.

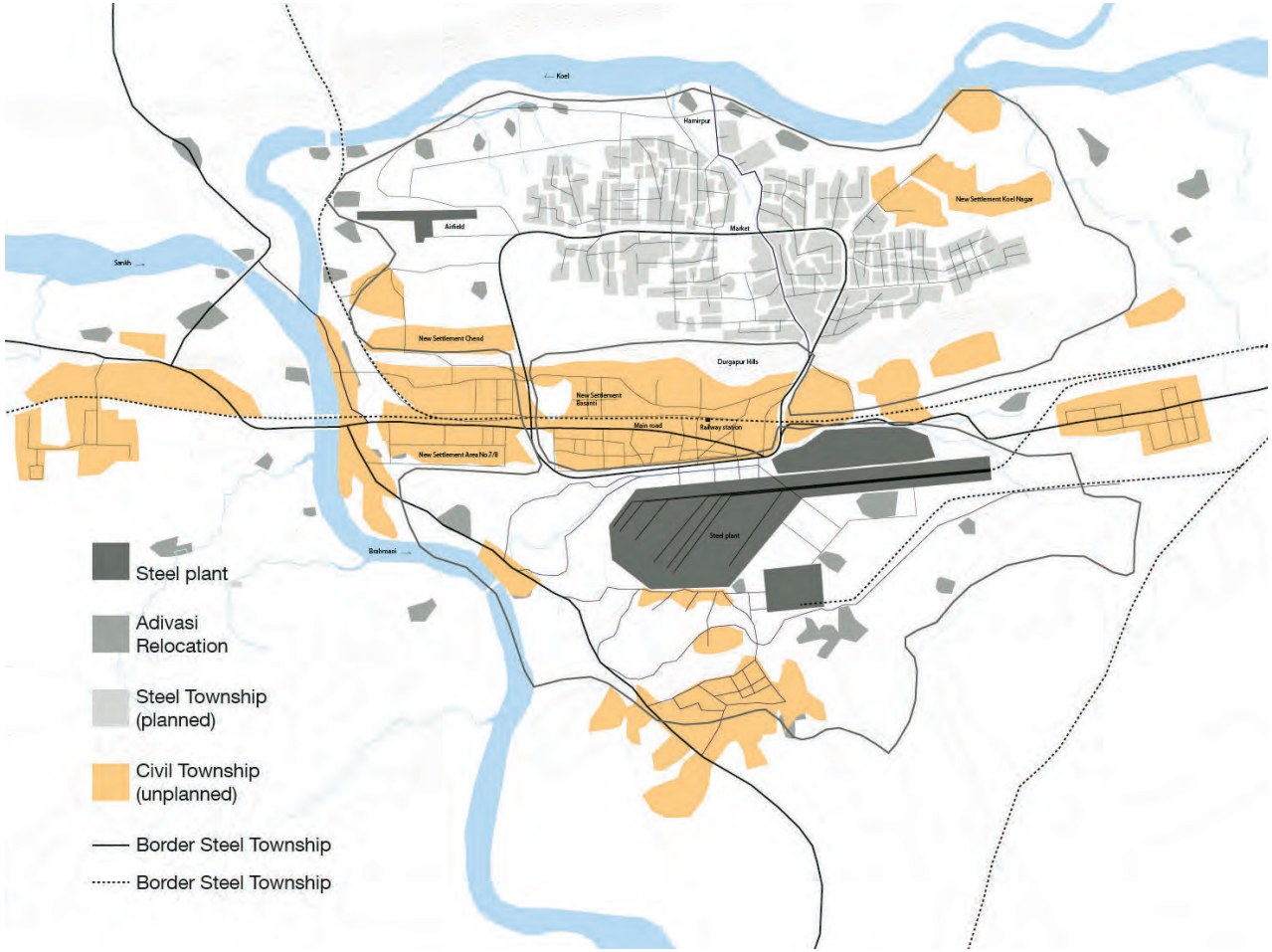
The boom of the unplanned city led to the decay of the planned centre with its large scale solitaires which were not affordable in view of the average Indian income. As even the last cinema had moved to the shadow city, the car-free green space was not used for strolling, as intended, but was used by the Adivasi for the cultivation of their rice fields. The intention of the steel city administration to create a pure working-class city, could not stand reality. The public pressure of NGOs and lobby groups, in combination with various uprisings, achieved that slums and rice fields of the Arivasi are not being removed by force anymore. After fifty years the ring street is still waiting to be used according to its capacity utilization.

The typological elements of the New Town, such as the ring road, the regional roads or the public open space, could develop new local potential through reinterpretation by entrenched life patterns.

The disregard of some groups of society, accelerated the transformation. For those with a lower income there was, similar as in Chandigarh, not enough living space. Because the mechanisms and

ideologies of the imported city model was unfamiliar to the various players, they used according to their understanding of space. Open space was rather understood as a mere resource of survival than socially integrating public spaces.

The city intrinsically finds itself within a permanent process of adjustment and has to be seen as an open, urban infrastructure. This view also has implications on Europe, showing that New Towns, Plattenbausiedlungen or Grands Ensembles as relicts of former times, can be adjusted on changing political, economic or societal contexts. A point of view, in which urban space is a political negotiation field of its users which opens it towards unforeseen transformation, is more important than the execution of urban plans which are, seeing the city as a perfect endproduct. It's all about deciding, which concerns have to be planned centrally and which are to be left open for unforeseen transformation, to trigger an interaction between planning and society. Here Ungers is interesting again, because with his thoughts on the large "Großform", which were strongly influenced by Schweizer's Theory, he had exactly this on his mind: "The large form defines the framework, order and the planned space for an unforeseen unplannable, vibrant process, for a parasitic architecture. Without those components each planning stays rigid and lifeless."[1]



Plan: Rourkela, 2007 / planned vs. unplanned districts

1 cf. archplus 185 "Indischer Inselurbanismus", 2007, p. 30ff.

Choosing the appropriate urban pattern for the expansion of a specific city

In its 2013 report “Urban Planning for City Leaders”, UN-Habitat distinguishes between three basic policy options of growth:

Intensification, extension and *multiplication.*

“To accommodate urban population growth, cities can either increase their current carrying capacity, expand their boundaries, create a spatial system with many new town centres, or use a combination of all these approaches. The choice is unique to each context and will be informed by population growth projections, land availability, topographic characteristics, cultural aspects, and the city’s ability to implement, including investment and enforcement capacity.”[1]

Intensification

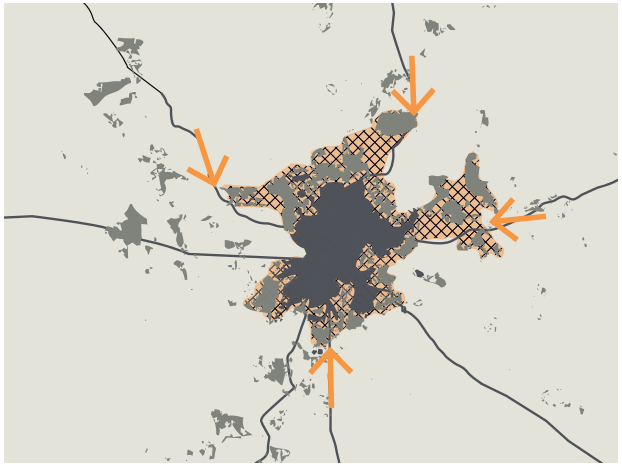
Intensify the density of existing built-up areas through infill development and setting growth limits, which would need to be moved outwards at regular intervals to prevent land shortages. Intensifying density implies regenerating brownfi elds and replacing existing buildings with new ones that accommodate more people. Consolidating built-up areas needs regulations to preserve no-development zones and to control a trend towards the decline of density (of both people and buildings). This approach may be adequate for cities with strong enforcement capabilities and where population growth is relatively stable. A successful example is Portland's Urban Growth Boundary in the United States.

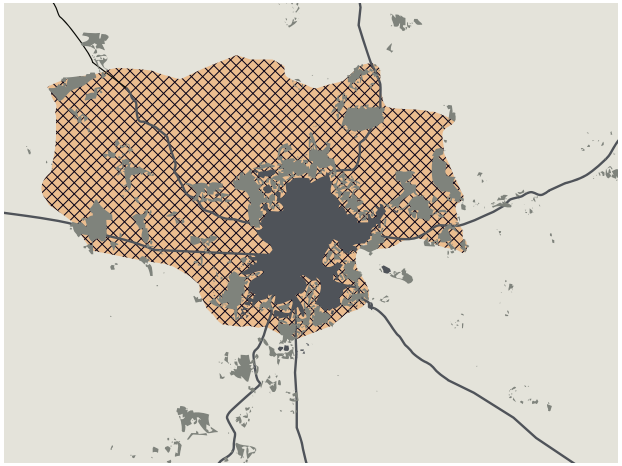
Extension

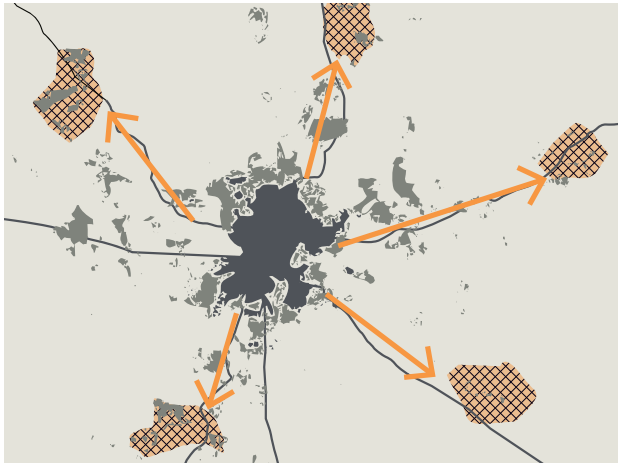
Extend the city at the fringes of the built-up area. Cities growing faster than 1-2 per cent per year need to ensure there is enough land to accommodate people and this could be at least twice the size of the existing land area. A city extension would border the existing footprint, and its infrastructure and transport systems would be fully integrated with it. The extended area may include urban services whose capacity has been calculated to also serve residents living in deprived districts in the existing city. Planning an extension requires vision and commitment. New York's Manhattan Commissioners' Plan of 1811 in the United States is one far-sighted extension plan.

Multiplication

Multiply nodes by building satellite towns that might be associated with existing urban masses. Although they would be physically separated and at least partially independent administratively, economically and socially, satellite towns would be coordinated with the central city to capitalize on synergies and economies of scale. Satellite towns differ from suburbs in that they have their own sources of employment and services, which would also prevent them from becoming dormitories. This option is suitable for fast-growing, large cities. The Comprehensive Plan of Shanghai 1999–2020 in China features nine satellites towns that absorb people who migrate from rural areas.







Plans (Urban Planning for City Leaders, UN-Habitat, Nairobi)

1 Urban Planning for City Leaders, UN-Habitat, Nairobi, 2013, p. 26
2 cf. Urban Planning for City Leaders, UN-Habitat, Nairobi, 2013, p. 27

CHAPTER III
Looking into the future

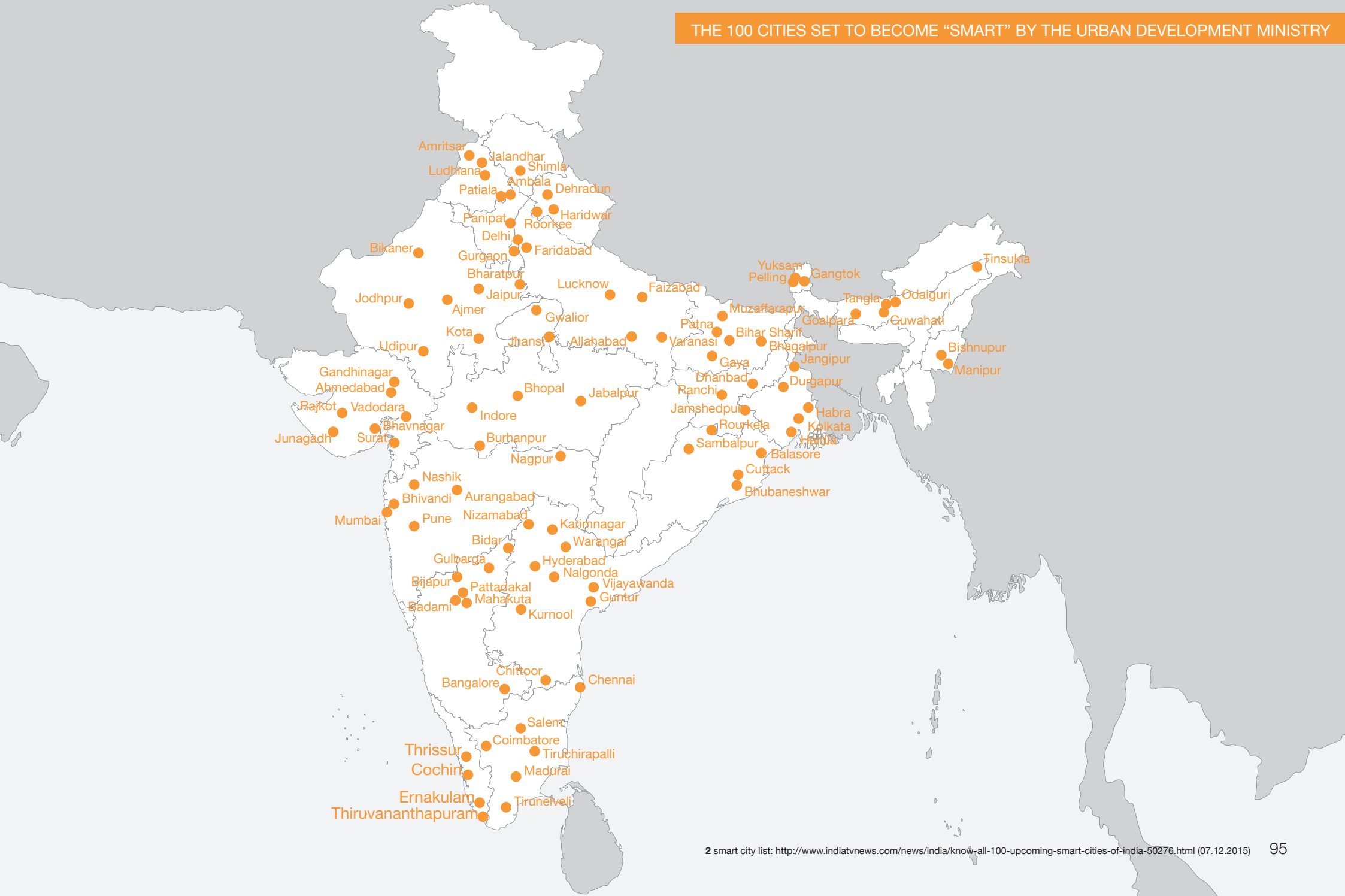
VISIONS FOR A NEW URBAN INDIA

Indian cities are currently under immense urbanization pressure. Forecasts, estimating that a total of 700 million people will undergo a process of urbanization within the next three and a half decades in India, give us a slight idea of the relevance of this trend.[1] In my opinion, the topic of urbanization, exacerbated by current unprecedented population growth, is currently one of the most pressing issues city-planners and politicians in India, but also many other parts of the world, have to deal with. And the Indian government members are quite aware of the arriving current of migrants emerging on the horizon, which is to be absorbed by the Indian cities. Therefore they did really well in preparing large-scale action-plans to handle this situation. The Indian officials envisioned an overall concept consisting of four strategically positioned economic corridors, basically aligning with three of four sides of the so-called "Golden Quadrilateral", the fifth largest highway network in the world, connecting the major cities Delhi, Kolkata, Chennai, Bangalore and Mumbai. The main idea behind this mega-project is to spur economic development by providing world-class infrastructure alongside these corridors, including a Dedicated Freight Corridor for container goods, to generate jobs for the rapidly growing workforce (about +100 million workers within the next decade). To absorb the mass of people moving to the cities in the near future, the Indian cabinet approved two flagship schemes in April 2015: One preparing for the creation of 100 smart cities and the other, an urban rejuvenation program for 500 towns. Beside the rejuvenation program for existing cities, a series of green field cities will be erected along the Industrial Corridors. Green field because the Indian government prefers to make state-of the art city planning; Walkable and sustainable cities with integrated ICT (Information and Communication Technology), which is much easier to achieve from scratch than by modifying or extending existing agglomerations. Those green field cities, such as the two early bird flagship projects of Dholera SIR and GIFT (Gujarat International Finance Tech City), located within the Delhi-Mumbai-Industrial Corridor (DMIC), are presented as ingenious (swiss knife) ideal cities, promising the beginning of a new age for India; bringing the Indian economy to the next level, getting rid of the "back-office of the world"-image and spreading an atmosphere of departure. But while striving towards international recognition as a high profile business location and reaching for new markets, the government is also well aware of the fact that no emerging nation's economy in the world has ever grown solely on the back of the service sector. This is why the envisioned master plans for the cities within the economic corridors are designed to serve one main purpose: attracting and serving large scale industries. Concentrated in large scale industrial parks, provided world-class infrastructure and connected by high speed dedicated freight corridors, the industrial sector is supposed to be the future backbone of the Indian economy; generating jobs and prosperity for the mass. This strategy reminds me very much of what happened in Rourkela, described earlier in this paper. It had exactly the same purpose, as the cities currently projected within the DMIC and it ended in a disaster; The local population was not served the promised jobs and reasonable housing, within the new township because at the end of the day the experienced workers from all over India were preferred. As a result, an informal shadow city grew right beside the newly erected planned city; an informal city as large as, and in the end more vibrant and more important than the originally planned city. So what we can learn from history is that a city, whose main purpose is to generate jobs, is highly attractive. It will lure a lot of people willing to work; many educated people, but also those who have no education at all: the illiterate, the old, the sick and first and foremost the poor, who will not be able to afford the cheapest housing available on the market. We are talking about a social stratum that can't even afford to pay the fees for energy, water and sewage; which, in succession, is the reason why every common (maybe legal) concept of urban housing is problematic per se. The example of Rourkela, is a very demonstrative, but by far not the only example of a new town which got out of control. Having

Industrial Corridors in India

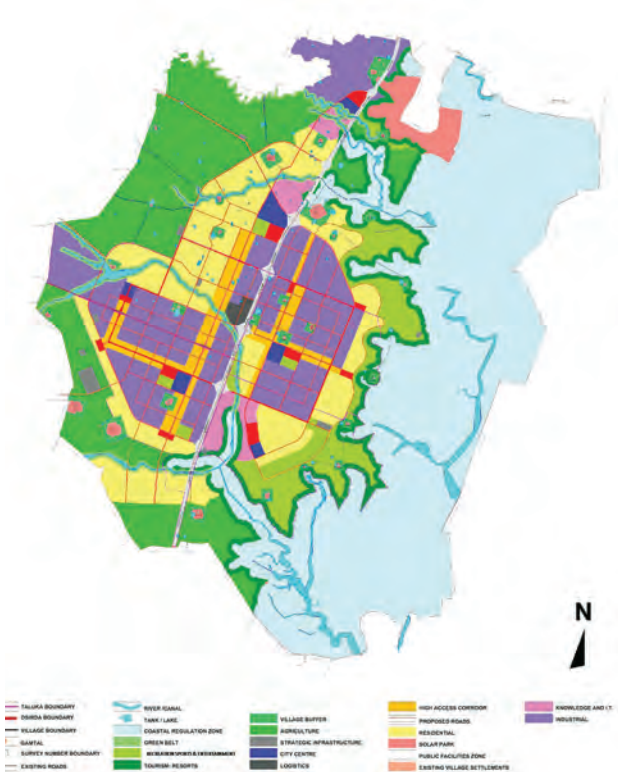
1 C. K. Prahalad - Speech at the first annual United World Colleges lecture series -"The United Wheels of Change"

THE 100 CITIES SET TO BECOME “SMART” BY THE URBAN DEVELOPMENT MINISTRY



2 smart city list: http://www.indiatvnews.com/news/india/know-all-100-upcoming-smart-cities-of-india-50276.html (07.12.2015)

looked at Brasilia or Chandigarh, we can already assume that this is rather the rule than an exception. The collective symptom that all those failed master plans have in common is what urban theorists call the "twin phenomenon". The "twin phenomenon" terms nothing else than the fact that the formal and the informal components of a city are intrinsically part of each other and that the strict rejection of one usually causes the failure of the master plan, expressed by residents in either not using or accepting the built environment as proposed, or even building something else with disregard to the official plans. Like force and counterforce, the formal and the informal existed in nearly every city on the planet, no matter what political or economic system, especially in times of great societal change and the global south, throughout history at least since antiquity. The modernist new town, as the ultimate example of formal planning, always tended to extinguish informality instead of envisioning a synergy of both radically different ways of city making. This, and the fact that the modernist city, with its separation of functions, was designed for car traffic and was definitely no city of short distances, led to exclusion, social segregation and was therefore a paradigm that, although unintentionally, favoured the upper and middle class, discriminating against the poor, hence doomed to failure. As mentioned before, statistics show that India is, although missing some of its UN Millennium goals, on a good way to eradicate extreme poverty. Estimates tell us that the number of Indian people, who are living from less than 1.25$ per day and are therefore, according to the World Bank, considered "extremely poor" will fall from today's (2016) 250,700,000 to approximately 37,000,000 in 2030. However, a closer look at the statistics reveals that while in 2030 "only" 37,000,000 people will live from less than $1.25, expected 171,000,000 people will still live from $2.50 per day. Knowing that the average rent for a one bedroom apartment outside the centre of Ahmedabad today is about $3 a day (5,701.30 Rs.), it is clear that those people are still financially vulnerable.[3] Summing up we can assert that during the next decades, while dozens of New Towns will be built, poverty will unfortunately still be an important issue, which has to be considered in future city planning.



Spatial development plan Dholera SIR
(Final Development Plan DSIRDA - Report 1, DSIRDA)

Dholera SIR

Looking for example at India's current Prime Minister Narendra Modi's, pet project, Dholera SIR, a village with a population of about 2800 people which will be transformed into a 2.000.000 inhabitant smart city (6 times the size of Shanghai) during the next three to four decades, it seems that not much attention is been given to the topic of how to deal with the urban poor. The focus is definitely set on the creation of a Global Business Hub. Think big! The details can be negotiated later. This seems to be the general attitude. Disregarding the neglected topic of the urban poor, it must be said, that the Dholera project is based on a considerably substantial state-of-the-art master plan designed by the English, globally operating company Halcrow (now part of CH2M Hill, also responsible for the project management of Masdar City Phase 1, in Abu Dhabi), based on extremely comprehensive documentation. In visualizations Dholera is portrayed as a sustainable, world-class city which is supposed to become the "Dubai of India"*. Narendra Modi appeared as the patron of the projected high-tech cities and as the man who will lead India and Gujarat into a new era; an era of success and economic upswing; slingshot projecting India into the next level, pushing the industrial capacity by investing in large scale infrastructure. Shortly after his efforts were rewarded with political success, as the former Chief Minister of Gujarat became Prime Minister of India in 2014. His plans for India are big. As big, that experts, even within the Governments own "Final Development Plan –

Gujarat Trade Centre (GTC) – iconic centrepiece of the Dholera master plan
http://www.cnn.co.jp/world/35051976.html (27.01.2015)

DSIRDA Report – 1" state that, as a conclusion on the population estimation, the capacity of the construction industry to build housing units in such a short period of time might be too low. According to the report, the rate of housing construction implied by the target for the city is extremely high and will test the construction industry. The highly ambitious plans for Dholera may only be achieved, with extensive technical and financial assistance. Overall, it is concluded that reaching the population target for the DSIR represents a challenge; one that will also only be possible to achieve if the project receives a very high degree of Government support.[4] With the glossy marketing images of the envisioned high-tech cities in mind, following on-site pictures of the current construction work on early bird residential projects in Dholera, bring us back down to earth quickly. We see construction workers and day labourers building up the fundamentals of the city with the simplest means. The men are accompanied by their families; women and children, who are acting as assisting labourers. This is the cynical smack of a project which is going to be one of possibly one hundred enclaves being erected for the privileged and the productive, for those fitting into the neo-liberal system, in a country where more than 300 million people live without electricity, and twice as many don't have access to toilets. So we can see immediately, that the success of the whole Dholera master plan depends crucially on government support and can easily turn into a semi-finished nightmare. And while hundreds of pages of the Dholera reports are dedicated to all different aspects of city planning, only one short paragraph deals with the topic of the housing of the urban poor. Within this paragraph estimates say that about 20.000 units of EWS-housing (economically weaker section) for 80.000 people will be necessary; which makes 4% of the total population. As the standard procedure of city making in this case is to hand on plots to developers, who are then free to design and build their proposals according to the building code, there will be very little interest in creating incremental housing schemes for the very poor, as they generate hardly any revenue. So what is still missing (and this is typical for this type of large-scale top-down planning scheme) is a strategy for dealing with this looming gap between supply and demand of adequate ultra-low-cost incremental housing schemes. Who makes sure that enough cheap land for incremental housing schemes is reserved in advance, to prevent the formation of informal settlements on remote and unfit land at the outskirts of the city? How are possible housing schemes subsidized? Who is in charge of planning the public realm within these settlements? How are possible settlements cross-linked within the city in an integrated manner? Or is the exclusion of the poor from the amenities of the smart cities just collateral damage, which is simply accepted and swept under the carpet in favour of economic success. Many experts and planners already fear that such "insta-cities", could prove dystopic and inequitable. Some even hint that smart cities may turn into social apartheid cities, governed by powerful corporate entities that could override local laws and governments to "keep out" the poor. In a monograph for a conference on smart cities in Mumbai in January, the economist and consultant Laveesh Bhandari described smart cities as "special enclaves" that would use prohibitive prices and harsh policing to prevent "millions of poor Indians" from "enjoying the privileges of such great infrastructure". "This is the natural way of things," he noted, "for if we do not keep them out, they will override our ability to maintain such infrastructure." When you invest so much without thinking about services and low-cost housing and governance, then you will end up creating enclaves that keep out the poor."[5]

The future / Wind farms in Dholera SIR
https://www.youtube.com/watch?v=YEDIY33bgI8 (27.01.2015)

3 http://www.numbeo.com/cost-of-living/compare_countries_result.jsp?country1=India&country2=United+States (16.11.2015)
4 cf. Final Development Plan DSIRDA - Report 1, Dholera SIR Development Authority, Sept 10 2012
5 cf. http://www.theguardian.com/cities/2015/may/07/india-100-smart-cities-project-social-apartheid (07.01.2015)
*Not only the appearance reminds of Dubai. Dholera's airport for example is going to be a direct rival of the Dubai International Airport.

Gujarat International Finance Tec – City
http://giftgujarat.in/documents/GIFT-Corporate-Presentation-Website-November-10112014.pdf (07.01.2016)

GIFT

The “Gujarat Internation finance Tec-City” GIFT** for example, conceived to become a cutting edge global financial hub, is being constructed currently between Ahmedabad and Gandhinagar, on the bank of river Sabarmati. It is built around a large golf course right in its centre and demonstrates once more perfectly for whom India’s first smart city flagships are tailored; Executives, economically productive consumers (shoppers) and producers (employees). And at this point it loses its “smartness”. Smartness, however one might interpret this abstract phrase, definitely always refers to sustainability. This also includes social sustainability. A city which is not rudimentary, socially sustainable, but exclusive, is definitely not smart. It is probably a bit smart (regarding its technological sophistication), but not entirely. It is only a glittering spectacle, seeming unlikely to provide many meaningful livelihood opportunities in the rural hinterlands where it comes up;[6] an interesting high-tech experiment, with no valuable answer and no relevance regarding the creation of reasonable urban living space for everyone.

“A CITY WHICH IS NOT RUDIMENTARY, SOCIALLY SUSTAINABLE, BUT EXCLUSIVE, IS DEFINITELY NOT SMART.”

6 cf. http://www.theguardian.com/cities/2015/may/07/india-100-smart-cities-project-social-apartheid (07.01.2015)

GUJARAT INTERNATIONAL FINANCE TEC-CITY

Gujarat International Finance Tec – City

A Global Financial Hub

Palava City

Palava City is another smart city being currently built across 3.000 acres northeast of Mumbai, by a city-based developer. It will feature 24x7 electricity, immaculate wide roads, public transport, malls, multiplexes and luxury housing, including “Mumbai’s first and only golf-course-equipped residential township”. To make sure that no one trespasses on its immaculate “Privatopia”, Palava plans to issue its residents with “smart identity cards”, and will watch over them through a system of “smart surveillance”. The emphasis on surveillance underlines the stratified, elitist nature of smart cities, according to the academic and author Pramod Nayar. “Smart cities will be heavily policed spaces,” he says, smart cities will be “more fortresses than places of heterogeneous humanity, because they are meant only for specific classes of people”; One class to be served, the other to be surveilled and contained.[7]

Despite all criticism, I’m also really appreciating the strong Indian belief in progress and the nation’s heavy enthusiasm for sustainable technology. It seems to me that India, such as China, has recognized the possibility to draw great advantages from its position as a reluctant urbanizer. It has the opportunity to learn from the mistakes of other nations, to do it better and maybe even skip some stages of the transformation process and avoid some negative side effects that we all know occurred during historic periods of great societal and economical change.

Palava City, Mumbai’s new “Sister City”, located at the centre of the economic triangle of Navi Mumbai, Thane and Kalyan.
http://a1realestate.in/wp-content/uploads/2015/09/lodha-palava-city.jpg (07.01.2016)

7 http://www.theguardian.com/cities/2015/may/07/india-100-smart-cities-project-social-apartheid (07.01.2015)
**Inspired by the boom cities of China, GIFT is being master planned by ECADI (East China Architectural Design & Research Institute), which is responsible for planning much of Shanghai, and Fairwood Consultants India, one of India’s largest and fastest growing consulting firms.)

A short excursus to reality

These on-site pictures, from the current construction work on early bird residential projects in Dholera, show a different and more realistic picture of the envisioned high-tech city. We see construction workers and day labourers building up the fundaments of the city with simplest means. The men are accompanied by their families; women and children, who are acting as assisting labourers.

1

www.aamanigroup.com/site_progres_aamanisir/#prettyphoto[group]/10/ (09.03.2015)

www.aamanigroup.com/site_progres_aamanisir/#prettyphoto[group]/4/ (09.03.2015)

www.aamanigroup.com/site_progres_aamanisir/#prettyphoto[group]/29/ (09.03.2015)

www.aamanigroup.com/site_progres_aamanisir/#prettyphoto[group]/14/ (09.03.2015)

www.aamanigroup.com/site_progres_aamanisir/#prettyphoto[group]/3/ (09.03.2015)

1 https://www.google.at/maps/uv?hl=de&pb=!1s0x395f273507c6eca1:0xdbdc77af372649b4!2m5!2m2!1i80!2i80!3m1!2i100!3m1!7e1!4shttps://plus.google.com/101991270827477190974/photos?hl%3Dde%26socfid%3Dweb:lu:kp:placepageimage%26socpid%3D1!5sgoogle+dholera+metro+city+maps+-+Google-Suche&sa=X&ei=INObVb3lGMT_ywO0io-oCg&ved=0CI8BEKIqMAo (24.03.2015)

www.aamanigroup.com/site_progres_aamanisir/#prettyphoto[group]/5/ (09.03.2015)

THE DELHI-MUMBAI INDUSTRIAL CORRIDOR

An interview with Amitabh Kant

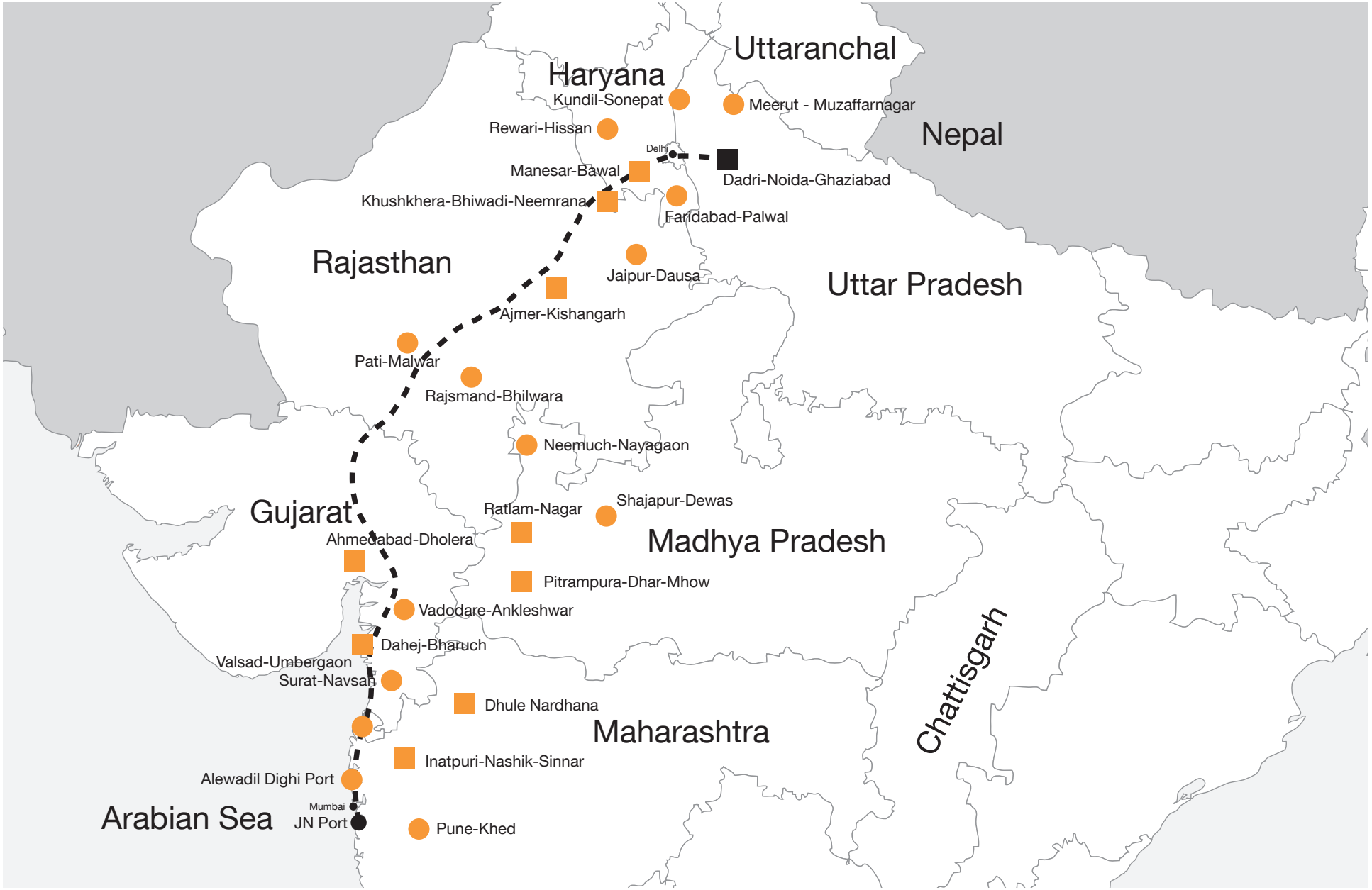
The following text is a summarised interview with the (in the meantime former) CEO of the DMIC Development Corp. Ltd. Amitabh Kant at Ashok Hotel, Delhi on February the 24th 2014.

"Cities are the key drivers of growth. They occupy only 3 % of the land in the world while consuming 75% of its resources. By 2030, 70% of the Indian population will live in cities. The process of urbanization is just starting in India, at a time in which it's already over in South America and Europe and nearly completed in China. While India will see urbanization in the next three to four decades, it'll be important to adopt a far more innovative and far more sustainable strategy of urbanization. A McKinsey study says that, by 2030 315 and by 2050 700 million Indians will have been part of the process of urbanization, which is 2.5 times the population of the US. Every minute 30 Indians move from rural to urban areas. This is happening at a time when India is passing through a window of demographic transition. The population is extremely young: 72% is below the age of 30. The challenge is to provide jobs for the young population. One of the most astonishing features in the world today is that the population in America and Europe is getting old, while India's population is getting younger and younger. This demographic change is an important one. The young ambitious population is looking for jobs. 52% of the GDP in India comes from the services sector, 16% from manufacturing and only 16% from agriculture. But almost 58% of the population is dependent on agriculture and while India's ambition is to grow at rates from 9 to 10%, agriculture only grows from 3 to 4%. No country in the world after WW2 has grown on the back of agriculture. So India will have to drive manufacturing, because it can't survive by only being a service sector driven economy. As India drives manufacturing, the logical consequence will be urbanization as the young population will move from rural to urban areas, searching for jobs. India has been a reluctant urbanizer, largely because of the religious and economical belief of its founding father Mahatma Gandhi. The Indian challenge is, as one of the leading economists from Michigan University C. K. Prahalad said: "We need to create 500 new cities by the time India becomes 75 in 2022; if not, existing cities will become slums." For that a sustainable strategy is needed and there are two things that are important: 1.: When cities were created in America and Europe, land, gas and water were cheaply available. It was possible to create sprawling cities and use cars for travelling. The places of accommodation and work were often far away from each other. They could afford to make cities like Atlanta where 98.2% of the inhabitants use gas to travel. Compared to a city with a similar population like e.g. Barcelona, the ecological footprint is twelve times higher. City planning has to include public transportation systems. That is, to my mind, the key! 70% should use public transport, 15% should cycle or walk. 2.: When urbanization took place in Europe and America, digital technology was not available. We created strands of power, water and sewage; Strands not speaking to each other. Digital technology enables you to integrate and actually make everyone speak to each other, get the data, analyse it, and provide real time governance and control. India has advantages being a reluctant urbanizer, being able to use digital technology and integrate it into the planning. That's what IBM is calling "Smart City" or CISCO is calling "Smart and Intelligent City". The task of new urbanization is very different to retrofitting existing cities. The challenges in India are both: greenfield cities and existing cities. India was among the first regions in the world to make cities! In a place called Dholavira in Gujarat cities were built about 5000 years ago. Those cities were extremely well planned cities. India needs to bring back its own genius into the making of cities. The key challenge today is to make cities that are compact, dense and highly liveable; which can reuse water and integrate digital technology. With the DMIC new industrial cities, which are

"INDIA NEEDS TO BUILD A MINIMUM OF 500 NEW CITIES URGENTLY... OTHERWISE EVERY EXISTING CITY WILL BECOME A SLUM..."

Prof C K Prahalad **1**

1 C. K. Prahalad - Speech at the first annual United World Colleges lecture series - "The United Wheels of Change"



DMIC city overview

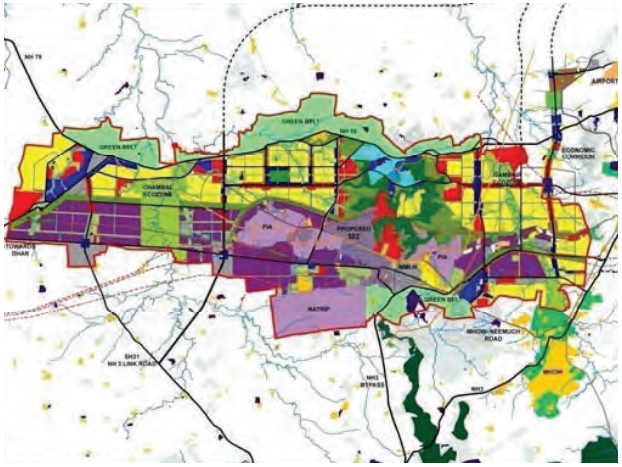
greenfield in nature, are created along a dedicated railway track, which will transport goods manufactured in the north of the country to the ports. The challenge is to bring in the best technical expertise from all over the world. To my mind India doesn't need a high speed train connectivity at this point of time. What India needs is good container movement. Right now all the goods are transported by using the road network. It takes about 13 to 14 days to bring a new car from the factory in the north to a port in the west. The new railway track will be exclusively reserved for container traffic. By 2017/18 a transport time of 17 to 18 days will become 17 to 18 hours. The DMIC Development Corporation is responsible for developing new industrial cities. We have identified 24 new industrial cities which can be taken up for the development in the next three decades; out of which we're developing seven new industrial cities in the first phase of the project. The Delhi-Mumbai-Industrial-Corridor is 1483 km long and passes through six states which are contributing 45% to the country's GDP. The target of the DMIC project is to double the level of employment, triple the level of output and quadruple the level of exports, within the next seven to nine years. Of the seven cities developed in phase one, there is one located in each state; and two in Maharashtra. The new cities are not developed in isolation. They are linked with the existing transportation network. All master plans are finished now and we're moving ahead with the engineering of the base infrastructure; the so-called trunk infrastructure. The sizes of the new cities are ranging from 84 to 920 km², bigger than the entirety of Singapore. The DMIC DC is working together with experienced consultants around the globe, following the key aspects of planning, which are: reduction of commuting means, creating neighbourhoods distributed across high access corridors, maximum reuse and recycling of water and solid waste, energy sufficiency, use of digital technology, and conservation of populated land. The soft development of the cities is also not to be ignored. As cities will grow, there will be a huge requirement of skilled workforce. This workforce will be in the position to attract companies and make them relocate their manufacturing bases. So we have identified the skill gaps between the supply and demand of skilled workforce and are developing new skill development centres now.

Amitabh Kant (hindi.revoltpress.com)

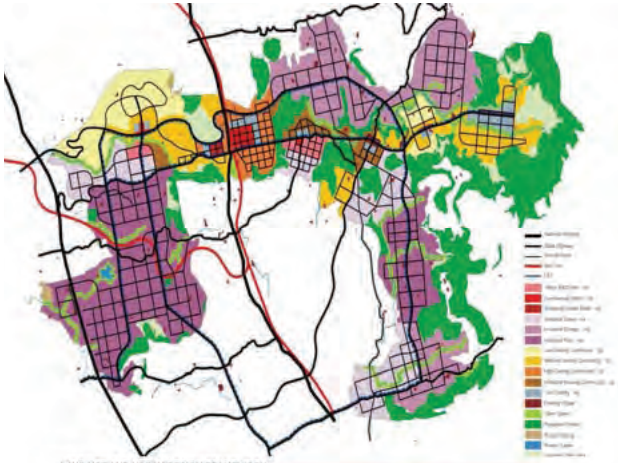
Our use of digital planning has been one of the key elements of all the master plans we have done. Therefore we brought in companies like Cisco and IBM to do the digital master planning. For the first time in the world, this level of digital master planning at this size and scale is happening in an integrated manner across all utilities. The first city we're developing is Dholera Special Investment Region* in the state of Gujarat. Dholera is located about 110 km south from Ahmedabad and has a total area of 920 km². The city is conceived for a population of 2.000.000 by 2040, with an employment integration of roughly 800.000 people. Today, the project area can be characterized as complete barren land. Dholera will be a greenfield city, planned totally from scratch. The first phase of the city will have an area of about 154 km². We are involving village communities and the land owners as one of the key stakeholders into the project. We open up all our master plans to them before the land is taken. Until now, more than 200 rounds of consultations have been passed. The total population in this area is very low: 30 000 people on an area of 900km². After completing the master planning process, the trunk infrastructure has to be implemented. At the initial state of the process we could invite the private sector (such as private developers) to come and exploit the land parcels. But their objective is to maximize the land value and their own returns and not what is required in terms of base infrastructure at the backbone of the city. That's why we are doing the detail engineering and design of the trunk infrastructure projects on our own, before inviting the private sector participants into the project. Again just to add, we're not doing this in a typical government setup. We have hired professional program managers from private companies like AECOM who are working as program managers to connect all the dots and to have a planning in an integrated manner. Every single road utility has to be designed by a separate consultant, but at the headquarter level the same is being integrated by a program manager. The process is being structured with government funding, but the execution is done by the private sector. For the first time in the country we are building all utilities below the road at the beginning, so that the problem of digging under the road at a later day and interference of the basic infrastructure utilities will not happen. The layer of the ICT is also already em-

* explained in detail later.

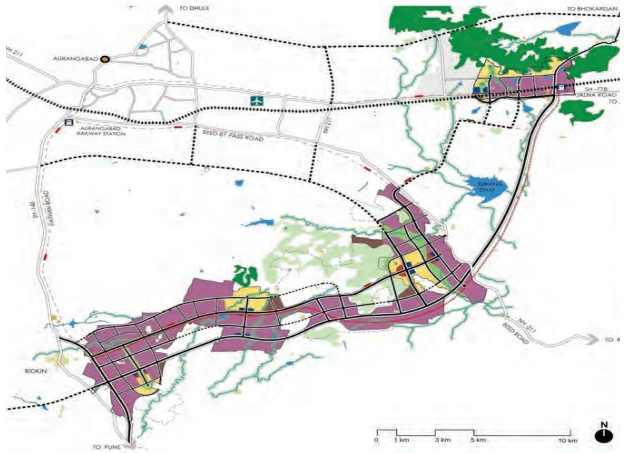
bedded because we're considering the broad band requirement is as important as water and power to any household. Therefore CISCO has undertaken the master planning. All the requirements of every single household have been taken care of, considering what'll be the broadband requirements of one household in 2040. So we're not looking at the basic infrastructure, we're taking into account the requirements in 30 years. Similarly we've looked at the requirement of power and water, identified the sources for meeting them for phase one as well as future developments of the project, providing the city with a high speed train connectivity from Ahmedabad, so that people can commute at a travel time of less than one hour. We're creating a command centre so that all city utility services can be integrated and leakages of water, power etc. can be identified. The second city we're developing is Pithampura - Dhar - Mhow in Madhya Pradesh. It is an existing brown field region which is getting expanded to an area of 372m²; again a mixed use development, meant for 1.16 million inhabitants. As the backbone of the whole DMIC project is the dedicated freight corridor, we're creating logistic hubs across all the states along this corridor. We're developing two cities (two nodes) in the state of Maharashtra, with the objective to take growth away from Mumbai. The first city which we're creating in Maharashtra is Dighi Port Industrial Area, a green field site with a total area of 253km². The second node is Shendra - Bidkin Industrial Park, close to Aurangabad. The total area of the node is 84km², being added to an existing industrial area. The next node is located in Harianna close to the international airport, has a size of 402km² and is called Manesar-Bawal Investment Region. The planning has been done by JEL (Jurong Engineering Limited) from Singapore. The beauty of the plan is that every single 10km² area in the master plan can be developed as a separate business district. We're also developing a very big logistic city at the intersection of the dedicated freight corridor and the national highway 8. This is going to be a logistic park which will have domestic-, auto- and export-packaging zones. Another node being planned is Khushkhera-Bhiwadi-Neemrana IR in the state of Rajasthan. Here the entire development is based in and around an airport. So we're calling it airport city or Aerotropolis (total area 24km²). The next node is Dadri -Noida – Ghaziabad Investment Region in the state of Uttar Pradesh. With a total project area of 210 km² the project includes an integrated township of 750 acres and provisions for primarily hi-tech, bio-technological industries as well as a logistic hub. The project has its own strategic importance in terms of location. Like there's a western DFC, there's also eastern DFC. So there is one more dedicated track running from a place called Dankuni in West Bengal to Ludhiana in Punjab. The two railway tracks will intersect at a place called Dadri in which we're developing a multimodal logistic city. We're developing power plants, because there'll be huge demands of power. Five such projects have been structured; which means we do the complete project development. We buy land for the state government and we take all clearances required for setting up a power plant in the country. So for every single



Pithampur - Dhar - Mhow IR



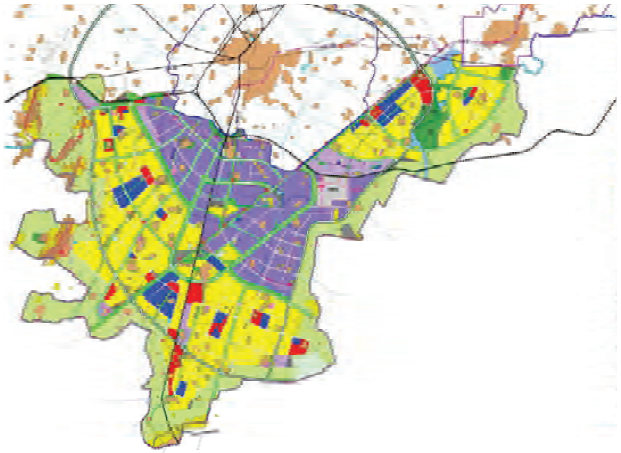
Industrial Township, Dighi



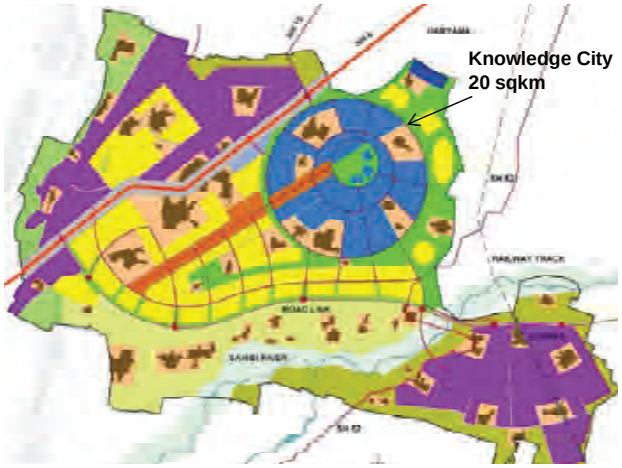
Shendra - Bidkin Industrial Park

(plans by DMIC DC)

project we obtain more than 42 clearances both at the central and the state level and house them in a separate project specific company. So whenever we want to invite a private sector party for participation, we just have to offload the equity and they can come and do the financial closure. So we do all the dirty work! We deal with the project before it is put out on the private sector. This is coming from our experience of structuring projects on the road sector on the PPP mode, where all the risk of the government is getting transferred to the private sector. So we have changed that model in a way that we'll be doing the project structuring and development, and once the project is fully structured then we'll be offloading the project to the private sector participants. As the DMIC Project is conceptualized as an Indo-Japan strategic partnership project, with Japan having promised 4,5 billion dollars subsidy, there are certain projects that we have structured in partnership with the government of Japan like e.g. the largest water desalination project of Asia in Dahej (Gujarat) involving technology from Hitachi, or a model solar project in Neemrana (Rajasthan). There are several early-bird projects already fully structured such as: an integrated industrial township at Greater Noida spreading on an area of 1100 acres in the state of Madhya Pradesh, a global city project close to Gurgaon, the phase one of Dholera which is going to be the first city for development, a multi modal logistics city in Rewari (Hariana), a multi modal logistics city in the state of Uttar Pradesh and a standalone development project of an exhibition and convention centre. What we have created is this black box called DMIC Project Implementation Development Fund which has been set up as a trust. The government of India has put up 4.5 billion dollars for funding for the trunk infrastructure development in the phase one of the project. The government of Japan has also agreed to contribute 4.5 billion dollars; which makes a corpus of nine billion dollars in the initial state of development that can further be leveraged from multilaterals and bilaterals. The model is pretty simple: The state brings the land and the central government funds the trunk infrastructure. Therefore a 50/50 SPV (special purpose vehicle) between the central and the federal government is created, which will be running all the planning and development activities for a particular city. Below this city-SPV there will be a lot of projects which can be structured either on PPP, or non PPP route. So if it is structured on non PPP route, the government of India's resources will be utilized and the project will be implemented on the EPC route. If it is PPP, the private sector will be invited to partner the government; to partner the city-SPV. But at the initial state of a greenfield development, all the projects will be structured on the EPC route, because PPP is not a viable option. Nevertheless it will be executed by the private companies only. The strategy is to capture any land monetization within the SPV vehicle, and use these funds to finance the development of the future phases of the same city and once that city is fully evolved, to finance the development of the future cities in the same state. This is how the structuring of the project has been done. If you bring in private sector too early, it will become a



Manesar- Bawal IR



Khushkhera - Bhiwadi IR

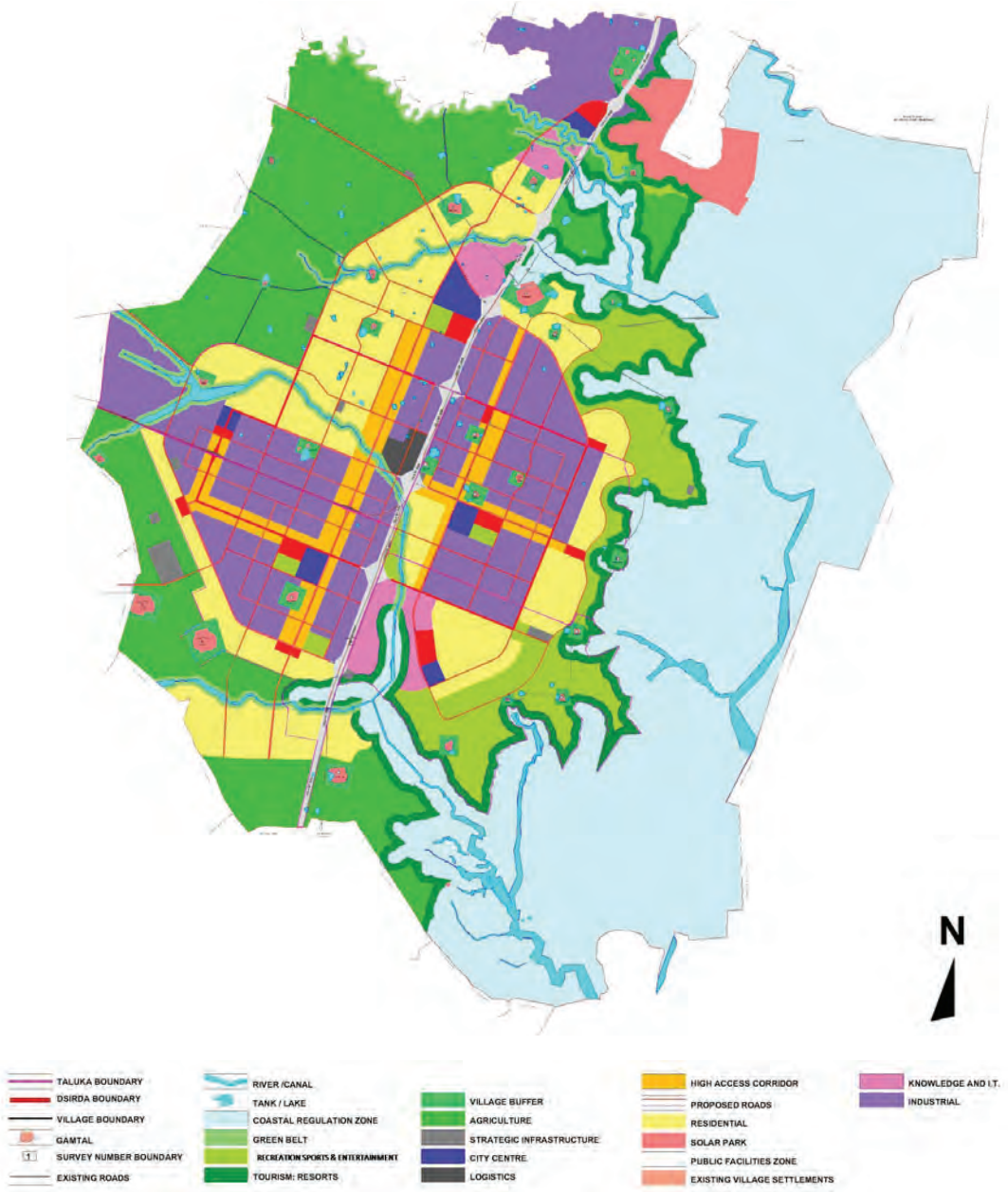
Dadri - Noida - Ghaziabad IR

(plans by DMIC DC)

real estate play. For us it's important to bring trunk infrastructure to perfection. Whatever infrastructure India is creating, it's falling short; because there's a huge domestic demand. So it's very important that the sequencing is right, that the phasing and the demand is right; sequenced economically. Every phase we have to monetize land values. China has done 495 cities in the last decade. Many of them are now known as ghost cities because there is no adequate amount of people. Cities don't happen overnight. Cities are happening over a three decade period and they need another three decades to mature. So this is about building a new India over the next 5 to 6 decades. There is no need to rush. Like the DMIC, which is also known as "Western Dedicated Freight Corridor", the Government of India is also planning an Eastern Dedicated Freight Corridor aka. AKIDC (Amritsar - Kolkata Industrial Corridor) and wants to develop industrial clusters similarly to what has been done in case of the DMIC. There is also a third corridor projected between Bangalore and Mumbai and a fourth one between Chennai and Bangalore. So when new cities are built, we need to attract skilled people. Skilled people go to places which are cool as we know. So, how are these people addressed in the projected DMIC cities? The challenge is that the population moves from agriculture to manufacturing. One of the keys is the implementation of public school projects, creating skills for people switching from agriculture to manufacturing. We are working with countries like Japan and Germany as well as the private sector of India to actually produce skilled workers to exactly the same standard as required; and provide these people with certifications from a wide range of very skilled institutes. The challenge really is that we should be able to provide a skill matrix across the seven cities that we are planning. What is actually the planning that has been done? What kind of industrialization will happen in those cities? What kind of manufacturing? What kind of manufacturing is growing globally and can come into that area and what kind of skills should we provide? So we are focusing very extensively on skill development. The challenge about new urbanization is that, as you create manufacturing new workers are going to get into those places. And to my mind it's important that we are able to bring in skilled workers, create skill development institutes and that we are able to create good workers' housing, because if we don't want slums to come. The challenge is that 58% of the population is working within the agriculture sector; there is a lot of unemployment in agriculture. India is growing at about 4%, but its ambition is to grow at about 9% per annum in 3 decades. No country in the world has grown on the back of agriculture. They are growing on the back of manufacturing. India has grown on the back of services, but there is this debate going on in India whether India has gone into the service sector too early in the day, and some strategists say, that for a young country, there are tendencies of deindustrialization too early. So India has to get back to manufacturing. Essentially the challenge for India is to create jobs. There is a demographic dividend which can easily turn into a demographic nightmare if we are not able to create jobs. Why does Japan cooperate with India? Japan is the only company in the world which has liquidity and which has zero rate of interest. It's the only country which can provide long term lending at low rates of interest. Japan is sitting on 14 trillion dollars at zero rates of interests. It's good for them to invest in long term infrastructure and at the same time use its companies to get into the Indian market. The Indian point of view is that the Japanese are very good at technology and execution. What are the alternatives available? You either develop a Shinkansen which has not run late for the last 30 years even by on minute, or bring in Chinese companies which have crashed in the sixth year. The Japanese bring in cutting edge technology and believe in perfection and that's what Indians must do.

DHOLERA SIR A GLOBAL MANU-FACTURING HUB

The Dholera Special Investment Region (DSIR) will be a new major industrial hub located on a green-field site about 100km south of Ahmedabad and about 130km from Gandhinagar within the Saura-shtra peninsula. The site covers an area of about 920 km² of land bordering the Gulf of Khambat. The plan provides for the development of an integrated and largely self contained new city with the poten-tial to grow up to and beyond a target population of 2 million. The project is the first investment region to be designed under the proposed Delhi-Mumbai Industrial Corridor project (DMIC), a joint Indian and Japanese Government initiative to create a linear zone of industrial development nodes along a Dedi-cated Freight Corridor (DFC) railway between Delhi and Mumbai. There is no rail connection to the DSIR at present. The nearest railway station is at Dhand-huka on the metre gauge rail line from Gandhigram to Botad.[1]



Spatial development plan Dholera SIR
(Final Development Plan DSIRDA - Report 1, DSIRDA)

Specifications:

area:
920 km²

time period:
2010 - 2040

encompassed villages:
22

existing population:
37 000 (census 2001) inhabiting small settlements

situated strategically between:
Ahmedabad, Vadodara, Surat, Rajkot and Bhavnagar (industrial centres)

linked to:
- major ports of Gujarat by state highways,
- internat. airport proposed northeast of the DSIR

predominant land use / economic activity:
- Agriculture

land quality:
- generally poor quality and saline
- especially close to the sea, farm output not high
- land values are therefore relatively low.

vision:
"economically and socially balanced, new age city with world class infrastructure and high quality of life. Adoption of a sustainable approach across the key components such as transportation, waste recycling, overall urban form and resource efficien cy form the cornerstones of this plan."

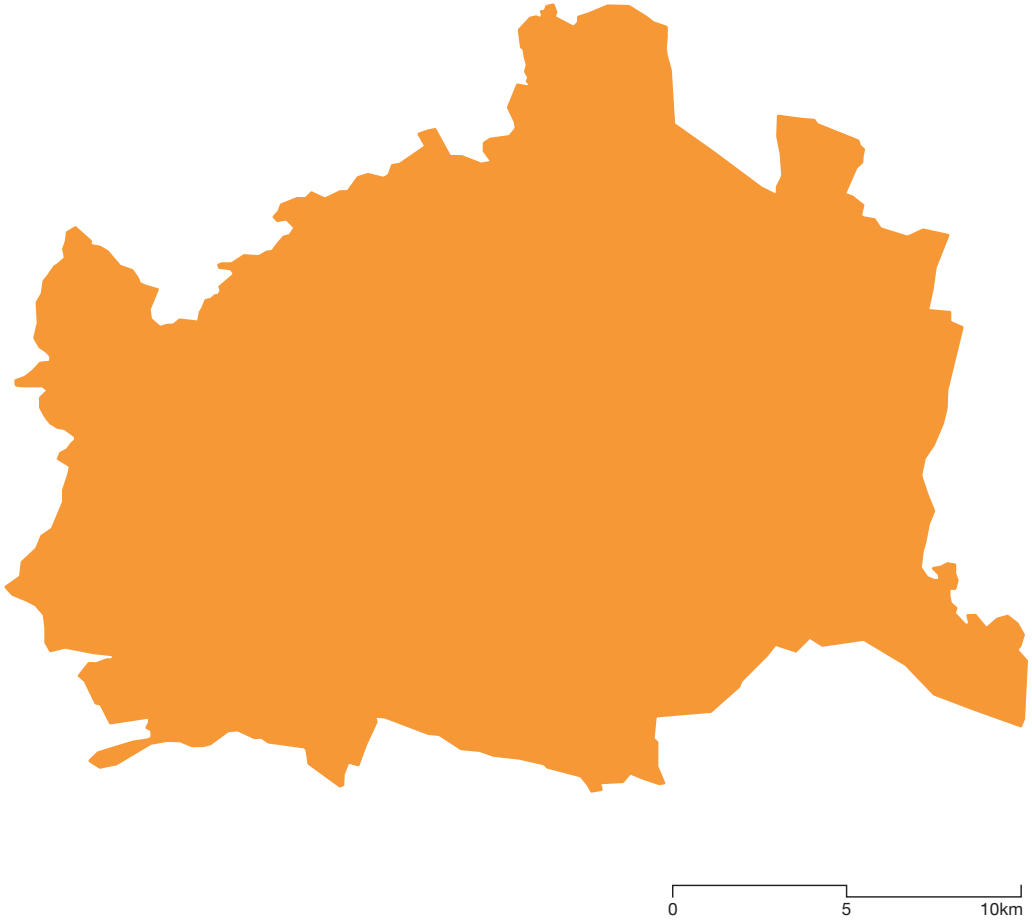
1 Final Development Plan DSIRDA - Report 1, Dholera SIR Development Authority, Sept. 10 2012, p. 1, 193

Dholera SIR

area:
406,59 km²

population:
2.000.000 (2040)

population density:
4918,96 people/km²



Vienna

area:
414,87 km²

population:
1.794.770 (2015)

population density:
4.326 people/km²

DSIR FUNDAMENTAL CHARACTERISTICS

Target population and industries:
According to a comprehensive assessment of the industrial and commercial potential, including detailed economic studies and stakeholder discussions, the Dholera SIR (DSIR) has the potential to attract a wide range of industrial uses, such as electronics and high tech industry, pharmaceuticals and biotechnology, heavy engineering as well as automobile and general manufacturing sectors. Industrial employment together with tourism and higher education will provide the economic foundation of the DSIR, generating approximately 343,000 base jobs, which in turn would generate a further 483,630 jobs in support services. This is expected to create a total of 826,630 jobs within a period of 30 years, supporting about 2.5 million people. Considering commuters from the neighbouring areas, it is anticipated that housing will be required for a target resident population of about 2 million. The average family size in the DSIR is expected to be about 4, which makes it necessary to plan for the construction of about 500,000 dwellings.

Location of Dholera within the DMIC

Land use allocations:
The DSIR has a total area of about 920km², of which large parts are covered by Coastal Regulation Zone (CRZ) restrictions. Note: The Coastal Regulation Zone (CRZ) was set up to protect coastal areas from the risk of flooding and natural hazards. It will not be developed, but enhancement through forest planting and landscaping as well as recreational usage will be permitted. Land area outside the CRZ (= developable area) is about 581km², of which urban land uses cover about 339km². The remaining land outside the CRZ is allocated for agricultural, forestry, nature reserves, recreation and solar energy parks. All in all, a total of 6,785 ha land area (+1,772ha of existing villages) is reserved for housing within various land use zones like Residential Zone, High Access Corridors, City Centre and Knowledge & IT. About 20% of the residential land will be allocated for the development of low income housing, another 57% for medium income housing and the remaining 13% for high income housing. All residential areas will be mixed-income areas and housing will be developed together with a wide range of community facilities, including schools, medical facilities, neighbourhood retail and open space. About 21% of the total DSIR will be dedicated to green space and recreation. A significant part of it will be allocated for agriculture in order to supply the new city with fresh farm products.The ratio between industrial areas and the areas allocated for residential use is balanced to provide approximately 80% of the projected demand for housing arising from employment opportunities within the DSIR. The city centre, district centres and high access corridors are envisioned as lively mixed use urban centres.

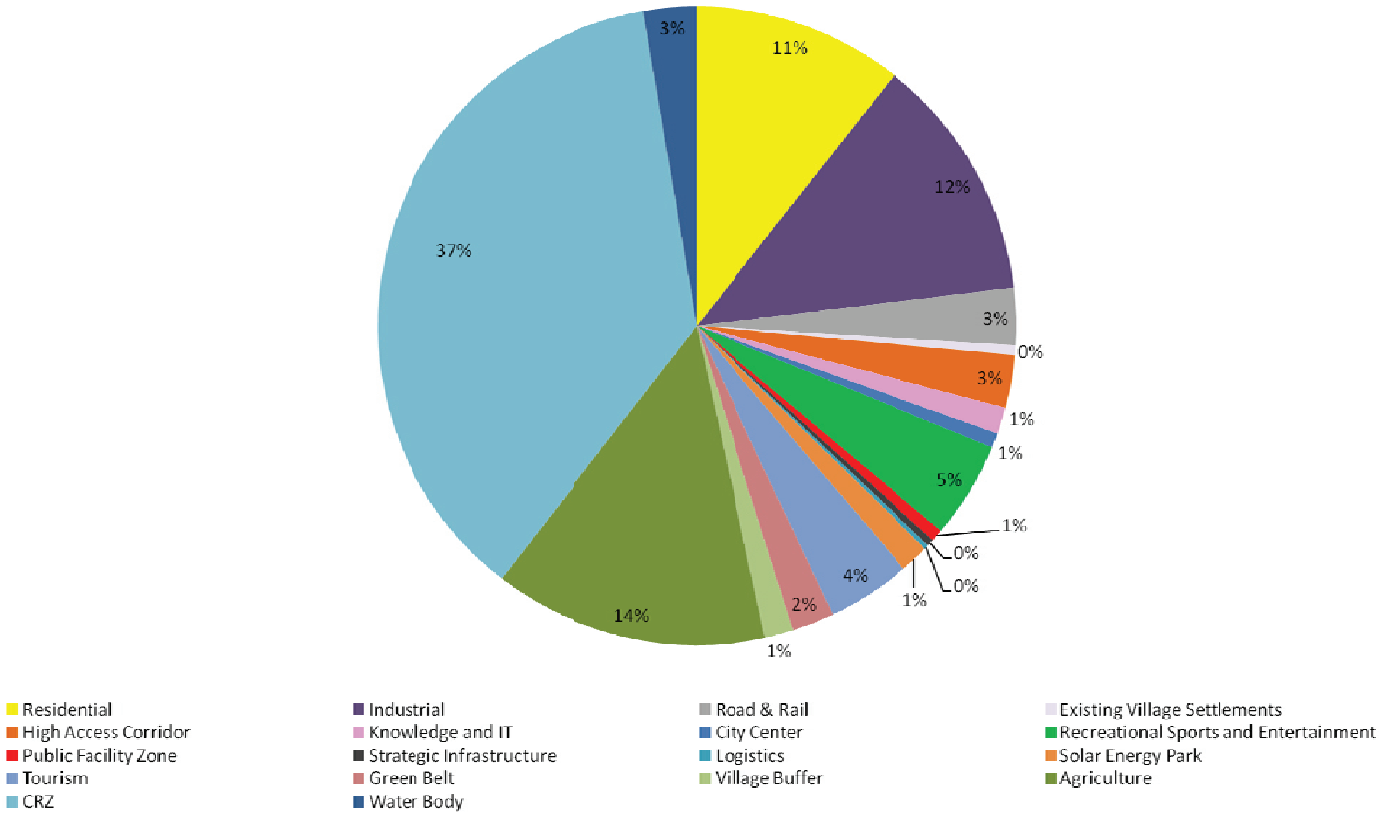
The land use is allocated based on twelve spatial planning principles:

- creation of a compact city
- integration of land uses
- accessibility of industrial zones
- focus of the city internally away from the central expressway, which will only have limited access
- separation of industrial and civic traffic
- provision for a high quality public transport system
- development of a poly-centric structure that has a number of commercial and community nodes
- integration of existing villages into the new city
- conservation of the better agricultural land
- protection of the Coastal Regulation Zone (CRZ)
- development of a strong landscape strategy
- a phased development for timed investment.

The break-up of the broad land use zones into further categories, displayed on the next page, is a critical component of the spatial plan. It shows that every functional zone within the master plan again consists of different functions:[2]

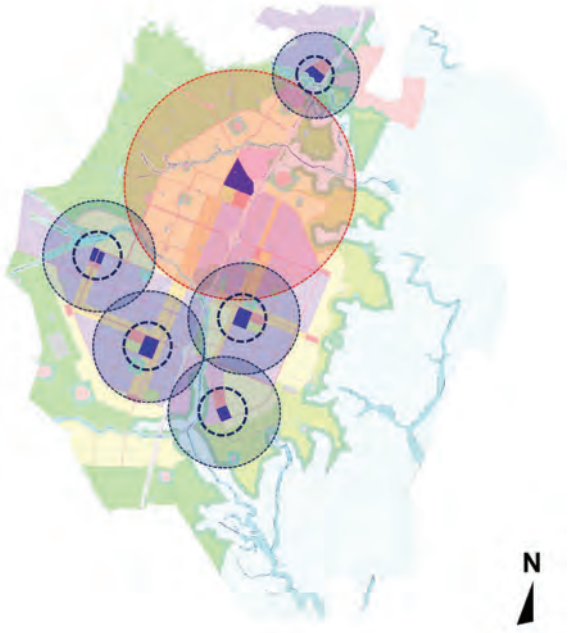
2 cf. Final Development Plan DSIRDA - Report 1, Dholera SIR Development Authority, Sept. 10 2012, p. 1f., 14ff.

A summary of the land use allocations proposed in the DSIR



All pictures from Final Development Plan DSIRDA - Report 1, DSIRDA,

Town typology:
The Dholera master plan provides for a *poly-centric* spatial model, consisting of six city centres distributed within the whole city area. (see picture below) Each of them will act as a local node that serves the surrounding residential and industrial areas. Furthermore, each district centre will achieve a certain degree of self sufficiency and viability on its own. The main central business district is located close to the existing Dholera village.



Transport strategy:
The central expressway corridor (see picture above) will provide direct access to the city through five grade separated interchanges. To avoid congestion and the growth of the informal sector, there are no service roads provided along the expressway. A *hierarchy of roads* with an emphasise on separation of industrial and other traffic will distribute traffic within the city. Furthermore, there will be provision for a high quality public transport system.The cross section of key roads in the city includes a reservation for bus only lanes, which can be upgraded to a higher capacity system such as a tram or trolley bus system as the city grows. The maximum distance of an industrial area must not be more than 3 km from the nearest residential area.

Preservation of villages and agricultural land
Within the DSIR area there are 22 existing village settlements. In order to allow each village to expand naturally at its own pace, a b*uffer zone* is drawn around them (see picture below). Those villages in the middle of the new city will inevitably lose their farmland to urban development over a period of time and alternative sources of livelihood will have to be generated for their inhabitants. Therefore appropriate job and skill training programmes for the existing local communities will have to be established. Some villages nevertheless will not lose their farmland and can continue as primarily agricultural communities.

The areas with better farmland on the western and southern edge of the city are allocated for continued agricultural use, offering a source of livelihood for many local villagers. Only if the supply of industrial land is seriously exhausted consideration should be given to the release of these farmlands for alternative uses.

The urban structure

The transportation network is a key component of an urban structure. In case of the DSIR, it is based on principles of mobility friendly circulation patterns, with priority to public transportation, pedestrians and cyclists. A basic grid that forms super blocks of 4km x 4km is adopted as broad level street pattern for the DSIR.

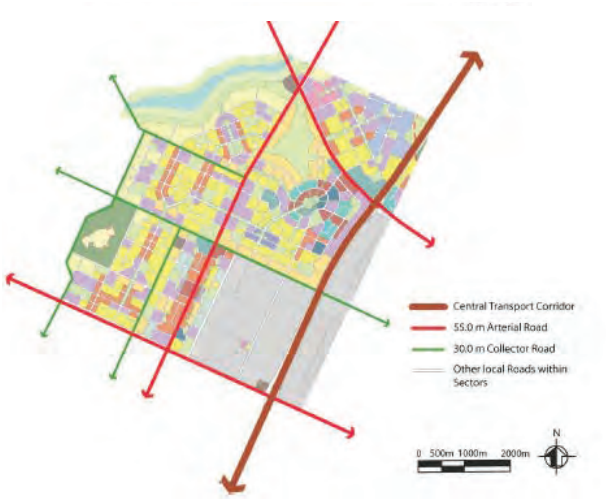


Figure 6-3: Internal Roads within Sectors and the Connectivity with the Strategic Ro

able urban environment. Due to its flexibility, the primary grid allows for the creation of larger or smaller blocks, according to requirements. Each larger block can break down into the standard 750m, 500m or 250m urban blocks according to a distinct road hierarchy.

Road hierarchy

The road system comprises of six categories of roads, as illustrated below:

- Expressway
- Industrial Priority Arterial roads
- Arterial roads
- Collector roads
- Priority Truck Collector Roads
- Local roads.[3]

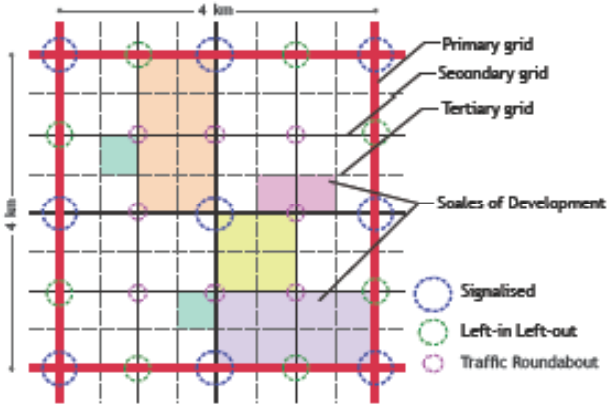
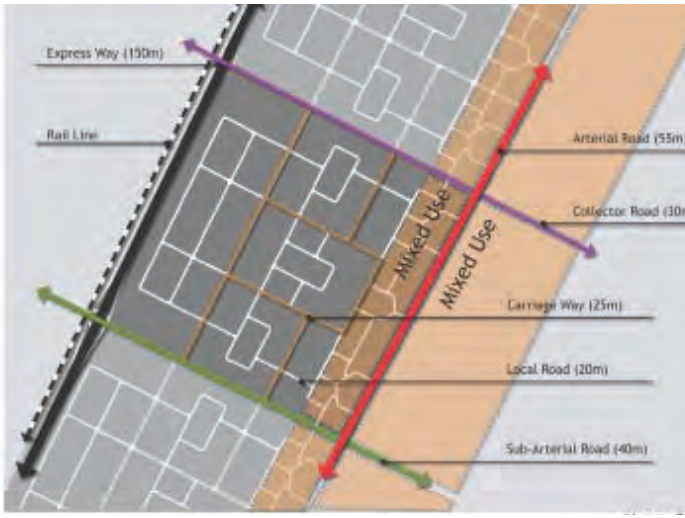


Figure 3-2: Broad Urban Structure - Street Grid

Connectivity andwalkability

The primary grid formed by the main streets (arterials and collectors) is responsible for access at higher levels within the city. This primary grid allows for local streets interspersed at a distance between 250m to 750m, providing for a hierarchy of intersections and an interconnected network.

The ideal distance between 2 major streets is considered to be twice the comfortable walking distance, which is about 400 to 500m. The adopted grid allows everyone to be within walking distance of at least one east-west and one north-south connection. This network provides for closely spaced intersections that enable access and visibility, while encouraging pedestrian trips and facilitating a walk-



All pictures from Final Development Plan DSIRDA - Report 1, DSIRDA

3 cf. Final Development Plan DSIRDA - Report 1, Dholera SIR Development Authority, Sept. 10 2012, p. 13ff., 68

Density:
In the DSIR the *gross city level density* (including roads and open spaces and excluding the CRZ zone) will be about 37pph (people per hectare). The *gross average 'urban' density* (including all roads and open spaces only in the urbanisable area) will be about 65pph. The *net average housing density* (including land for purely residential purposes, excluding all roads, local open spaces and common amenities) will be about 393pph or 98dph (dwellings per hectare).

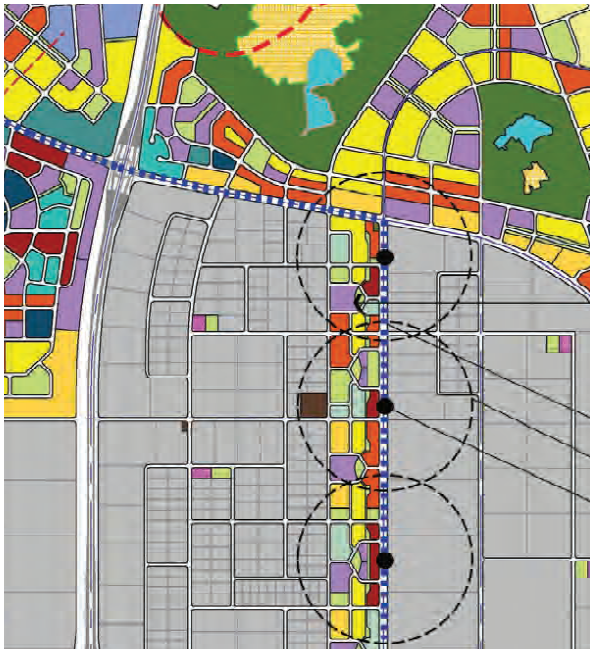
District centres
The district centres will be smaller, scaled down versions of the main city centre. Their job is to ensure that the city can develop as a poly-centric urban area, with facilities spread evenly all-over the city. They would typically contain facilities required at a lower level in the hierarchy of provision. For example, on city level the DSIR will provide the highest level of specialist medical facilities, but each district centre would be expected to have a smaller general hospital to serve a more local population. The range of facilities provided by the district centres is as follows:

- Retail shops, with both comparison and convenience goods such as food shopping;
- Commercial and Government offices serving the district;
- Community facilities that require good accessibility from the rest of the district;
- Residential accommodation, including high and medium density apartments, some of which could be built above retail units.

High Access Corridors
High Access Corridors are arranged within a distance of about 250m to 750m (5 to 10 minutes walk) from the major public transit routes, as illustrated in the picture below.

These zones will have the character of 'transitoriented developments', with higher FARs and residential densities than other residential areas and a greater mix of activities.

Beside retail and service oriented activities for the surrounding population, they will provide high density housing for industrial workers. There will also be shops, services and community facilities for its residents and the day to day needs of the industrial areas.It is expected that each corridor will become a major public transit route; at the beginning as a bus route, but eventually as a tram or light rail transit (LRT) route when traffic levels are high enough.


Picture from Final Development Plan DSIRDA - Report 1, DSIRDA

The breakdown of the different uses is roughly as follows:

- High density housing, including provision for High Income & Low Income Group as well as the Economically Weaker Sections (EWS)
- Community facilities to meet the needs of the resident population and workers from the adjoining industrial areas, including parks and sports areas
- Commercial facilities to serve the needs of residents and workers, such as retail shops, restaurants, hotel, banks and other services
- Institutional buildings serving the direct needs of the locality.

Land demand
The estimated demand for industrial land, derived from the market assessment studies, suggests that demand will build up slowly at first, then grow at a fast rate through the middle period and then level off as the city matures. The demand for residential, commercial and other land uses will follow a similar pattern. In determining the spatial phasing strategy, the DSIR Draft Development plan recognises that:

- Development is best started where the most comprehensive range of existing facilities and infrastructure is already available, particularly where they are close to existing centres of population

- Concentrating early development on Government owned land will minimise the cost and potential delays in land procurement

- Development should preferably be concentrated in one or two locations at once, rather than be spread thinly over the entire developmentarea, so as to allow utility services such as water and waste water treatment to be supplied eco nomically and with minimum delay

- Each phase should be as self sustained as pos sible and should provide a well balanced mix of uses so that it can function effectively and not require development within subsequent phases to complete it

- The early development phase should be largely completed before subsequent phases are brought on stream [4]

Comment:
There are two main papers issued by the state of Gujarat giving detailed information about nearly every topic possibly relevant for the Dholera project, forming the starting point for any kind of planning within the Dholera SIR zone. First there is the “Final Development Plan – DSIRDA Report – 1” which is basically a project description featuring 263 pages of background information, containing cultural, economic, geographic, demographic etc. surveys, involving renowned engineering consultancy companies like e.g. Synovate India Pvt. Ltd and Knight Frank (India) Pvt. Ltd., as well as a detailed description of the financing, jurisdiction and competences/hierarchies within the involved institutions and companies. The example of the estimated waste which will be produced in the Dholera Metropolitan Area within a certain year, illustrates how detailed those surveys are. Secondly there is the “Final Development Plan – DSIRDA Report – 2 General Development Control Regulations” which is a 274 pages building code, in which the whole poly-centric city is acted out precisely. The mixed use master plan extending on both sides of the central traffic spine featuring a ten lane highway and train tracks, consists basically of several mega industrial parks interconnected with residential areas via so-called high-access corridors, high density mixed use areas providing for short ways and efficient public transport. The central spine is part of the DMIC-dedicated freight corridor, which is supposed to cut the logistical costs of manufactured goods to make it the lowest in the world. While Cisco and IBM have been contracted to develop Dholera as a smart city, the US-American company AECOM is responsible for the general project management. Due to the elaborate master plan every single street can be associated with a precise cross section. Maximum building height, function and density of each and every block are already determined. The blocks are ready to be released for further advancement by developers. Most of the land is in public hand and is only sold step by step, according to the scheduled city development plan. What distinguishes Dholera from the twenty-two existing ‘historical’ or ‘organically grown’ villages it will absorb later, is the political act of founding a city and then authorizing professionals to draw up a master plan in order to establish an urban community from scratch on a spot where there was none before. This is what all New Towns have in common. After that common starting point, there is an enormous variation in the way brand new cities are designed. At one end of the spectrum are the grid cities which, within the established lines of infrastructure, plots and zoning, adopt a liberal attitude with respect to the urban infill of the grid. At the opposite end are the comprehensively designed modernist cities (Chandigarh and Brasilia represent the high point of this development) which work out every detail in advance, from the large scale down to the design of the residential environment and the individual dwelling, from public space (and its use) to the economic and social structure of the cities and set it all down in a blueprint. Dholera definitely belongs to the group of cities in which a liberal attitude towards the urban filling of the previously prepared grid is exercised. [5]

4 cf. Final Development Plan DSIRDA - Report 1, Dholera SIR Development Authority, Sept. 10 2012, p. 18, 26f., 33
5 cf. New Towns for the 21st Century - the Planned vs. the Unplanned City, Michelle Provoost, SUN, 2010

DSIR DETAILED INFORMATION

Housing provision

The development of industry and other economic sectors in the DSIR will create a massive demand for urban housing. Particular attention has to be paid to adequate housing provision for lower income groups (LIG) and economically weaker sections (EWS) in order to prevent the formation of informal settlements. The release of residential land will also be phased in order to ensure an orderly housing market and to prevent price speculation. The demand for housing is derived from a detailed employment forecast and the analysis of the market for housing in the DSIR. This study examined the likely employment structure in the DSIR over a 30 year period and the income levels of employees, both for those directly employed in the base industries of the industrial parks and in the knowledge, higher education and tourism sectors and those in the support sectors such as banking, retail, construction and infrastructure services.

As mentioned before, about 500,000 dwellings are required to meet the housing demand of the DSIR for the 30 year plan period. The analysis of income levels and affordability in the DSIR identified a requirement for three different categories of housing.
Each housing category is based upon densities and is described in terms of average gross and net density. Gross density includes local roads, community facilities and open space, whereas net density includes plot areas or saleable land only.
The description of each category of housing is as follows:

Low Density Housing
This will include detached bungalows and villas above 100m² in carpet area on large plots. The average net density proposed for such housing is about net density of 25dph.

Medium Density Housing
This will typically be larger row houses and apartments with carpet areas of 50m² to 100m². The average net density proposed for medium density housing is 75dph.

High Density Housing
This will include group housing structures such as apartments, smaller row houses, dormitories and bachelor housing for migrant industrial workers as well as sites and services schemes.
These units are likely to have carpet areas of less than 50m2. The average net density proposed for such housing is about 195dph.

Note:
- low to medium density housing (High income groups with an annual income more than INR 500,000)

- medium to high density housing (Medium income groups with an annual income within INR 150,000 to 500,000)

- high density housing. Low income groups, includ ing EWS (annual income less than INR 175,000)

Housing will be located within residential areas, high access corridors and commercial zones, including the city centre and district commercial centres.

Furthermoreousing housing will also be allowed in higher education and knowledge industry campuses as well as in the village buffer zones. The allocation of various housing densities is supposed to encourage mixing of different income groups in each of the land use zones containing residential usage. The map below highlights the distribution of housing allocation across the Residential, High Access Corridor, City Centre and Knowledge & IT Zones. All three density categories are included in the Residential Zone, while only high and medium densities are included in the City Centre and High Access Corridor Zones. In the Knowledge and IT Zone only medium and low density housing is allowed.

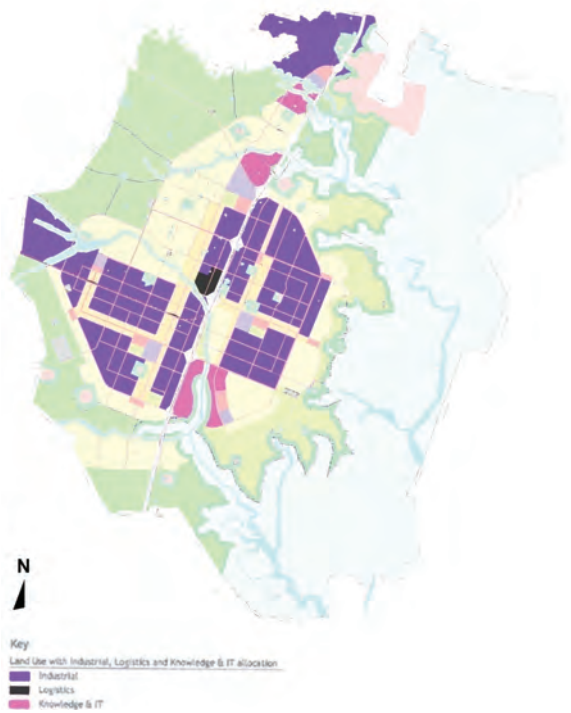
Figure 5-1: Land Uses with Housing Allocatio

Local conditions

The DSIR contains 22 villages and houses a population of less than 40,000 according to the 2001 Census. The majority of the existing population depends on farming for their livelihood, while only very few are employed in the industrial sector. A variety of different crops is grown in the DSIR area; the main ones being wheat, cotton and jowar. Gram and jeera are also grown. “There is some double cropping with the aid of irrigation, but generally the soil is poor and the area is not a highly productive. Salinity is a major problem, especially on the eastern side of the project area. In some villages the proportion of the land under cultivation is very high, for example at Panchi it is 97% but in other villages on the eastern boundary of the site, farming land can be a very low proportion of the village land area. Cultivators are the majority of the workforce and the proportion of marginal farm workers is fairly high, at about 35%.“ Population growth within the study area will reduce the proportion of people employed within the agricultural sector substantially. Marginal workers, not owning any land, are amongst the most vulnerable to the changes brought about by the DSIR urban development. They have no assets to sell and they will require particular help and assistance. This means, *Non-land-based Economic Opportunities* will have to be created. Investors or local employment contractors for infrastructure development as well as industries will need to be encouraged to provide appropriate employment, education and health-care facilities as well as priority in contract work etc. The DSIR Development Authority could in turn prepare a database of potential persons from the affected families and provide this database to the industries. Based on the experiences from other development projects, provisions of about 5% of the project costs could be made to address the issues related to resettlement assistance and economic rehabilitation of the affected families.

Developable land

The developable urban land in the DSIR is about 33,846ha (of the 58,100ha total developable land). The major saleable elements of this will be industrial land at 11,457 ha and housing and commercial land at about 2,165 ha.



Climate

In the project area there are four seasons, namely summer, south-west monsoon, post-monsoon, and winter. The summer season starts in March and continues until the end of June. October and November constitute the post monsoon season. The weather is generally cold during December to February. (According to Indian Meteorological Department)

Table B- 2: Monthly Average Variation in Dry Bulb Temperature at Bhavnagar and Ahmedabad

MONTH	TEMPERATURE (˚C)			
	0830 HOURS		1730 HOURS	
	AHMEDABAD	BYHAVNAGAR	AHMEDABAD	BYHAVNAGAR
January	14.6	15.4	26.8	26.8
February	17.4	18.2	30.1	29.7
March	22.8	23.6	34.9	33.8
April	27.4	28.1	38.8	36.8
May	29.4	29.9	40.6	37.5
June	29.4	29.8	36.5	34.4
July	27.4	28.1	31.6	31.1
August	26.3	27	30.3	30.2
September	26.5	26.7	31.9	31.1
October	25.5	26.6	33.8	33.5
November	21.4	22.3	30.6	30.8
December	16.6	17.3	27.5	27.5

Temperatures

The Table above shows that the average temperature at 08:30 and 17:30 for both, Ahmedabad and Bhavnagar is nearly the same, every month of the year. May is the hottest month, both at Ahmedabad and Bhavnagar. The same trend is expected at the project site with slightly decreasing temeratures in June (beginning of monsoon) but remaining steady until September. After the end of monsoon in September, the temperature continues to decrease in post-monsoon and winter season. The minimum temperature is recorded in the month of January.

All pictures from Final Development Plan DSIRDA - Report 1, DSIRDA

6 cf. Final Development Plan DSIRDA - Report 1, Dholera SIR Development Authority, Sept. 10 2012, p. 45, 147ff., 184, 198

Rainfall

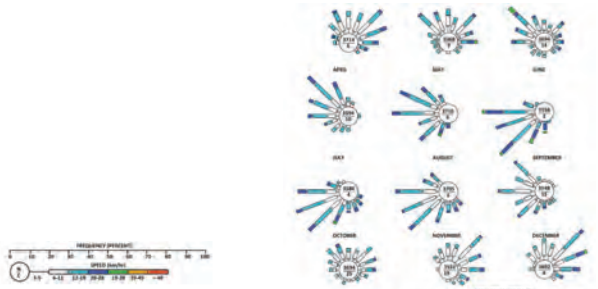
The estimated annual rainfall in DSIR will be approximately 800mm as climatological conditions of Bhavnagar district dominate this area. The mean average monthly rainfall for Ahmedabad and Bhavnagar district is given in the table below.

MONTH	AHMEDABAD (mm)	BHAVNAGAR (mm)
January	2.6	1.2
February	1.1	1.5
March	1	2.4
April	0.9	0.4
May	6	4.6
June	108.7	114.9
July	265.3	180.5
August	219.8	152.9
September	171.9	117.4
October	10.8	26.1
November	8.9	10.8
December	2.6	2

(Table from Final Development Plan DSIRDA - Report 1, DSIRDA)

Wind speed

Wind speeds in this region are generall light to moderate with some strengthening during the south-west monsoon. Within the period from April to August wind speed is usually higher. Again also the wind speed at the project site is likely to be in the range indicated for Bhavnagar. The average monthly wind speeds at Ahmedabad and Bhavnagar are presented in the table below.



(Table from Final Development Plan DSIRDA - Report 1, DSIRDA)

MONTH	WIND SPEED (km/hr)	
	AHMEDABAD	BHAVNAGAR
January	5.8	13.7
February	5.9	14.6
March	6.3	16.1
April	7	18
May	9.2	22.6
June	10.1	25.9
July	8.7	23.2
August	7.2	19.3
September	6	15.7
October	4.3	13.1
November	4.6	11.9
December	5.3	11.9

(Table from Final Development Plan DSIRDA - Report 1, DSIRDA)

Seismicity

The DSIR falls under the Zone III of the Seismic zoning map of India, which suggests only a moderate risk of earthquakes. The project site lies to the west of the West Cambay Fault but this doesn't appear to be active as only a few shocks have occurred along it in historical times.

Topography

The DSIR project area is generally very flat, occupying a low lying plain that falls very gradually from the 8m contour on the western boundary to the 4m boundary in the east. The eastern edge of the site lies below the high tide level which is at about 5.5 to 6m.

Soils

Generalty, the soil type in the DSIR is fine to coarse loamy, mixed montomorillonitic, (shrinkage and swelling characteristics) calcareous and mostly saline. The ground water table lies between 1 to 2.85 m in Dhandhuka, Dholera and Bavaliyari. The subsoil consists of the alternate layers of soft silty clay/ clayey silt of medium to high plasticity and fine to medium grained sand. Usually in this region the bed rock is not encountered at a considerable depth. The load carrying capacity or Safe Bearing Capacity of the soil is about 5 T/m², which is very low. Generally, construction of rigid and even flexible structures on such soils is not considered feasible. Improvement of ground conditions prior to commencement in construction activity is extremely critical. (205)

Population of the DSIR in the broader perspective of the population of Gujarat

In 2001 the total population of Gujarat was recorded to about 51.3 million people, out of which about 38% were living in urban agglomerations. By 2040, about 65% of the Gujarat population (50 million) will reside in urban agglomeration. Therefore by 2040 the State will have to allocate adequate urban resources, such as land, infrastructure and social amenities, for its *additional urban population of 31 million*, which is about 165 percent of the 2001 figures.

Already in 2025, an estimated 5.9 million people will have to be accommodated in 'new' urban centres, in addition to those that will be housed in the existing urban regions in Gujarat. Assuming that the DSIR will be heading towards the end of its phase 1, its supported population could be about 0.6 million inhabitants by 2025, which is about 30% of its target population of 2 million. Given that the un-allocated urban growth for Gujarat will be 5.9 million by 2025, the target for the DSIR seems to be quite realistic. Actually the DSIR, if built, will be the built manifestation of the ongoing dramatic rural to urban shift. The area with its present predominantly rural character is supposed to turn into an economically diverse and productive urban city, and will therefore change completely. However, without proposed new cities such as Dholera, it is difficult to figure out how the

predicted growth of urban population in the state of Gujarat, could be accommodated.

Conclusion on the population estimation by the planners themselves

"Lastly it is considered that the rate of house construction implied by the housing target for the city is extremely high and will test the construction industry, which may require technical and financial assistance by the Government to achieve the required rate of house building. Overall, it is concluded that reaching the population target for the DSIR represents a challenge and one that will only be possible to achieve if the project receives a very high degree of Government support."[7]

AECOM Who are the makers of the Dholera master plan?

AECOM is a global provider of professional technical and management support services to a broad range of markets, including architecture, urban planning, transportation, facility management, environmental, energy, oil, gas and chemicals, water and government. AECOM was launched as an independent company in 1990, though its history can be traced back to the early 20th century and the inception of the Ashland Oil & Refining Company in Kentucky.

Annual Revenue
$19 billion (during the 12 months ended March 31, 2015)

Business Segments
Professional technical services and management support services.

Clients
Government and private industry.

Countries of Operation
Approximately 150.

Employees Worldwide
Nearly 100,000.

Engineering Design Firm Revenue Ranking (Engineering News-Record magazine)
#1.

Fortune 500 Ranking
#343 (+Fortune World's Most Admired Companies 2015)[8]

7 Final Development Plan DSIRDA - Report 1, Dholera SIR Development Authority, Sept. 10 2012, p. 1, 201ff., 212f.
8 https://en.wikipedia.org/wiki/AECOM (22.06.2015)

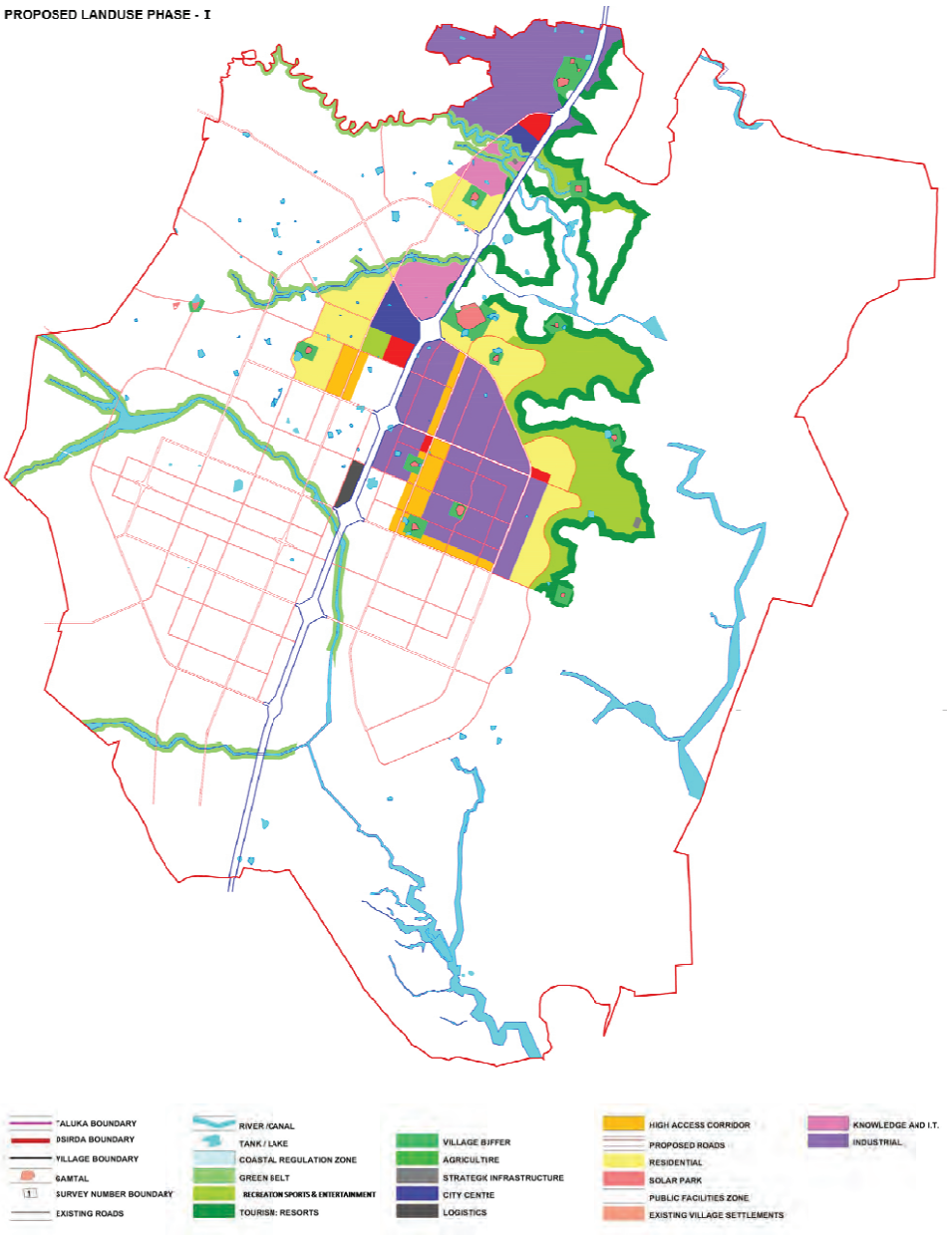
PHASING

Phasing: 30 years, divided into 3 equal parts; Phase 1: 35%, Phase 2: 36%, Phase 3: 30% of the land under urbanizable zones. Development of the DSIR is recommended to start from Ambli village in the north side, close to the existing State Highway and then proceed generally southward either side of the expressway to Bavariyari Village.

The phased land management strategy, in order to achieve quick implementation at relatively low cost, involves, in the first instance, limited compulsory land acquisition for critical infrastructure elements in order to kick-start the development. Thereafter the Town Planning Scheme can be applied as soon as the market for the resale of land is established and farmers are able to resell their land at a profit.

Phase 1 (2010 - 2020)

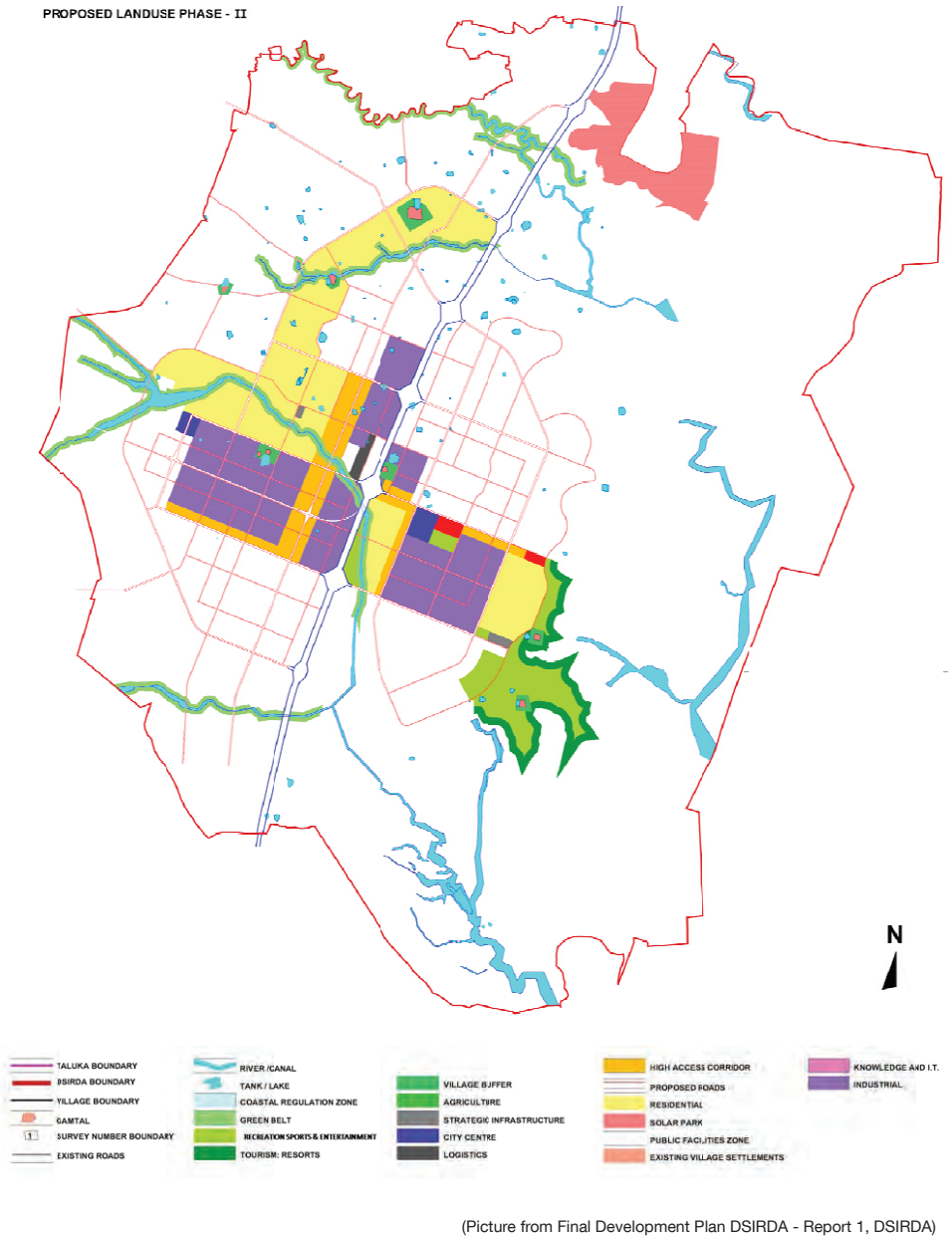
The early development of DSIR is located in the north of the site, close to Dholera, on either side of the existing SH6. The northern part of the DSIR is currently more developed than the south and has better existing road connections to Ahmedabad, Vadodara and the nearest railhead at Dhandhuka. Being closest to the sources of fresh water and electrical power lines this area can be most easily provided with utilities. The largest concentration of Government owned land is in the north-east portion of the DSIR and therefore adds considerable weight to the development of this part of the DSIR in Phase 1 of the plan. Phase I of the development can be considered in two sub-phases of five years each. The first five years would concentrate on enabling works and infrastructure and see little actual development. The next five years will provide much more industrial and housing uses with supporting community infrastructure.[9]



(Picture from Final Development Plan DSIRDA - Report 1, DSIRDA)

9 cf. Final Development Plan DSIRDA - Report 1, Dholera SIR Development Authority, Sept. 10 2012, p. 3, 5, 34

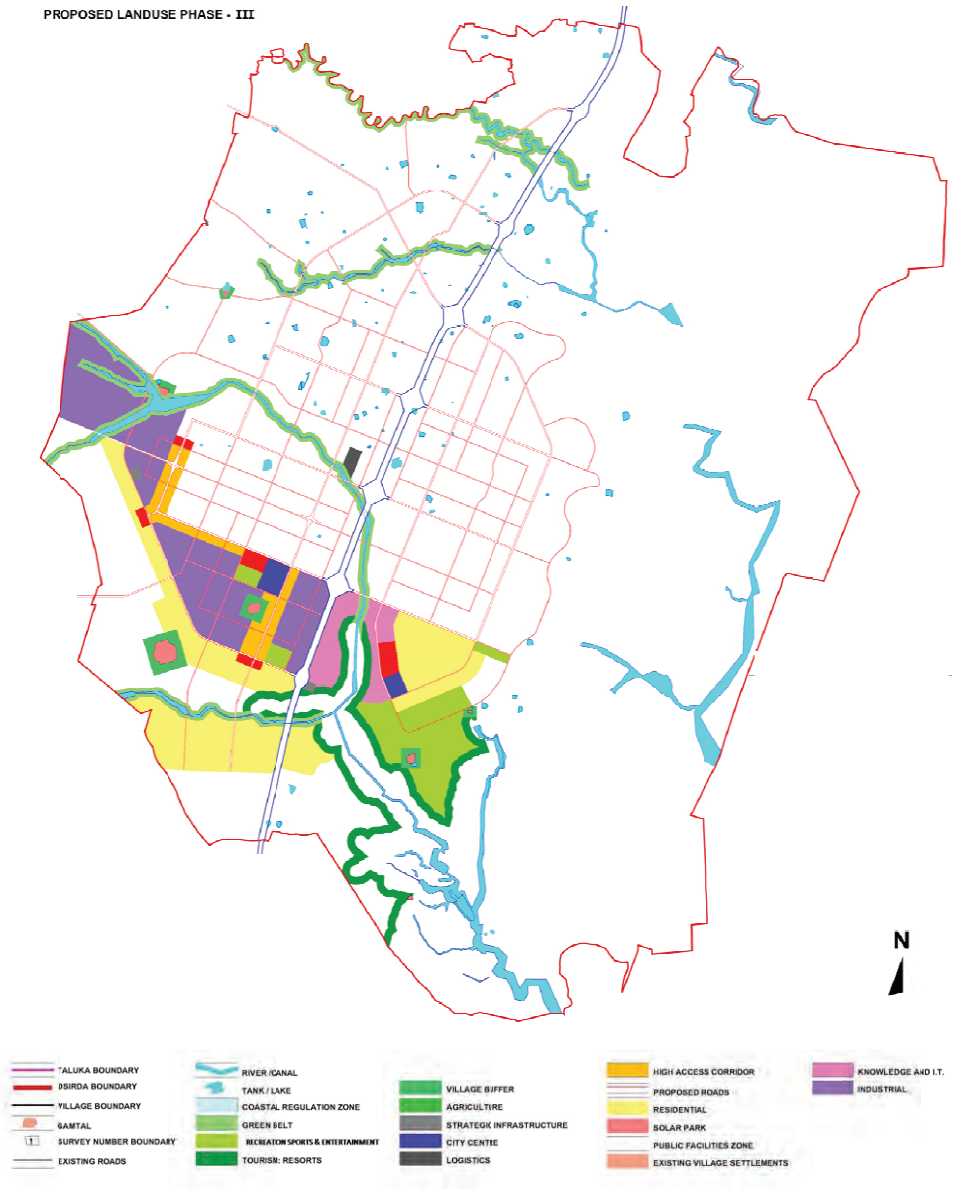
Phase 2 (2020 - 2030)
Construction of the second stage of the city's development would not commence until substantial progress has been made on the earlier stage. The intent is to make maximum use of already serviced land before new investment is made in opening up additional areas for further development. Development of the second phase will be a logical extension of the Phase 1 development and will also include a mix of industrial and residential uses. This growth can be accomplished by extending the existing grid of roads outwards from the phase 1 area. This will be an economical and efficient way of creating new development opportunities. Less extensive expansion might also be considered to the north-west so as to make use of the good access this area has to the existing development. Building of the first section of the tram system should be started during this period. The section from the railway station south-east over the expressway is likely to be the most viable section in the short term.



(Picture from Final Development Plan DSIRDA - Report 1, DSIRDA)

Phase 3 (2030 - 2040)

This phase sees the completion of development on the western and southern sides of the DSIR, again with a balanced mix of land uses. In this phase of development the uptake of land for industry and housing is expected to slow down as the city matures. As with the other phases, Phase 3 will provide a balance of industrial and housing uses, together with supporting community infrastructure and commercial centres. The key infrastructure components required to bring this about will include the further extension of the grid of city roads, construction of additional sewage treatment works to serve the south of the city and completion of the tram network comprising two interconnecting lines.[10]



(Picture from Final Development Plan DSIRDA - Report 1, DSIRDA)

10 cf. Final Development Plan DSIRDA - Report 1, Dholera SIR Development Authority, Sept. 10 2012, p. 37, 39

CHAPTER IV

An Attempt to prevent future Indian cities from turning into slums

GENERAL CONCEPT. A PROACTIVE INCREMENTAL HOUSING STRATEGY

Introduction

The idea is to provide a proactive strategy which addresses the impending shortage of affordable urban housing by establishing basic frame-conditions allowing for the implementation of adequate self-build-neighbourhoods as an integral part of future Indian cities.

These envisioned neighbourhoods are well-integrated into the urban fabric, being linked to the transportation network as well as having access to necessary infrastructure and amenities of the formal city. In contrast to pure (and as mentioned before heavily debated) formal social housing schemes, the proposed strategy constitutes an alternative way of city making. At the same time it also represents an alternative to undesired and miserable pure informal settlements at the cities' outskirts, which are generating distress, environmental pollution, congestion and social segregation. The concept is an appeal to recognize self-settlement as a viable way of city making. It envisages the reservation of land for prospective self-built neighbourhoods (or districts) within the formal master plan of future city developments, in order to offer a guided, legal and more promising way of self-settlement instead of illegal squatting at the city outskirts. This of course requires a strategy for the estimation of land demand as well as a method to select appropriate sites within the particular city, which will be explained later in this text. This general concept is tailored specifically for future Indian green field cities, within this very specific current situation facing unprecedented urbanization and population growth simultaneously. It has to be understood as a strategy to overcome a critical phase; a proactive strategy to allow for the self-construction of the city, in order to provide enough liveable urban living space within the next decades of change, in a country striving for the ascent from an emerging nation to an industrialized nation. Of course, the proposed strategy is no universal remedy. Just as little it is a stand-alone concept. India has to tackle a whole bunch of challenges within this phase of economic, societal and demographic change. My proposed strategy has to be seen as one piece of the puzzle; one concept, addressing one specific aspect, which is part of the overall action plan aiming at leading India into a highly developed and prosperous future. The proposed urban strategy has to be embedded into a context of educational and fiscal measures, in order to work out and to provide for the creation of affordable living space for those, for whom the market will not provide any housing.

"THIS IS A CONCEPT OF DAMAGE LIMITATION AND NOT A CONCEPT OF OPTIMIZATION."

Two sub-strategies

This overall proactive incremental housing concept consists again of two distinct strategies, here referred to as macro strategy and micro strategy.

The macro strategy strongly focuses on the maintenance of a healthy balance between occupied land and public realm, as well as the rough functional subdivision of the projected sites and their integration within the urban fabric. Therefore it is operating on a more metropolitan scale. It provides an urban layout, which is to be settled by the informal builders. Still it reserves, and this is its main effort, strategic space in-between the semi-informal housing areas, in which public facilities and public space can be created. Space in which the public realm, which is necessary for an urban development to blossom and which is usually missing in non-guided informal settlements, can evolve, subsequently to the upgrading process of the self-built homes. As the demands on the public realm are rising with the proceeding upgrading process and the increasing wealth of the population, the macro strategy preserves the required public space by occupying it with a series of transformative functions, which are able to react on the changing needs of the inhabitants and which are capable of preventing the prospective public realm from being occupied illegally. These functions are suitable for replacing each other in terms of size, morphology and utility, as the whole settlement develops.

The micro strategy in contrast is in charge of ensuring a sustainable and orderly mode of settlement, with a focus on holding the extent of intervention very low. Its sphere of action is confined solely to the

emerging semi-informal housing areas (neighbourhoods) located somewhere within the urban framework provided by the macro strategy. The micro strategy can be described as a form of self-settlement strategy. Everyone who fulfils the requirements to settle can do so, but only according to some simple rules: a protocol of settlement. The premise is to ask ourselves: "How little do we have to intervene as professionals that a self-built neighbourhood is capable of turning into an urban quarter of reasonable quality?" This is a question of effectivity and efficiency. In my opinion, ultimate optimization, in the sense of performative parametric modelling and evaluation with the goal of finding the perfect layout is not the way to go within this context. The goal should be to reach as many informal dwellers as possible and to achieve a big impact with little financial and legal effort, by utilizing their sheer infinite manpower. Providing the settlers with guidance and advice, the concept aims on the creation of a whole series of such emerging self-built neighbourhoods. Despite having different layouts, all the resulting neighbourhoods are working to a certain extent, due to stemming from the same DNS (protocol of settlement). This is a concept of damage limitation and not a concept of optimization. Sacrificing the optimum (and the built repetition), allows us to reach the mass! The core of the micro strategy is therefore represented by a simple rule-set, a protocol of settlement on not more than two A4 sheets, informing the settlers about, how to settle sustainably, for which in turn they have the prospect of getting a legal status, becoming part of the formal city plan and benefitting from full infrastructural and public support.

Disadvantages of Site and Services

But what is the advantage compared to classic site and service schemes described earlier in this paper? Undoubtedly, site and service schemes are very successful at a neighbourhood scale, but as David Gouverneur, Ass. Professor at the University of Pennsylvania, aptly states in his book "Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City" (Routledge, 2015), they are not able to address the complexity of large territorial and metropolitan scenarios. This includes aspects such as dealing with the magnitude of informal growth, the involvement of urban dynamics as well as social and environmental challenges.
In particular site and services projects usually fail in following matters:

1. They do not address urban complexities occurring when settlements are expanding, or when they are part of a larger agglomeration

2. The sustainable development of self-constructed settlements and the reduction of disparities between the formal and the informal parts of a city require a more robust level of management and design

3. If new higher-level demands cannot be met, unattended informal settlements as well as site and service neighbourhoods will remain disadvantaged

Nevertheless, what site and services can do very well, such as informal settlements, is at least providing shelter and establishing local social networks, in which institutional planning and public housing programs usually fail. Furthermore, informal settlements might convey a sense of place, belonging and identity. They might be closer to the settlers' cultural heritage than the planned and regulated formal product. The difficulty however is that the positive aspects of informal settlements are usually counteracted by serious urban deficiencies. As soon as urban conglomerations reach a certain size, they require forms of governance, services and infrastructure as well as spatial and functional solutions; complex requirements for unattended informal settlements cannot develop on their own.

Two forces

Informal settlements don't appear in a vacuum. They depend on the resources and the socio-economic drivers that the existing city offers. In this context two contrary forces can be observed - two forces which are defining the location where a future informal settlement usually originates:

– First of all, new settlers are seeking proximity to city's services, infrastructure, jobs, amenities, institutions and social forces

– But secondly, without access to the formal real estate market, settlers occupy land at minimum cost and effort, usually being pushed to undesirable land at the fringe of the city[1]

Integrating informality

Self-built settlements are strongly influenced by implicit cultural rules as well as individual and communal behaviour, resulting in predominantly organic urban forms. These are typically mixed use areas, basically allowing individual dwellings to become valuable income-generating assets over time. So beside all negative side-effects informal settlements

1 cf. David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015 , p. 21ff.

may have, they could also be seen as dynamic, resilient and adaptable neighbourhoods, able to escape regulatory planning and design efforts. Today, as we are facing unprecedented growth of our global urban population and a lack of sustainable urban solutions (especially after decades of failing social housing schemes) we should consider to shift from the current top-down creation of individual housing schemes, to the creation of neighbourhoods and cities. Previous strategies like e.g. the site and services approach and land use planning on master plan level, have turned out to be very limited in dealing with population growth, short time frames of implementation and land resources. Due to David Gouverneur these conventional concepts are: "…focussing only on socio-economic, design and managerial aspects involved in the production of urban housing and good neighbourhoods, but not on contemporary challenges like climate change, water management, food sufficiency, global economic meltdown and increasing violence." The major obstacle impeding the implementation of adequate semi-informal urban solutions is the fact that formal professionals and politicians are prejudiced against the informal city; even in countries which already legally accepted informal modes of city making.

According to Gouverneur, the most important conditions needed for the successful integration of informality into a formal urban environment are:

- offering flexibility for growth
- the possibility of including income generating activities in dwellings
- empowering communities to build according to their needs
- adequate resources and time frames in urban interventions
- offering the provision of a balanced habitat
- appropriate relations with existing neighbour hoods
- advancement of a robust public realm
- provision of community and metropolitan services
- environmentally sensitive management of existing natural resources

Lessons from Venezuela and Colombia:
Due to the OPEC Arab oil embargo, Venezuela's economy was booming from the 1940s to the 1970s. As a result governmental resources and spending quadrupled within five years. The unemployment rate dropped to almost zero and immigration of low-income groups from neighbouring countries increased. To cope with the arriving wave of poor migrants attracted by the economic upswing, the national government erected large scale affordable housing projects like e.g. "23 de Enero", by Guido Bermúdez (Caracas, Venezuela, 1958.) Despite these public efforts, which were only possible due to heavy national funding, the number of informal settlements continued to increase and at the beginning of the 1980s, half of Caracas' population was living in informal settlements (whose informal dwellings by the way were up to 10 storeys high) With this example history teaches us once again, that large scale master planning, such as the projected DMIC (Delhi-Mumbai Industrial Corridor) cities can fail easily, even in the best case in which the public hand is aware of the problems and tries to handle the situation with great endeavour and subsidizations. Another parallel between those two cases, which makes the Venezuelan incident so relevant for the DMIC project, is the aspect of the booming industry which attracted poor migrants to Caracas and led in succession to the emergence of uncontrollable informal settlements. The DMIC-Corridor has only one big purpose: To generate such a booming industry! This will attract many poor migrants in search for jobs, which will very likely, if not guided in a pre-emptive manner, result again in uncontrolled informal urban sprawl. This brings up the need for a strategy anticipating this process and initializing a guided and legal program of self-settlement. Having been among the most stable democracies in Latin America, Venezuela showed how even a resource-rich country might convert its tremendous capital into political instability through mismanagement, corruption and above all an exploding gap between rich and poor, which is probably also the aspect that is most symptomatic and omnipresent in India. In South America however, governments soon tried to tackle the problem of growing urban informal settlements by introducing large scale site and service schemes. As mentioned before, it turned out, that existing large scale structural problems within a city, which usually fall into the scope of regional planning, cannot be solved through the simple summation of micro interventions in neighbourhoods. In these cases the introduction of so called Urban Design Units, like those formed during the "Caracas Barrio Plan", can be a viable working method. These Urban Design Units were parts of large scale action plans, which operated on a metropolitan scale focussing on interventions that the whole community would benefit from. Another reason why the simple provision of formal housing for the very poor is no adequate option is that formal housing programs require the dwellers to have a minimum of cash flow in

order to pay for formal services or mortgages. Professors Bolivar, Baldó and Villanueva were some of the people who recognized very early, that the simple erection of formal housing was no viable solution for most poor people. Instead of inventing another low-cost housing scheme, they made a handbook in which they informed the self-build communities about the risks of building upwards and recommended solutions for enhancing the structural stability of their informal dwellings.

Informal Armatures

Within the next two decades, the worldwide number of builder-residents will presumably double from one billion to two billion. As a result informal settlements will become the dominant form of urbanization in most developing countries. Assuming that properly supported self-constructed cities can become balanced, accessible and desirable urban areas, it makes sense to develop a strategy for the implementation of such a scenario. As mentioned before, the envisioned strategy is operating on a micro and a macro level. The macro strategy is strongly influenced by David Governeur's "Informal Armatures" theory, which he describes as a: "[…] set of principles stakeholders can implement to make appropriate physical and performative decisions that guide the growth of informal settlements, fostering their evolution as integral parts of sustainable cities.", "[…] a hybrid of simple design solutions and managerial strategies highly responsive to local conditions." [2] It is an approach that brings together the advantages of adaptive capacities while avoiding random occupation, constituting a middle ground on which formal as well as informal city components are closely interrelated. Informal planning is driven by necessity, practicality and self-determination. Identifying and focussing on aspects that require attention and leaving those untouched that do not need intervention is therefore the key for setting up a cost-effective strategy as well as its feasible implementation.[3]

"The main aspect of the Informal Armatures approach is to anticipate and secure eventual spatial requirements of informal areas and provide them with alternative uses until they are needed to fulfil future needs." (D. Gouverneur)[4]

"DYNAMIC HYBRID URBAN ECOLOGIES MAY BECOME THE BEST FORM OF TERRITORIAL OCCUPATION IN THE DEVELOPING WORLD"

Therefore it is required to not only operate on neighbourhood but also on metropolitan level. It is necessary to interweave the planned informal areas with the surrounding urban infrastructure, for example through the provision of mobility corridors overlapping with other systems like networks of public libraries and educational facilities.

Public space can be reserved in many different ways and site functions can change completely over time, according to the grade of consolidation, responding to the changing population demand for communal services and amenities. The trick is to select functions that are suitable to replace each other due to their size, morphology and utility and to stimulate the transformation process of the settlement in a positive way. One specific site might for example be the perfect spot for a dumping site, which may later, as the settlement consolidates and the demands are changing, turn into a park library.Another example how urban land can respond dynamically as the city transforms and constantly generates new needs, are the so-called Alamedas in Bogotá. They are pedestrian-friendly mobility corridors and linear public spaces, set up on vacant land, that are open for being urbanized.

An important aspect of the Informal Armatures strategy is to specifically make use of the spill-over effects triggered by social mixing, implementation of infrastructure and service provision.As the urban infill as well as the public spaces will both be predominantly self constructed, the community plays a major role in both transformations.

The Informal Armatures strategy is a design and managerial approach fostering the sustainable growth of the informal city. What distinguishes it from the site and service principle is that it offers a more extensive framework for self-constructed neighbourhoods, districts and cities.[5] Due to the fact that public investment is much higher in the formal than in the informal districts because of greater revenues, the urban fabric usually becomes increasingly divided and dysfunctional. This intensifies the image of informal settlements being urban enclaves where non-residents are not welcome. As a reaction the Informal Armatures approach intends to provide favourable spatial and performative conditions before occupation and to support the transformative

2 David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015 , p. XXIVf.
3 cf. Gouverneur, p. 27ff.
4 Gouverneur, 2015 , p. 27ff.,
5 cf. Gouverneur, 2015 , p. 75ff., 119f.

Political Will

Besides all conceptual considerations the fundamental precondition for the implementation of such an informal urban strategy is most importantly: political will. As Medellin's mayor Sergio Fajardo demonstrated with his motto: "Medellin: la mas educada!" (The political will makes the difference). Political will is the reason why the implementation of slum improvement in Caracas failed and succeeded in Medellin.

Fajardo's Medellin agenda consisted of just five simple points:

1. Replacing improvisation with planning and providing immediate response

2. Strategically located park libraries and an ambitious program of educational facilities

3. Holistic urban plans (district plans, PUIs) that prevent social exclusion

4. Social housing programs

5. Promenades, urban links, special node

What we can learn from Medellin is that it is important to have a vision and full commitment; commitment to allocate limited resources, introduce transparency mechanisms and to gain local and international funding.

Sergio Fajardo for example once said: "There are brilliant professionals who can design beautiful architectural and urban interventions, but what makes a difference in changing societies is the political project that supports these transformations."
The intense and complex processes of transformation that have been taking place in Medellin recently cannot be properly understood without considering the social forces, specifically political changes in the municipal government, which resulted in a new respectful and inclusive relationship among public policy, the citizens and the territory of the entire city."[6]

process as long as needed. The interconnectivity between different scales and components of the city gives robustness and synergy. In early phases of colonization, the public realm serves as place for basic temporary scenarios like e.g. food production, shelters for newcomers, informal recreational zones or markets. Later, as the settlement consolidates, these public places will manifest as network of self sufficient mixed use areas: Populated emergent hybrid landscapes.

While the public realm of the new self constructed settlement transforms over time according to community needs, land uses and urban forms from planned, designed and market-driven initiatives will be borrowed in order to contribute to the overall system performance.Therefore it is important to understand that there are significant differences between industrialized and developing countries translating concepts into reality. Developing nations need solutions to adopt informal logics and resources in order to become sustainable and resilient. This is why the creation of frame conditions enabling sustainable growth and education can make the difference. Furthermore, the design methods used should be as non-prescriptive as possible. Agricultural patches for example are such simple components suitable to operate as spatial organizers. Markets as well as agricultural schools could be located on these patches which are potentially surrounded by recreational buffer zones. They interrupt continuous predominantly residential areas, creating new open spaces that are giving importance to the food production. The land is subdivided to create individual family gardens, allowing each family to produce their own food and become familiar with composting techniques. Farm-

ing as a major component of such settlements is not new and not untested: In South Africa for example the farming approach is quite successful. It improves the family income while the landscape transformation process reproduces elements of the rural environment enriching the urban landscape with arrangements that facilitate prospective urban adaptation.

“Reasonably priced high quality food produced by urban farming reduces transportation costs, saves energy and enhances social ties.” (D. Gouverneur)

For a successful implementation before the actual settlement process, it is necessary to have a creative operating team with visions, skills and transparency. Then, as soon as the land starts to be newly settled the needs of the first settlers are quite low and the main focus is put on survival - but for a conglomerate of e.g. 500,000 people complex support is required. Sensitivity to local conditions, as well as awareness of socio-economic and environmental needs are fundamental. However, what plays the lead role in the Informal Armatures approach is high quality design of the public realm: An equilibrium between public realm components, land that is fit for new settlement, land for supplementary and productive use and performative conditions stimulating systemic growth are essential aspects.

The settlers will focus their work on urgent needs while being aware of being part of a larger urban system through:

1. Security: Occupying a piece of land without the fear of being evicted
2. Water access (if only cistern initially)
3. Offering safe public space for socialization
4. Facilitating sources of recycled, site-produced, outsourced construction materials for dwelling construction with technical assistance on indi vidual and communal level

In the Informal Armatures strategy, the informal infill, is defined as a homogenous urban fabric, not influenced by zoning, contemporary building types, aggressive interventions or new construction techniques. Its uniform aesthetics are characteristic for the informal infill. The public realm in contrast is preconfigured in location and scale. Furthermore there are special productive patches defined to turn into more mixed use areas in a later phase of the development. In practice, the strategy envisages to determine performance and design conditions under which these supplementary uses may occur. The design quality of interventions in the public space is of importance, as it attracts tourists and formal inhabitants in general.

Regarding crime rates of informal settlements it is interesting to observe that there are huge country differences. Some countries with large populations, like e.g. India, are home to less violent societies, while others with low population and small cities, like e.g. El Salvador, have very high rates of violence. However, a system of open spaces based on an initial urban framework, which is typically missing in such settlements, is important as it is able to counteract the culture of violence and to create civic pride. Predefining this public space using simple means is a good way to create a sense of communal belonging, opportunity and peace. The physical definition of places with “community eyes“(Site Keepers) on them and the institutional support to design, maintain and fill those places with activities, are contributing to the creation of stewardship for the emerging public realm.

In the beginning physical marking of the prospective public realm can be as simple as using wooden sticks and ropes. Workshops, such as the Talleres Imaginarios in Medellin, in which community members are given the opportunity to participate in the creation of the public spaces in their neighbourhood can be established. Collectively the inhabitants decide about location, names, and programming of those public spaces, which again creates a strong sense of belonging and strong ties to their new neighbourhood.[7] “Urban frameworks capable of bundling mobility systems and infrastructure, good public spaces, economic drivers, and ecologically friendly solutions are valuable tools to pre-emptively guide sustainable growth of the predominantly informal city”, says David Gouverneur.[9]

“Those who marvel at the spatial equality and adaptability of the informal city without pondering the severe socio-economic injustice crime and violence, the poor health conditions vulnerability to natural disasters, and environmental degradation frequently associated with spontaneous informal growth are underestimating the problems and the consequences of inaction.” (D. Gouverneur)[10]

6 cf. David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015 , p. XIX, 86ff., 102
7 cf. Gouverneur, 2015 , p. 123ff.
8 Gouverneur, 2015 , p. 212
9 Gouverneur, 2015 , p. 254
10 Gouverneur: 2015 , p. 130

ESTIMATING REQUIRED AMOUNT OF LAND

Before the concept proposed in the previous section can be applied on a specific city, it is necessary to estimate the amount of land that will be needed for the operation. After that, it is crucial to choose appropriate sites and follow a proactive approach towards land banking. “Although demographic information about the estimated growth of a city may not be accurate, it is possible to determine what percentage of this growth can be accommodated in different sites. With a general appreciation of site options where the IA (Informal Armatures) approach may be introduced, planners can estimate the amount of land that is required for each operation”, says David Gouverneur. (210) The most important questions, setting up an IA district are:

How much land is needed for the settler-community to self-construct their dwellings?

How much land will remain in the public realm?

And how much land will be used in the broader interest of the public sector to operate beyond the neighbourhood boarders?(211)

The usual ratio of public land (streets, open spaces, community services) to urban infill is 50:50. (In the case of IA a 60:40 recommended though.)

Lot sizes should be similar to existing ones in surrounding informal settlements with similar conditions. (Slight augmentation recommended)

Lot sizes may vary from one city to another, depending on local economies, cultural practices, average cost of land in the informal market and topography Sampling should include at least: construction methods, average size and proportion of the lots, spatial organization, used materials etc.

IA facilitators: can recommend initial house shells and growth patterns(211) extra space adds future extra value, improves spatial organization and ventilation, place for expansion, rainwater-

Failing to consider supplementary land operating beyond the neighbourhood boarders in the territorial estimates, will result in incomplete, predominantly neighbourhood oriented areas that will be left at a disadvantage in relation to formal areas.[11]

In Dholer for example it is expected that about 4% of the total housing provision of 500,000 units will have to be carried out as incremental housing plots, to ensure that there is enough housing appropriate for the “Economically Weaker Section” (EWS, = population with an annual income lower than INR 150,000).[12] Applying the presented recommendations on Dholera SIR, the total amount of land *(T)* needed to meet the projected demand on incremental housing units would be approximately 210 ha:

Dholera SIR:

$T = 212.3\ ha$

$L = 58.0\ ha$

$RP = 104.4\ ha^{*}$

$CT = 108.6\ ha$

“THE GOAL IS TO PROVIDE NEW INFORMAL AREAS WITH SIMILAR LEVELS OF SERVICES AND AMENITIES AS FORMAL AREAS” [11]

11 cf. David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015, p. 210ff.
12 cf. Final Development Plan DSIRDA - Report 1, Dholera SIR Development Authority, Sept. 10 2012, p. 45
*modification of original formula: x0.9

Total amount of land *(T)* = Land for Receptor Patches *(RP)* + Corridors and Transformers *(CT)*

Land for Lots *(L)* = Average Lot Size *(Al)* x Number of Dwellings *(D)*

Land for Receptor Patches *(RP)* = 2 x Land for Lots *(L)***

Corridors and Transformers *(CT)* = Land for Receptor Patches *(RP)* x Proportion Metro/Residential *(P)*

(T) ..... is the total amount of land projected to foster an Informal Armatures district

(D) ..... is determined by demographic information and managerial possibilities as well as social pressure, political demands and capabilities of funding

(P) ..... is the proportion of land for metropolitan demands in relation to predominantly residential areas of the formal city

*** ..... this formula is usually applied to site and service programs to balance the amount of land needed for self construction lots and land intended for the public realm on the neighbourhood level*

13 formulas from: David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015, p. 211ff.

CHOOSING APPROPRIATE SITES

On the graphics below you can see how the required land is located within the city boundaries. At first unappropriate areas are discarded. Then the land is distributed within the remaining areas and integrated into the existing master plan, considering a whole series of aspects such as: land use, housing densities, phasing, infrastructure, traffic system, soil quality etc.

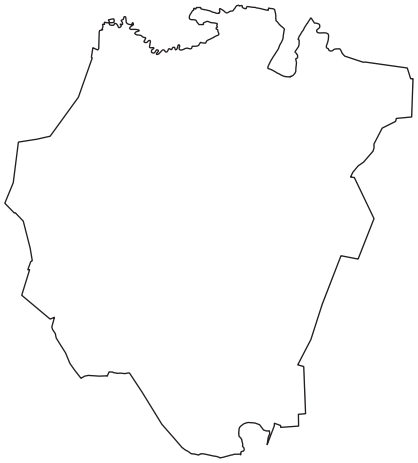
Developments should not be concentrated in only one location in order to:

1. Achieve a balanced distribution of income groups.

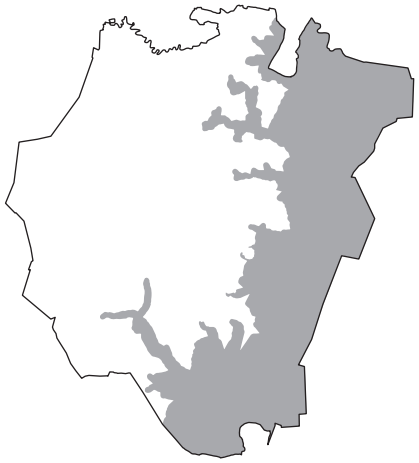
2. Deal with manageable and walkable packages, gradually activating different fronts of development.

3. Effect the whole urban system; considering that settlers are usually seeking proximity to places where they can earn money.

4. Profit from experience of first managerial groups, that can move on to work in other sites, as older territories start performing with more autonomy.[12]



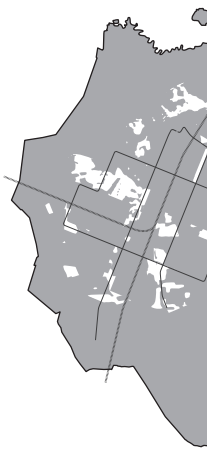
City border



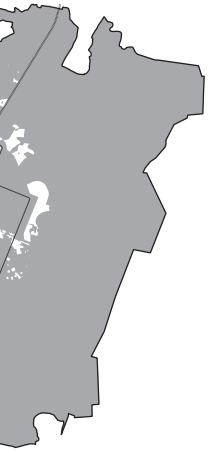
Coastal Regulation Zone

Public property land

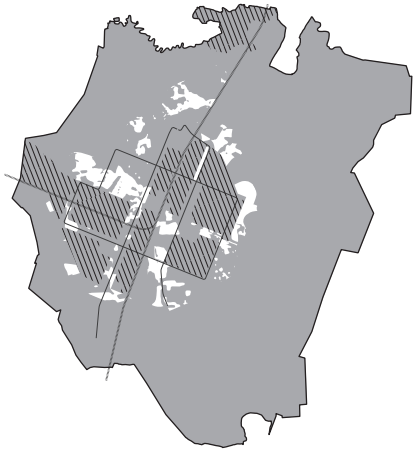
No housing allocation



Public transport s



system



Industrial areas

City centre proximity

Phasing / growth

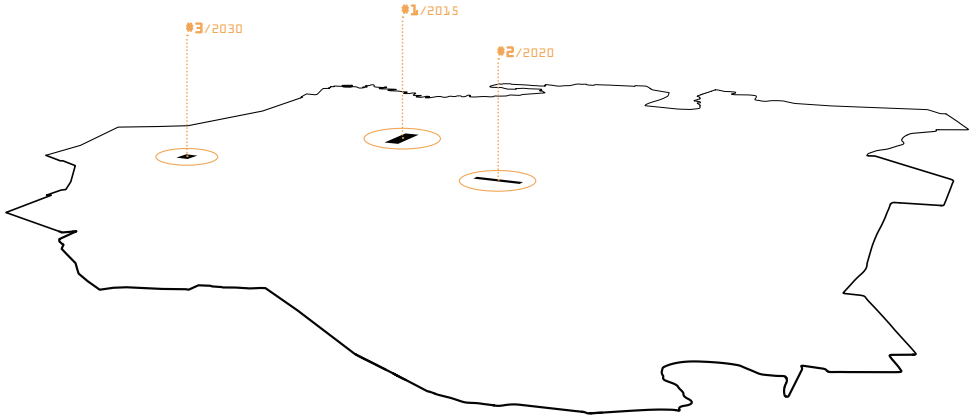
Reserving required area

12 David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015, p. 210

PROJECT SITES / PHASING


#1/2015
Koth
Saragwala
Fedara
#2/2031
Pipali
Bhadiyad
Gogla
Dholera
Bhangadh
Lilka
Sikotar Maa

PROJECT SITES / AREAS



Field #3

total area: 45,41ha
expected start: 2038

Field #1

total area: 119,89ha
start: 2015

Field #2

total area: 45,41ha
expected start: 2031

MACRO STRATEGY. MODELLING A TRANSFORMATIVE PROCESS ON DISTRICT LEVEL

The Macro Strategy (Informal Armatures Strategy) provides a simple set of generic design and spatial/morphological strategies suitable for steering the growth of self constructed cities. These "design components" can be seen as a toolkit for reserving public space. Within this tool kit, there are three different categories: Corridors, Patches and Stewards

Corridors:
As mentioned in the previous chapter "General Concept", the public realm within an evolving settlement is created simultaneously alongside initial occupation. Corridors are elongated multifunctional systems acting as organizers of this public realm. They accommodate various different functions such as mobility, water management, urban agriculture, commerce and recreation and they are designed to serve and interact with both formal and informal components.
There are two subcategories of Corridors: The Attractors and the Protectors.
Attractors are designed to attract settlers and to concentrate activities in appropriate areas. Protectors have the opposite function. Their job is to remove pressure from e.g. environmentally sensitive areas. The workflow is as follows: First define areas to be protected. Then define magnets for occupation.

Attractors intensify activity. They facilitate occupation by acting as magnets, offering a series of assets that unassisted informal settlements usually don't provide. They facilitate the well-regulated expansion of newly settled territories and are conductors bringing vitality from other districts. The ideal width of an attractor is between 30 to 150 metres. Highest priority is given to social, experiential and environmental qualities of the open space, especially since in many developing countries roads and infrastructure are often defined without any sort of qualitative consideration of the public realm. The urban infill in-between the corridors can be expected to be dense but rather low; max 3 – 4 floors. The correlation in scale between urban infill and the attractor corridors is crucial, and has to be balanced carefully, especially as it changes over time.

"A HYBRID FORM OF URBANIZATION WILL EMERGE, PERHAPS RICHER, MORE DYNAMIC, AND MORE RESILIENT THAN EITHER THE FORMAL OR THE INFORMAL CITY ON THEIR OWN."

Protectors in contrast support less intense uses and are expected to experience less change than the attractors. They slow down the urban expansion in areas where it is needed and might include institutions or communal uses. They may for example act as buffer to block expansion on the urban fringe. In this case, they should be narrow and elongated, ideally 45 to 180 metres wide, to guarantee better visual control in order to prevent squatting.(169) In defining character and function, and in the operation of the Protector, the community plays an important role. In very late phases of consolidation, a Protector may even accommodate extraordinary functions like for example a cemetery.

Patches:
While the corridors are creating a framework of public space, the urban infill is what will be built in-between these zones. It is both formal and informal, a mixture of individual and communal efforts and of publicly supported initiatives and developer driven operations. The land on which the urban infill will be constructed is fragmented in so called "Patches", of which again we have two different types: The Receptor Patches and the Transformer Patches.

Receptors secure land where informal occupation is expected to occur. They are "[...] the place to plant the seed of strong, cohesive vibrant neighbourhoods." (D. Gouverneur)[1] Regarding the size, it is important that the individual patches can be orga-

nized as identifiable neighbourhoods that are accessible by foot. The actual mode of occupation itself can take place in multiple ways:

1. Totally non-assisted process without urban lay outs or urban services.

2. Different levels of pre-occupation organized by public sector, community organizations, pirate developers, or Sites and Services programs in order to infuse several degrees of urbanization. (This usually demands grid configuration, lot dis tribution, provision of infrastructure, reservation of lots for communal services, and provision of technical assistance for construction of the dwellings)

3. Complete urbanization schemes with infrastruc ture, services, and formal incremental housing units.

The proposed Macro Strategy is open for all three types of occupation. A combination of “come and squat schemes”, sites and services projects and a certain percentage of formal housing would be desirable.

The strategy is somewhere beyond top down and bottom up; something in-between, trying to combine the benefits of both. Including formal housing developments into the receptor patches speeds up the transformation process and creates stronger neighbourhoods because groups with a regular income have higher expectations on their neighbourhood. They are seeking better environments and amenities and they afford a more complete urban product. This might help pushing the settlement to the next level.
For the process of settlement itself, following aspects are of particular importance:

1. Committed planning/design team guiding occu pation (e.g. “Community Architects” might provide technical assistance and knowledge. They could develop design solutions with exist ing materials, closely related with the inhabitants, knowing their needs and aspirations.)

2. Preparation of site according to predefined spa tial organization

3. Make the settlers feel like co-participants and provide assistance

4. Openness to multiple initiatives

5. Possibility of monitoring the process, to respond to new situations or to introduce changes

Transformers: They are dynamic and rapidly changing zones for the provision of services, commerce, production, real estate operations and eventually more complex urban scenarios. They are interconnected with the corridors and interacting with receptors. Developed by either the public sector or within public-community-private partnerships, they are acting as economic drivers, providing goods and sources of income. Initially Transformer Patches might contain functions like for example simple tent shelters to accommodate newcomers or recycling centres to provide free construction material, low cost transportation and technical support as well as tools and machinery. The recycling centre for example can be moved to another location as soon as the original settlers integrated to urban life, having a stable income and construction material is no longer required. As the settlement matures, the Transformer Patches can be converted into manufacturing centres, educational or health facilities, and parks or real-estate operations. They might also start providing basic functions like water supply, desalination, food production or just serve as place for community gatherings. Over time they will transform and cover a wide array of supporting uses. Sometimes Transformer Patches can act as catalysts of urban change, including functions of metropolitan importance such as e.g. a stadium, university or concert hall, enhancing the public notion of the self constructed district. While some Transformer Patches may remain in public hands accommodating subsidized or non-profit activities, others could for example incorporate specialized forms of agriculture or alternative forms of energy generation to keep the land free of occupation for a longer period.

Within this strategy private as well as public sectors benefit from increased land values and real estate operations. The idea is that public land serving basic functions is being sold at a later point for more sophisticated commercial uses like e.g. mixed market housing. This generates revenue streams to the diversity of the urban system and stimulates social mixing. Furthermore it attracts funding and allows the public sector to gain some return of early investments.[2]

1 David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015 , p. 172
2 cf. David Gouverneur, 2015 , p. 163ff.

Stewards

The third “design component” beside Corridors and Patches, are Stewards. Stewards can be institutions, community organizations or even individuals who are trusted by the community, meant to look after the system of open spaces, keeping it free from unwanted occupation. This spatial system, being predefined by estimating the immediate community, as well as the future urban and metropolitan demands, cannot be protected simply by legal means.

“In the informal city, the best way to protect open spaces is to use them, to make them visually recognizable and defendable.”, D. Gouverneur. The very best strategy is to choose spaces coinciding with places that are already associated with something important to the community, like for example a shrine. Stewards can be for example Park libraries, business incubators, like the CEDESOSs in Medellin or simply garden keepers. In terms of defendability, it is an advantage to divide large open spaces into smaller more manageable interconnected areas or enclaves (emblematic places), each one associated with a particular Steward. One scenario could be for example a smaller sports field with unrestricted access; used, fostered and “defended” by a local sports club, acting as Steward. Later the field might become fenced and turn into a real training centre. With the consolidation of the surrounding areas, it might finally turn into a stadium.

“ALL CITIES UNDERGO CHANGE BUT WITHOUT GUIDANCE THEY USUALLY DON’T EVOLVE WELL.”

Over time, the system of Corridors, Patches and Stewards will become increasingly densified and diversified paving the way for further adjacent receptor patches being occupied. For the success of the whole strategy the support and commitment of the public sector is crucial. Without the diversity of uses, performances and urban morphologies, the self-constructed settlements that will form in decades ahead will continue to grow and suffer from the same urban, social and environmental problems like today.[3]

The landscape architects Bart Brand and Marco Broekman have a similar view on this topic. Their work focuses on a kind of planning that establishes a framework while leaving scope for ambiguity and the unplanned at the same time. With their “open-ended-urbanism”, they are striving for opportunities of growth and change. They suggest that urban planners should abandon any form of blueprint design and act as the guide of the urban development process. They should work with scenarios that can modify through a process of permanent evaluation, ”a mix of standard and customized planning methods”.[4]

3 cf. David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015 , p. 181ff.
4 cf. Michelle Provoost: New Towns for the 21st Century - the Planned vs. the Unplanned City, 2010. p. 26, 270

Possible Steward: sports ground.
Photo: Azad Maidan, Mumbai (02.2014)

FIELD #1

- Residential High Density
  (< 50 m², 195d ph, ann. income < INR 175.000)
- Residential Medium Density
  (50-100 m², ~75 dph, ann. income betw. INR 150.000 and 500.000)
- Residential Low Density
  (> 100 m², ~25 dph, ann. income > INR 500.000)
- Commercial Offices / Retail
- Leisure / Hospitality
- Light Service Industry
- Industry
- Education
- Community Facilities
- Recreation, Sports and Entertainment
- Local Public Open Space
- Local Roads
- Utilities

1:10000

City Centre

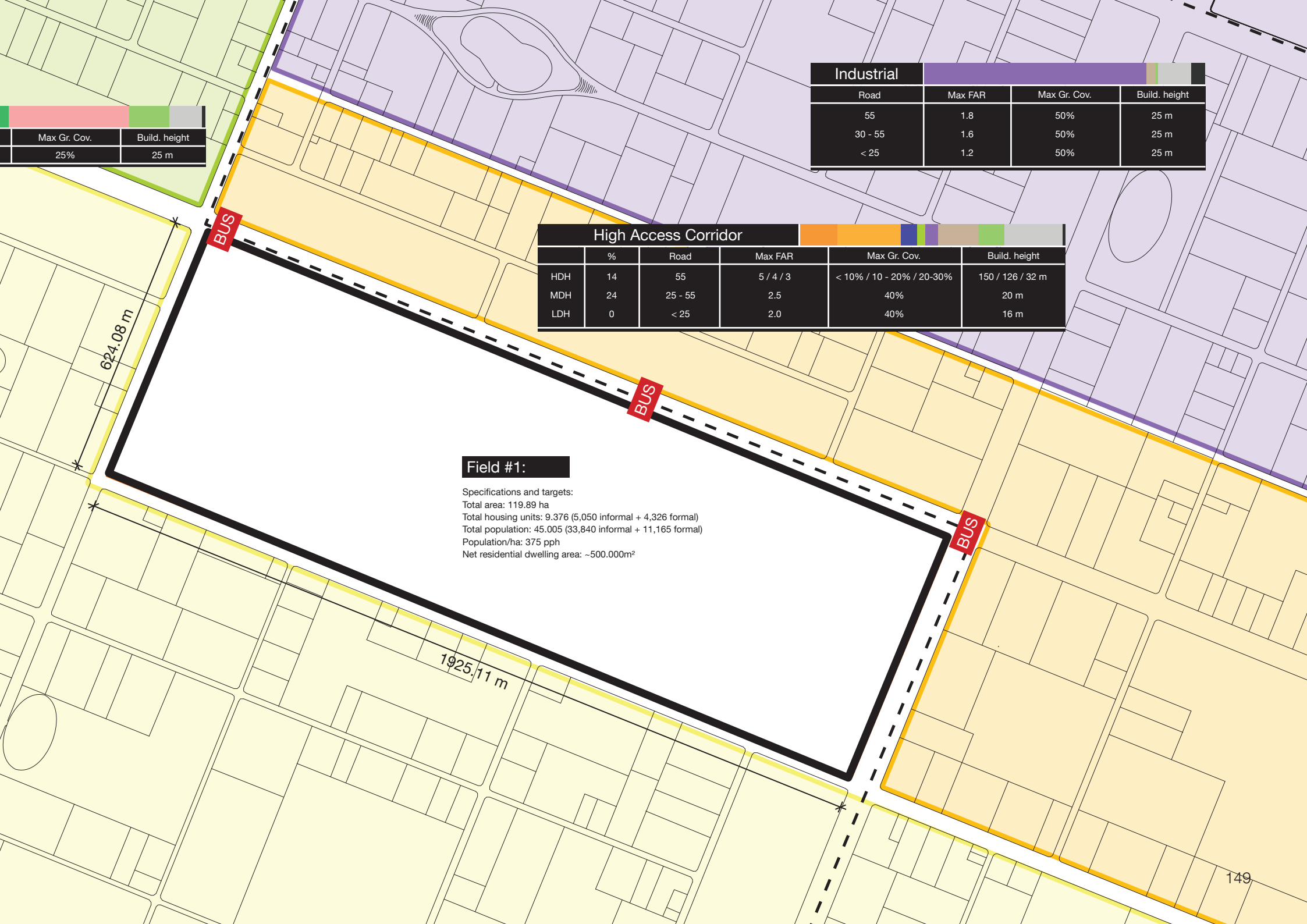
	%	Road	Max FAR	Max Gr. Cov.	Build. height
HDH	16	55	5 / 4 / 3	< 10% / 10 - 20% / 20-30%	150 / 126 / 32 m
MDH	15	25 - 55	2.5	40%	20 m
LDH	0	< 25	2.0	40%	16 m

Recreation

Road	Max FAR
55 -12	0.5

Residential

	%	Road	Max FAR	Max Gr. Cov.	Build. height
HDH	8	55	2	60%	18 m (6 St.)
MDH	31	25 - 55	1.5	60%	15 m (4 St.)
LDH	15	< 25	1.0	60%	10 m (3 St.)



	Max Gr. Cov.	Build. height
	25%	25 m

Industrial			
Road	Max FAR	Max Gr. Cov.	Build. height
55	1.8	50%	25 m
30 - 55	1.6	50%	25 m
< 25	1.2	50%	25 m

High Access Corridor					
	%	Road	Max FAR	Max Gr. Cov.	Build. height
HDH	14	55	5 / 4 / 3	< 10% / 10 - 20% / 20-30%	150 / 126 / 32 m
MDH	24	25 - 55	2.5	40%	20 m
LDH	0	< 25	2.0	40%	16 m

Field #1:

Specifications and targets:
Total area: 119.89 ha
Total housing units: 9.376 (5,050 informal + 4,326 formal)
Total population: 45.005 (33,840 informal + 11,165 formal)
Population/ha: 375 pph
Net residential dwelling area: ~500.000m²

CORRIDORS, PATCHES AND STEWARDS

a toolbox of transformative uses

the spectrum reaches from: *access to potable water* or a *community center* to *linear agricultural land* which transforms into a *mobility corridor* and gets enhanced by communal services on non-occupied land in a later stage, like the Alameda El Provenir in Bogota. Places that are already associated with something are highly suitable, e.g. a shrine.

green belts/buffers, but always combined with some sort of institution or communal usage to protect areas which are not fit for occupation, which can be: site or *garden keepers*, *educational facilities*, *agricultural gardens, training centres, park ranger stations*. At mature states, *universities, technical schools* and *cemeteries* are suitable for situations where larger dimensions are required.

receptors can also start with simple uses, as e.g. *food production*, *desalination*, or simple places for public gathering. Later, the area will mature and be equipped with a wide array of supporting uses.

at an early stage a transformer patch can accomodate as simple usages as e.g. *basic tents or shelters* for newcomers. Later a *recycling center* can be built. This gives unlimited access to free building material to the settlers. Cheap transportation, technical support and tools could be provided. As the settlement consolidates, the center moves to a new young settlement again. In the end the area is converted into a *park* or a *real estate project*.
or
the transformer patch starts as a simple *agricultural patch*. As time passes, *informal markets* and *agriculture schools* emerge. The surrounding areas are transformed into *recreational buffer zones*, interrupting the surrounding predominantly residential patches. New *public places* are giving importance to the food production. The land is being subdivided into *family gardens*. People are producing their own food and learn composting techniques...
or
In some cases the transformer can act as catalyzer of urban change: hospital, concert hall, stadium, university (usually only in formal areas)

Business Incubators (CEDESOSs Medellin), Park libraries (Medellin), Site / Garden keeper, Institutions, Cricket club
e.g. small sports field > gets fenced > becomes a training center > stadium

Attractor Corridors

They are acting as magnets. They serve as gathering places, providing a wide array of services and assets settlers normaly seek, with enhanced morphological and administrative conditions.

Protector Corridors

They protect environmentally sensitive areas from unwanted occupation, utilizing communal uses and institutions.

Receptor Patches

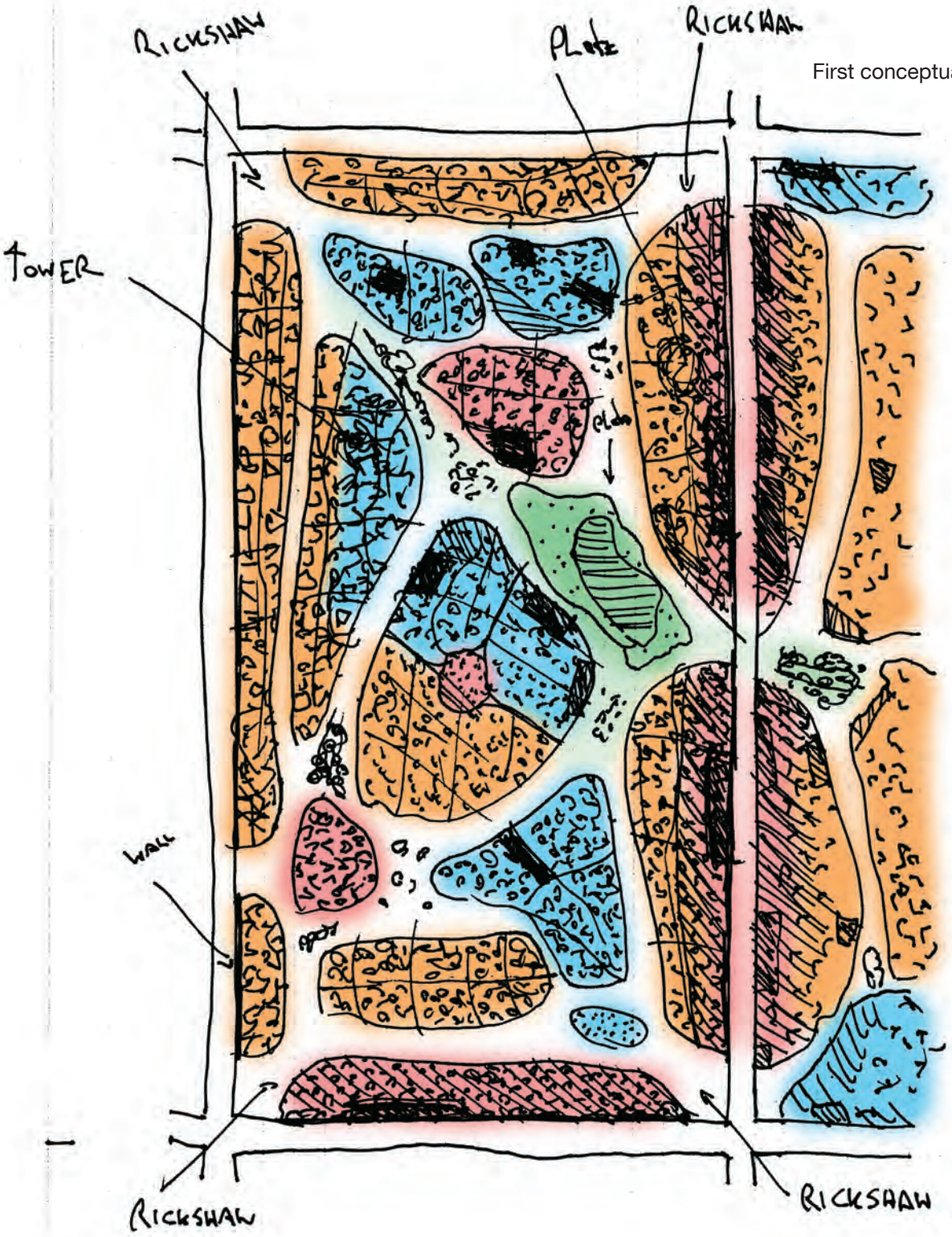
Land reserved for informal urban infill. (Different kinds of incremental housing typologies mixed with a certain degree of formal housing.)

Transformer Patches

Land secured for special transformative uses, acting as catalysts for urban evolution. Productive and income generating!

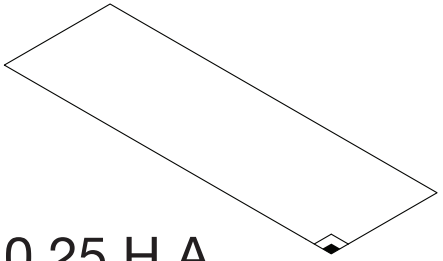
Stewards

Stewards are an instrument for defending the public realm in informal settlements, including uses as well as spatial and performative conditions that are able to engage the community.



First conceptual drawing

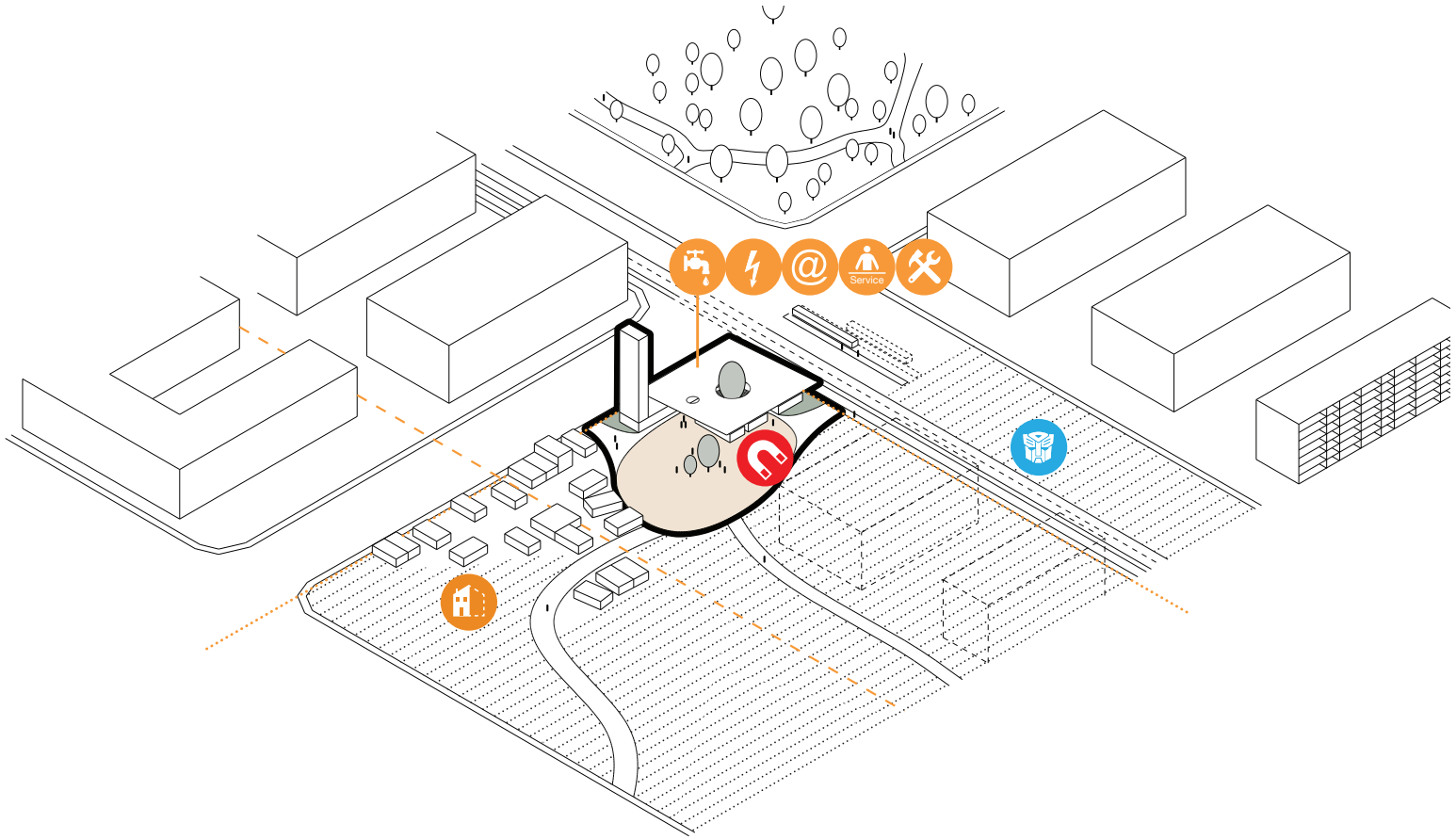
DISTRICT CENTRE



0.25 H A of 120 HA

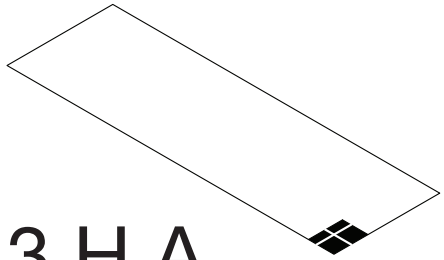
The *district centre* marks the starting point of the whole project. Its establishment can be seen as a precondition for everything happe
development area. Located at a strongly frequented public transport node close to the city centre, it first of all serves as an attracto
electricity and internet. The *district centre* is operated by a small team of “social workers”, consisting of independent NGO-members,
the fields of sociology, urban planning or architecture, as well as qualified local craftsmen/professionals. They utilize their international
tatives of renowned institutions such as UNHABITAT, The World Bank, top-ranking Universities and other testimonials, to gain credibili
Their job is to retain intensive communication with local politicians and to represent the interests of the citizens of the informal area
the transformation process within the project development area, as well as within the surrounding quarters. Working on-site, they are
development plan for the particular project area, applying the urban strategy explained in this paper and adapting it to the local con
for the inhabitants of the future informal settlements and they serve as contact persons. Furthermore, the team is responsible for t
technical support to settlers erecting informal houses, guiding the transformation process, land allocation, fund-raising, collection of p
public realm and community facilities, as well as intervening if someone ignored the community rules. In order to strengthen the collabo
community members with special skills, such as construction workers etc. are recruited and employed as additional team members.

ening subsequently within the project
r, providing access to potable water,
renowned academics or scientists in
network of specialists and represen-
ty and recognition from local powers.
as. They are steering and monitoring
e in charge of creating the initial draft
ditions. They are the persons of trust
he registration of newcomers, giving
otential fees, (cross) financing of the
oration with the community, individual

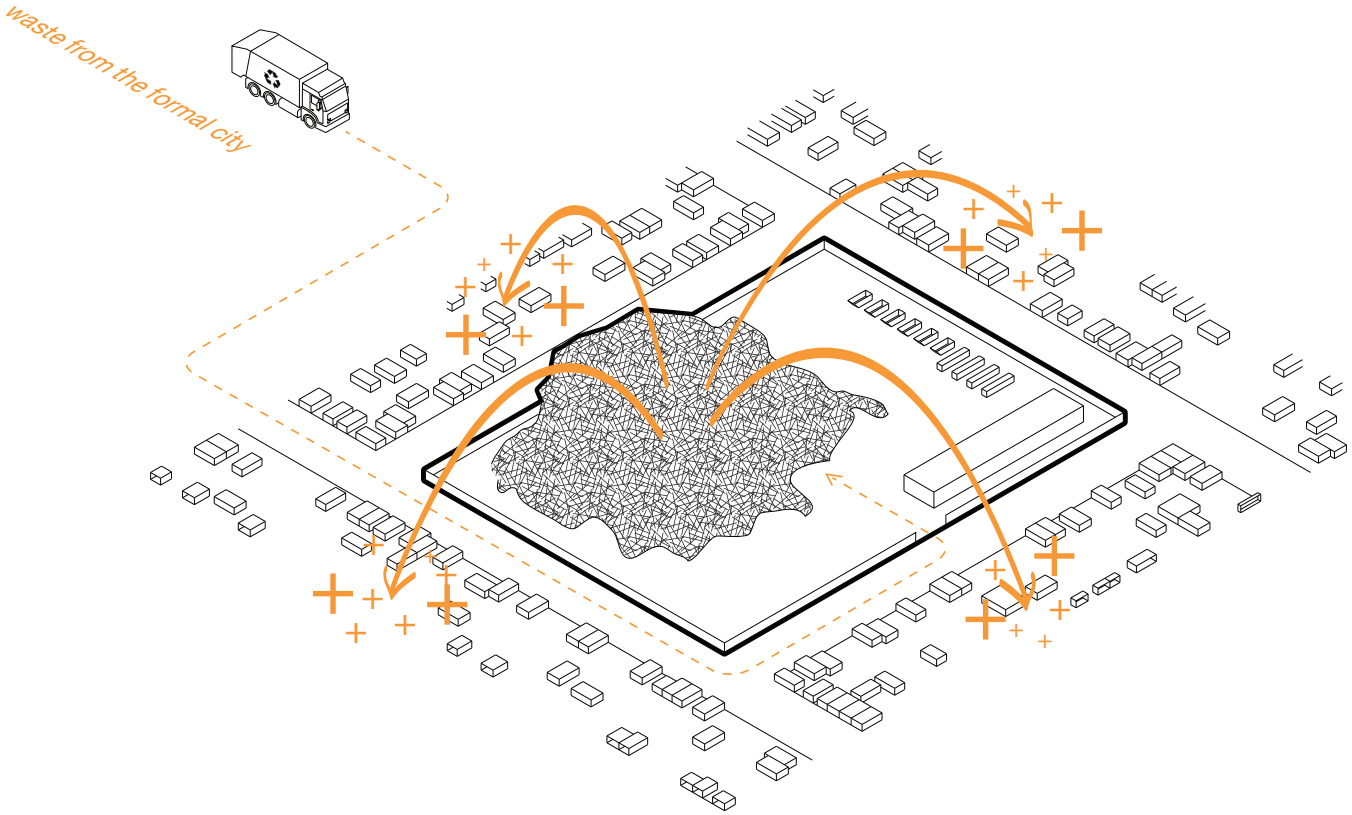


RECYCLING CENTRE

The erection of a new town for two million inhabitants generates an enormous amount of construction waste - waste that is highly suitable for the construction of future informal homes within the project area. Therefore, it makes sense to reserve land for a recycling centre adjacent to the area designated for informal housing. The centre will act as a starting point and catalyst for the settlement, since it provides material for self-made housing as well as job opportunities in the upcycling sector.



3 H A of 120 HA



1-15

Recycling Centre

3ha land are reserved to accommodate a recycling centre. This gives unlimited access to free building material to the settlers. Cheap transportation, technical support and tools could be provided.

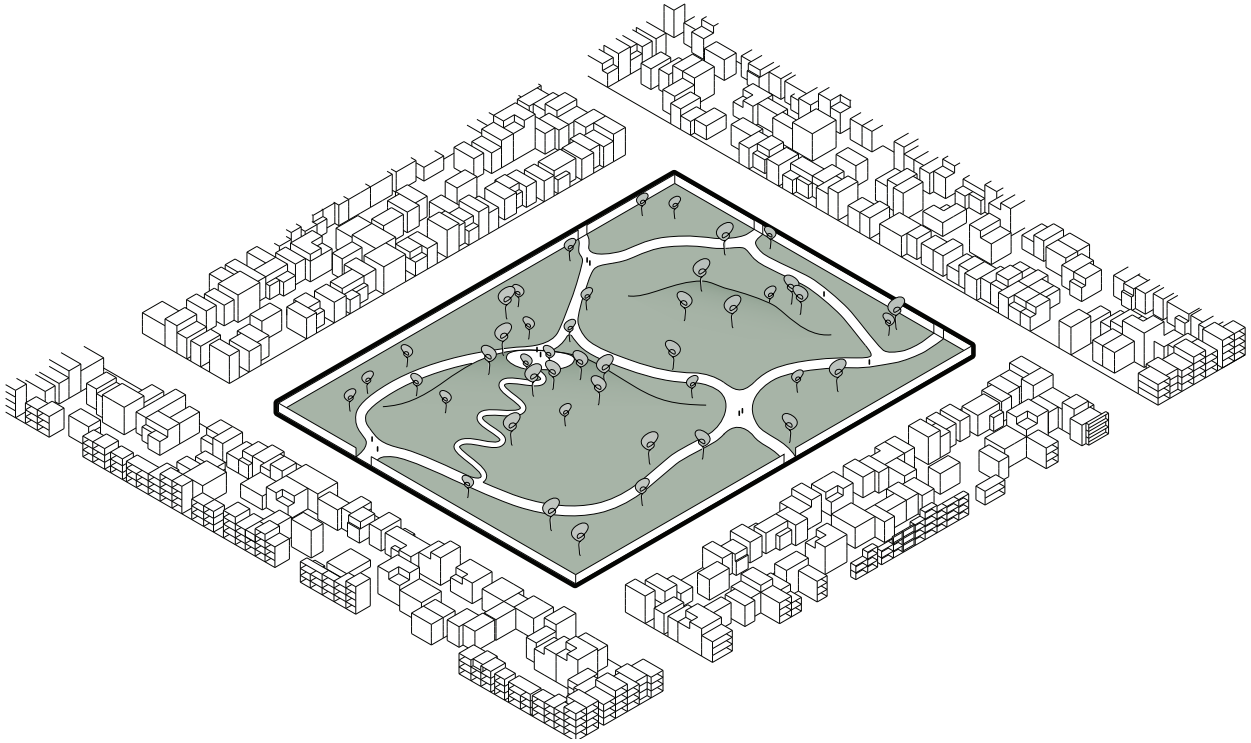
16

field #2

As field #1 cons
young settlemen
vacant area is be

Inspired by Rock Garden, Chandigarh

The Rock Garden, a 40 acres sculpture garden, was built illegaly by Nek Chand, a government official. It is completely built of construction waste and debris generated by the erection of the city of Chandigarh as well as industrial and home waste.



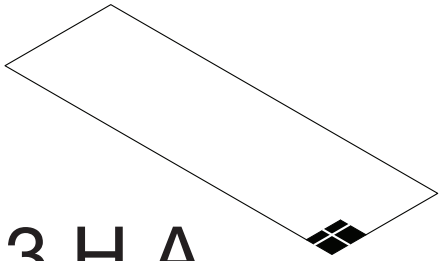
25

Community park

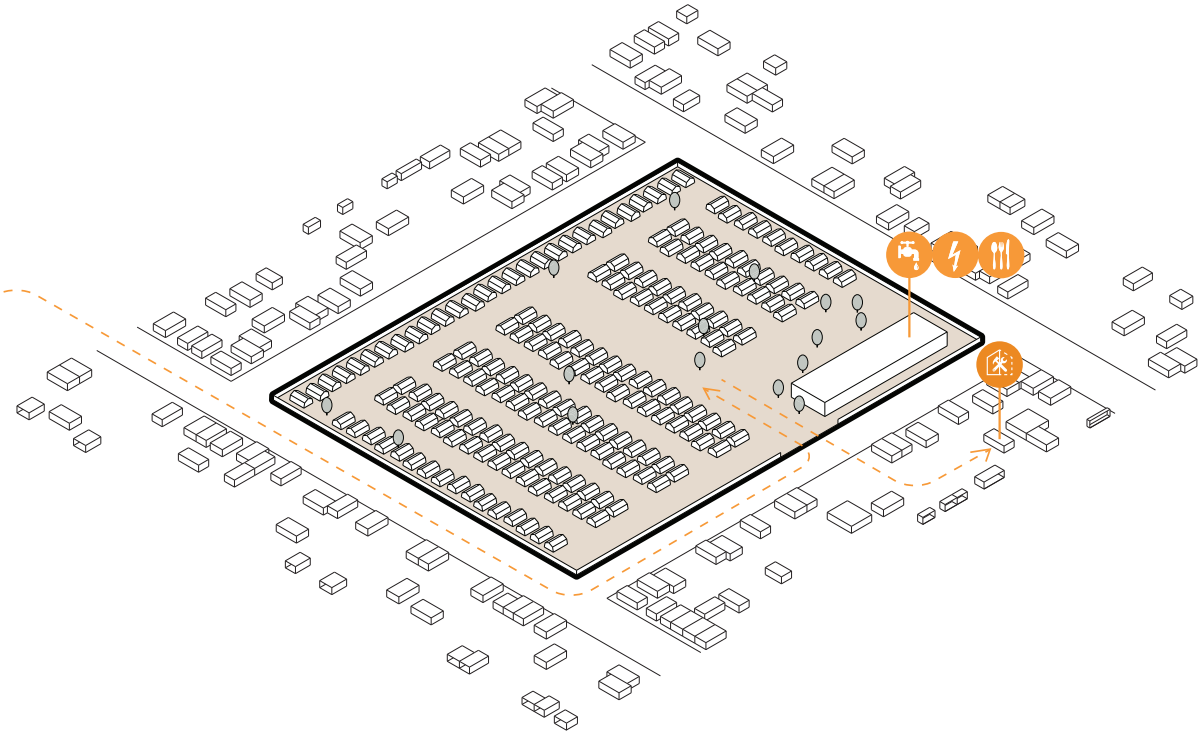
After 25 years the former recycling centre might serve as a high quality recreational zone for the inhabitants of the consolidated informal housing area.

solidates, the recycling centre moves to a new
nt (field #2) and the process starts afresh. The
eing transformed into a community park.

TENTS AND SHELTERS



3 H A of 120 HA



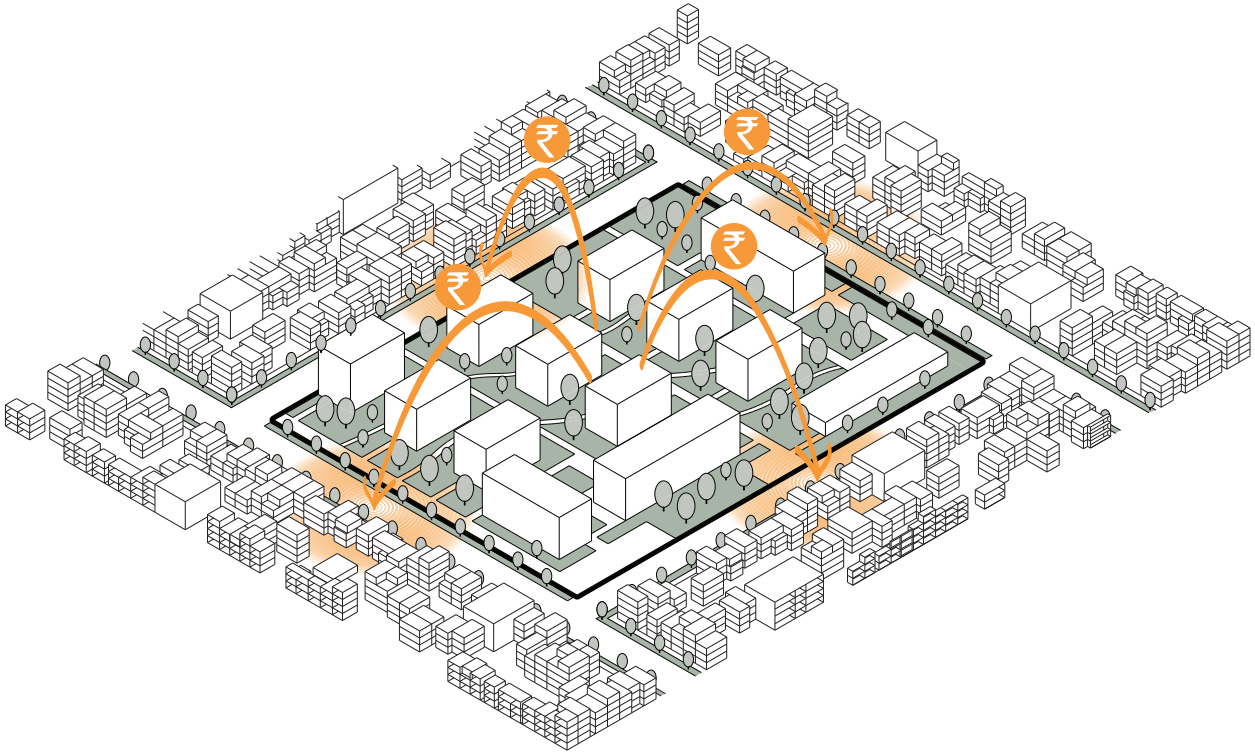
1-15

Tents and shelters for newcomers

3 ha of land are reserved to support newcomers by supplying them with basic tents and shelters. The patch provides initial shelter for migrant coming to the city from rural areas in search for jobs. The migrants can stay during their phase of orientation, registration and during the construction work on their own self-built home within the adjacent receptor patches.

16

As field #1 consc
income generatir
lution. Making hi
are helping to pu

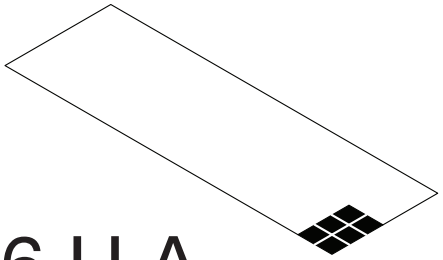


25

Real estate projects

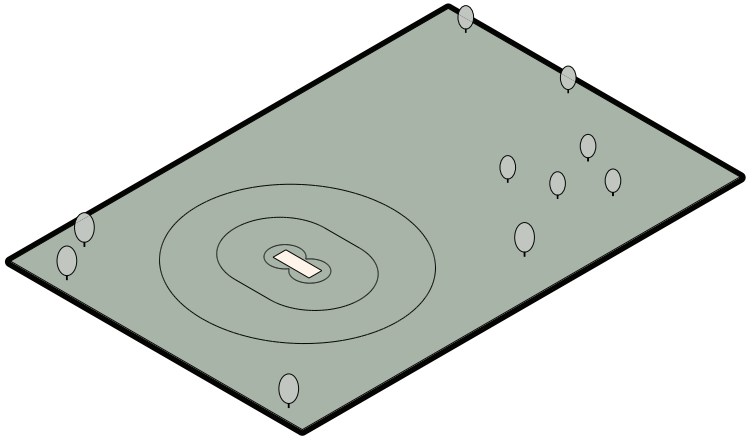
After 25 years the formal real estate projects are a fully integrated part of the urban fabric predominantly consisting of consolidated informal housing schemes, contributing to the diversity and strong identity of this urban district.

lidates and the land value has risen, the plot is cleared for
ng real estate projects acting as a catalyst for urban evo-
igh demands on the public infrastructure, these projects
sh the overall quality of the public realm to the next level.



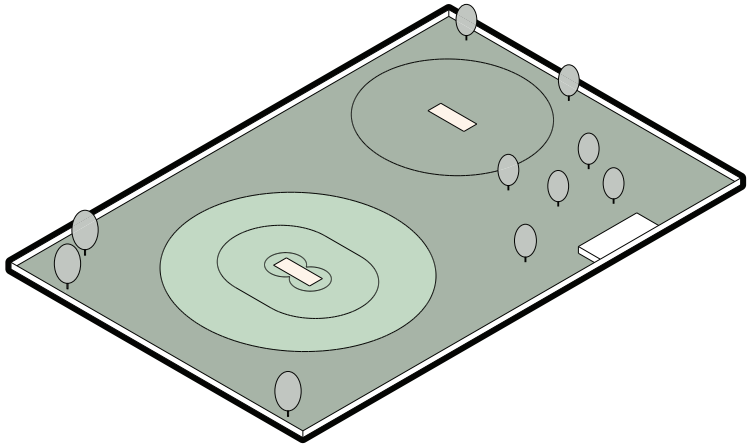
6 H A of 120 HA

SPORTS FIELD



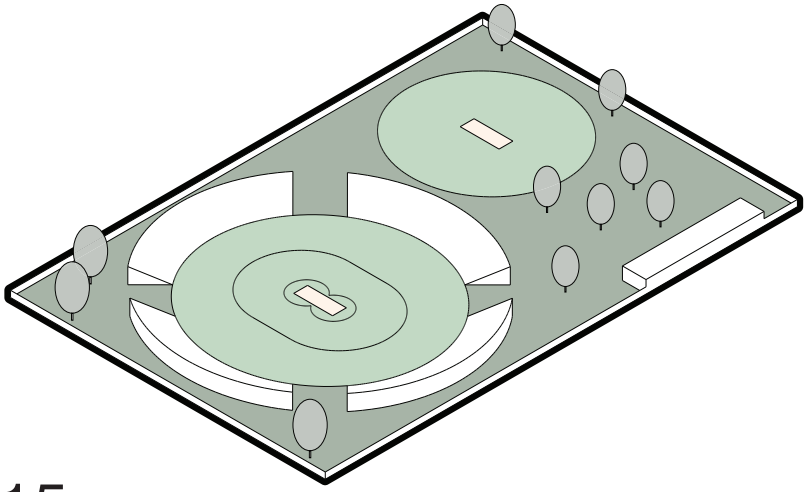
0 Sports field

5ha land is reserved to serve as provisional sports field. A cricket team is created, defending the site against unauthorized occupation.



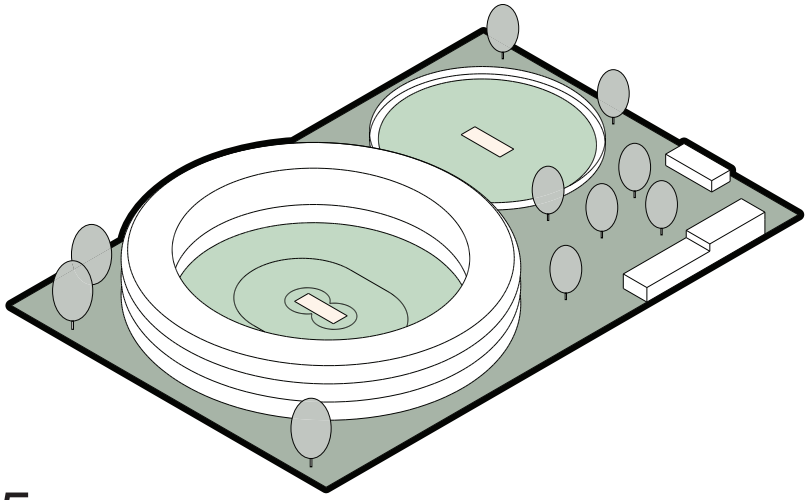
10 Cricket club

After ~ten years, a professional cricket club is founded. The site is being fenced and upgraded with a club house and an extra training field.



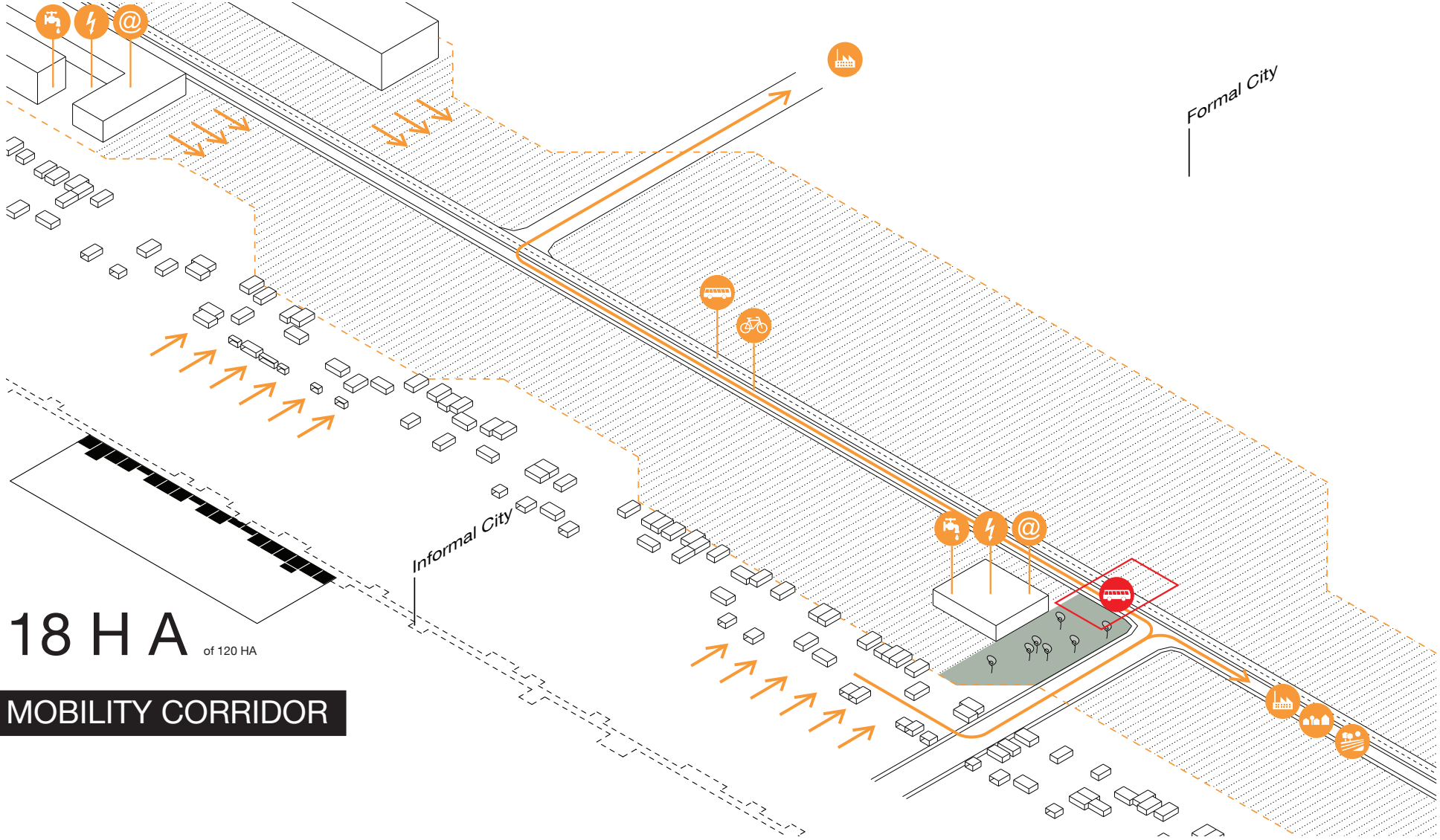
15 Cricket training centre

Later, as the built environment of the planning area matures and the population's demand for upscale public facilities rises, the cricket field is enhanced with stands.



25 Cricket stadium

As the planning area is about to be completely consolidated, the cricket field is turned into a cricket stadium, which acts as a landmark to attract residents from the formal districts of the city.

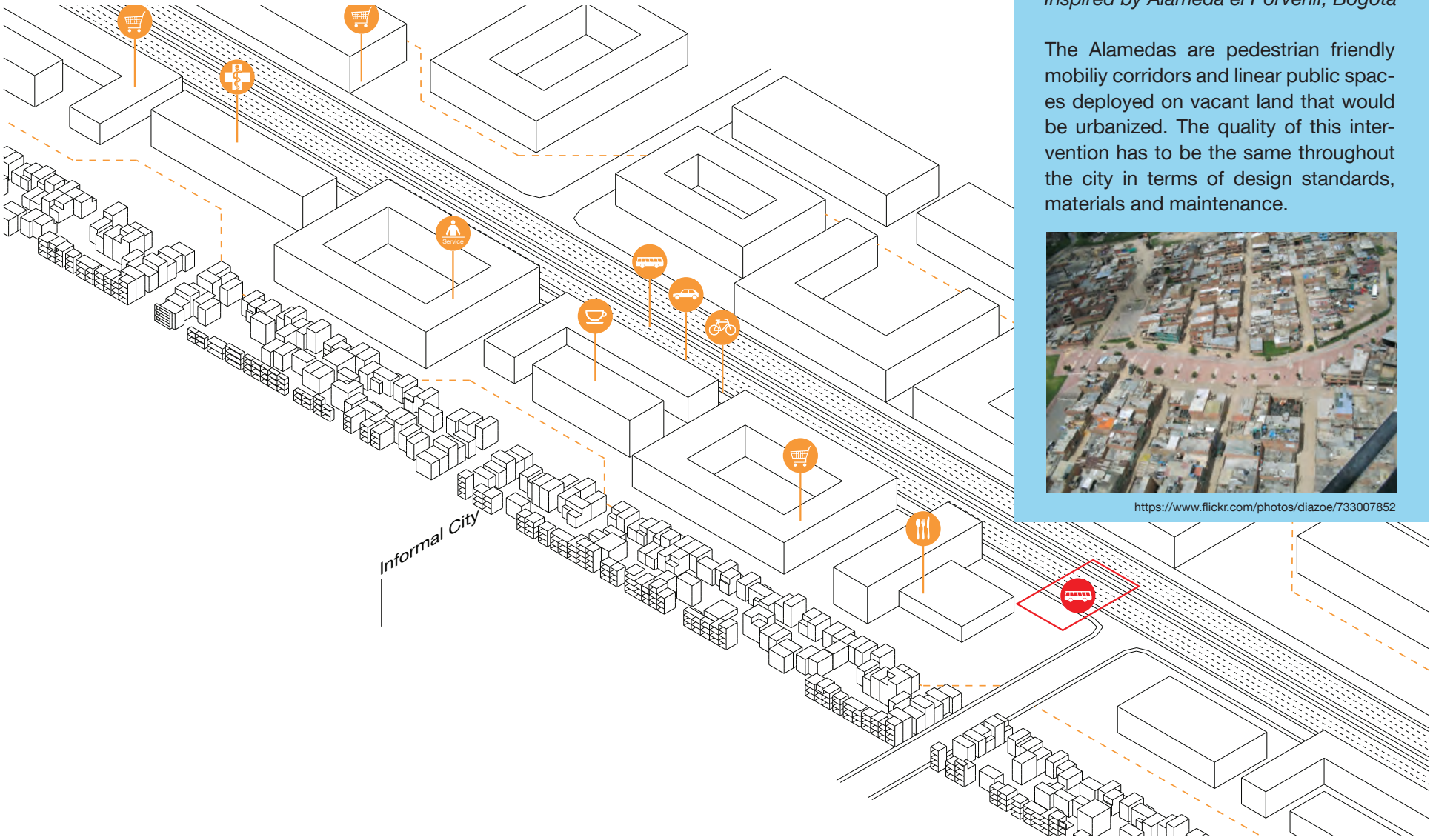


18 H A of 120 HA

MOBILITY CORRIDOR

0 Linear agricultural land

About 18ha land is reserved along the eastern fringe of the project area to serve as initial agricultural strip, operated by the informal community, including pedestrian walkways and cycling paths, connecting the settlement to the city centre as well as remote areas in the south (leisure, existing villages etc.). The morphology of the strip plays an important role for its future transformative purpose. At the beginning the long stretched corridor acts as an Attractor, providing easy access to public transportation as well as amenities and services normally sought by the settlers.



Inspired by Alameda el Porvenir, Bogotá

The Alamedas are pedestrian friendly mobiliy corridors and linear public spaces deployed on vacant land that would be urbanized. The quality of this intervention has to be the same throughout the city in terms of design standards, materials and maintenance.

https://www.flickr.com/photos/diazoe/733007852

25 Enhanced Mobility Corridor

As the project area and the surrounding industrial and residential districts mature, resulting in rising demands on the public realm and especially the traffic capacity, the required land still reserved within the agricultural corridor is transformed step by step into a high access mobility corridor with a wide array of services and assets.

Implementation principles:
While the transformation of the urban infill is steered mainly by communal efforts, local and metropolitan institutions together with community organizers will steer the transformation of the public realm. Therefore it is important to identify and meet the actual community needs. An over dimensioned and finished infrastructure network at a too early stage can result in enormous maintenance costs.
(Note: The implementation of this strategy in a large scale new town development like Dholera however, seems to make sense in particular because of two aspects: First because of the vastness of the scheme; it is simply impossible to monitor the whole city and effectively regulate informal urban sprawl without offering alternatives. Secondly, those cities are already growing on the back of an extensive infrastructural grid which is provided by the public hand in advance, which is perfectly eligible for docking self constructed urban components.)
In creating the public realm, using effective design for the creation of compelling places is of great importance. The goal is to make the most active zones within the self constructed district competitive and attractive within the broader urban context. Before the settlement is being expanded onto adjacent areas, a high level of density and function diversity has to be achieved. A new Receptor patch shall only be settled, if the patches already populated are fully occupied and if new uncontrolled informal settlements would occur otherwise. Stewards are recommended to be particularly placed in the threshold between initial and future Receptor patches. This could be for example a market or a food processing facility which might turn into a central market place with restaurants, a cinema or similar amenities.

The applied guiding process is what could be called "managed gentrification". Its objectives are achieving a gradual improvement of the socio-economic conditions as well as increasing social mixing. (NOTE: Within this concept the poor are not displaced directly, because this is mainly a matter of the rental market. In general this dynamic is less distinctive in developing countries.) The method is the incorporation of higher income residents in formal real-estate operations located on Transformer Patches. The main advantages of settling within Receptor patches are:

1. No risk of being evicted

2. The site benefits from adjacent urban areas and the transformative influence of corridors

3. Defined edges: neighbourhood identity, manageable scale

4. Able to incorporate different support systems, like site- and services schemes, but being part of a multi scale and multi-performance model

5. Possibility to incorporate strategy-inherent design conditions like for example using material from the recycling centre

Dividing the self-built district into smaller occupied areas (neighbourhoods) with recognizable boundaries stimulates the development of stronger communal ties and self-governance. Newcomers should promptly be integrated in the decision making process, acting actively within the planning, construction and operation of public initiatives, contributing to the metamorphosis of the settlement. Ideally, over time, as the self-built district formalizes, the inhabitants might even forget the way in which the initial occupation started, accept taxes and gradually turn into a full formal citizen.[1]

Enacting
For a successfully guided consolidation process, facilitators who are aware of all the principles mentioned in this text are needed. The envisioned guiding process should be far more efficient than the usual mode of formal city making, in which administrations devote time, financial and managerial resources to control a very long and ineffective formal urbanization process. The success depends heavily on the cooperation of the involved stakeholders: politicians, institutions, professionals, the private sector and the community. Further important aspects are:

1. Allocation of public funding and managerial efforts normally used within public housing programs or infrastructure and road construction

2. Integration of efficient managerial and technical teams to maximize the impact of available resources

3. Efforts to reduce up-front costs through strategic association with institutions and community Organizations advocating for the IA initiative, targeting international and national sponsors or donors

4. Provision of appropriate public land which does not require allocation of capital

Balance is important. All citizens should have the opportunity to contribute but also to benefit from urban life fairly according to their potential. Regarding this, there are many taxation strategies. Property taxes suitable for creating community revenue could be for example commercial taxes graded in categories such as: small, intermediate and full floor occupation. Another proven tax collecting strategy used for example in Colombia is called “Revalorización”, meaning to introduce taxes that are associated with added value created by public investments in the public realm. This type of fiscal contribution is typically associated with specific urban enhancements, making public investors more eager to pay dues and contribute to the quality of public space. Transformer patches in general are income generating: They create up-front cash if sold and steady revenues if developed and operated together with the private sector. They are also subject to taxation. These additional sources of income allow to either reinvest capital gains in the same district, or to invest in similar emerging territories.

Summing up we can say, the most significant advantages of the Informal Armatures approach are:

1. Taking advantage of conditions occurring spontaneously, while acting in a pre-emptive manner

2. Mobilizing human capital

3. Reducing demand for financial capital

4. Addressing the fact that in the near future the majority of the urban population in developing countries will live in self-constructed cities

5. Offering an alternative for the modernist model which is not suitable for dealing with the challenges of informal growth.[2]

The approach envisions informality continuing within its intrinsic rules characterised by the flexibility and dynamism of millions of settlers shaping their own habitat. The advancement lies within the introduction of managerial and morphological efforts, contributed by facilitating expects, that will steer the process and allow cities to reach the socio-economic and environmental challenges of the twenty-first century. “This will require a new set of urban paradigms, one in which city planning, urban design, and management are key. Instead of focusing on the regulation of the real-estate market for a fraction of the population, we will need to envision how to foster sustainable living conditions for the majority.” (D. Gouverneur)

“METROPOLITAN SCALED INFRASTRUCTURAL, ECONOMIC AND SERVICE FUNCTIONS ARE ACTING AS URBAN EQUALIZERS.”

For a sustainable future, the emerging hybrid-informal city will, as well as the formal city, also have to deal with global concerns, such as climate change and its impact on potable water and food sufficiency, alternative modes of mobility and creating networks of micro-production and local markets in an age of globalization. Agile forms of governance simultaneously addressing the large and the small scale, the top-down and the bottom-up decision making processes are needed. Advantages of an interconnected world with immediate access to data information will hopefully enable an easier implementation of such structures.

Biases

Although there is a constructive dialogue with informality already in some parts of the world, still it is difficult for politicians and professionals to support new informal and self constructed occupation in public because it is perceived as illegal and aberrant compared to the conventional city making process. These biases persist although statistically informality will be the driving force of upcoming urbanization and although successful improvement plans in Venezuela or Medellin have proven that a paradigm shift in the way we are dealing with informality is needed to incorporate these areas into broader urban dynamics. The self-constructed city must be considered an inseparable and equally important part of the urban system. [3]

To change the biases towards informal city making it is required to gain political support, to carry out pilot projects in order to test new approaches and to evaluate the results. Furthermore it is necessary to involve academia and to introduce marketing and public relation campaigns to accustom a general audience to the new ideas. Therefore it is also required to make use of state of the art forms of city mapping and graphic representation for communicating the

1 cf. David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015 , p. 19, 195ff.
2 cf. David Gouverneur, 2015 , p. 126ff.
3 cf. David Gouverneur, 2015 , p. 110f.

hybrid and transformative nature of the IA proposals in a suitable way. Innovative systems of data collection can serve as input to monitor and calibrate the transformative processes. It is assumed that cutting edge forms of management and design solutions can merge with the vitality and adaptability of the informal city. The result could be a hybrid form of urbanization, perhaps richer, more dynamic, and more resilient than either the formal or the informal city on its own. In contrast to the modernist movement, which established generic urban solutions worldwide, this approach attempts to work with the complexities, imperfections, and constant transformation of cities, particularly in those with high informal capacities. Shaping the future of the self-constructed city is a topic of enormous global consequence. Let us rethink the contemporary city and let the boundaries of the formal and informal dissolve![4]

The consolidated informal settlement

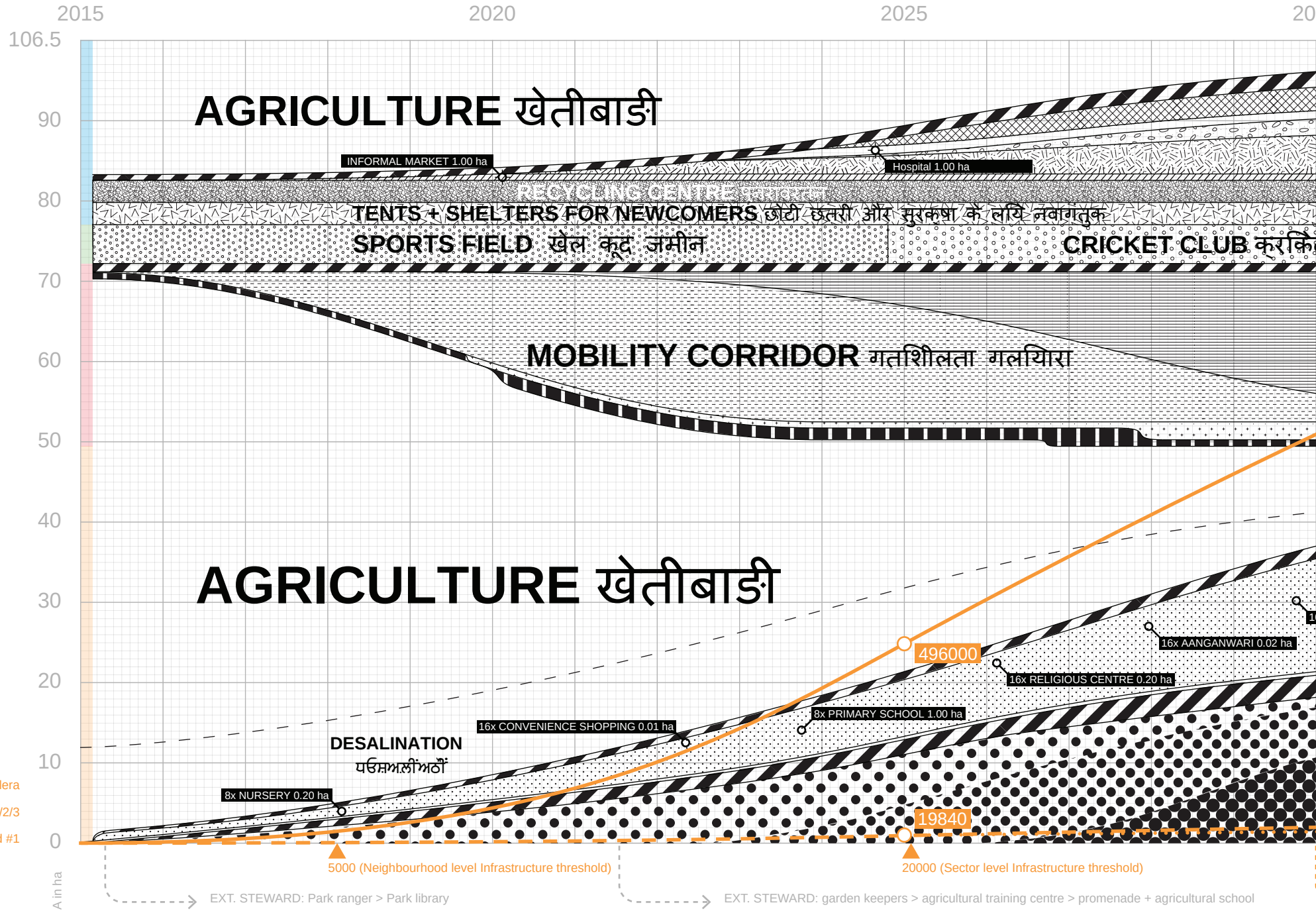
So what would be the result of applying the proactive urban strategy described in this paper on a future new town? What would it look like and what is the best case scenario I envision to achieve? The idea is to simply provide frame conditions, which guarantee that emerging self-built neighbourhoods, whose formation is obviously inevitable, are capable of being upgraded unobstructedly. As soon as dwellers intend to invest time and money in the enhancement of their dwelling or the adjacent public realm they should do so, as long as they stick to some simple rules, which are set up to guarantee a certain level of spatial and functional quality. The idea is to speed up the incremental transformation process of the settlement. At the end of this process, I envision a fully consolidated self-built neighbourhood, fully integrated into the urban fabric of the surrounding formal city; totally different yet no way inferior to the formal districts. The final result, the fully consolidated self-built neighbourhood/district shows many similarities to the typical organically grown historic Indian city in its urban layout as well as in its functions: It is pedestrian friendly, built on a human scale, environmentally friendly, and it has low use of resources. The self-built areas are totally different from the adjacent formal areas; something of an antithesis to the surrounding top-down new town. This difference on its own already gives these districts eligibility. They constitute special areas within the city; areas offering a different atmosphere, functioning according to different rules, contributing to the diversity of the cityscape. And as they are so different from the rest of the city, they might even be capable of attracting not only the poor. As they underlie the effect of a projected healthy gentrification, the creative class (students, musicians, artists) could turn these areas into some of the most attractive and vibrant spots of the whole city at a certain point. This phenomenon can be observed all around the world, as people in general admire medieval city centres, preferring them to purely top-down master planned new towns. The proposed strategy could give such districts, similar to medieval city centres, back to the projected future Indian new towns, which are lacking such components.

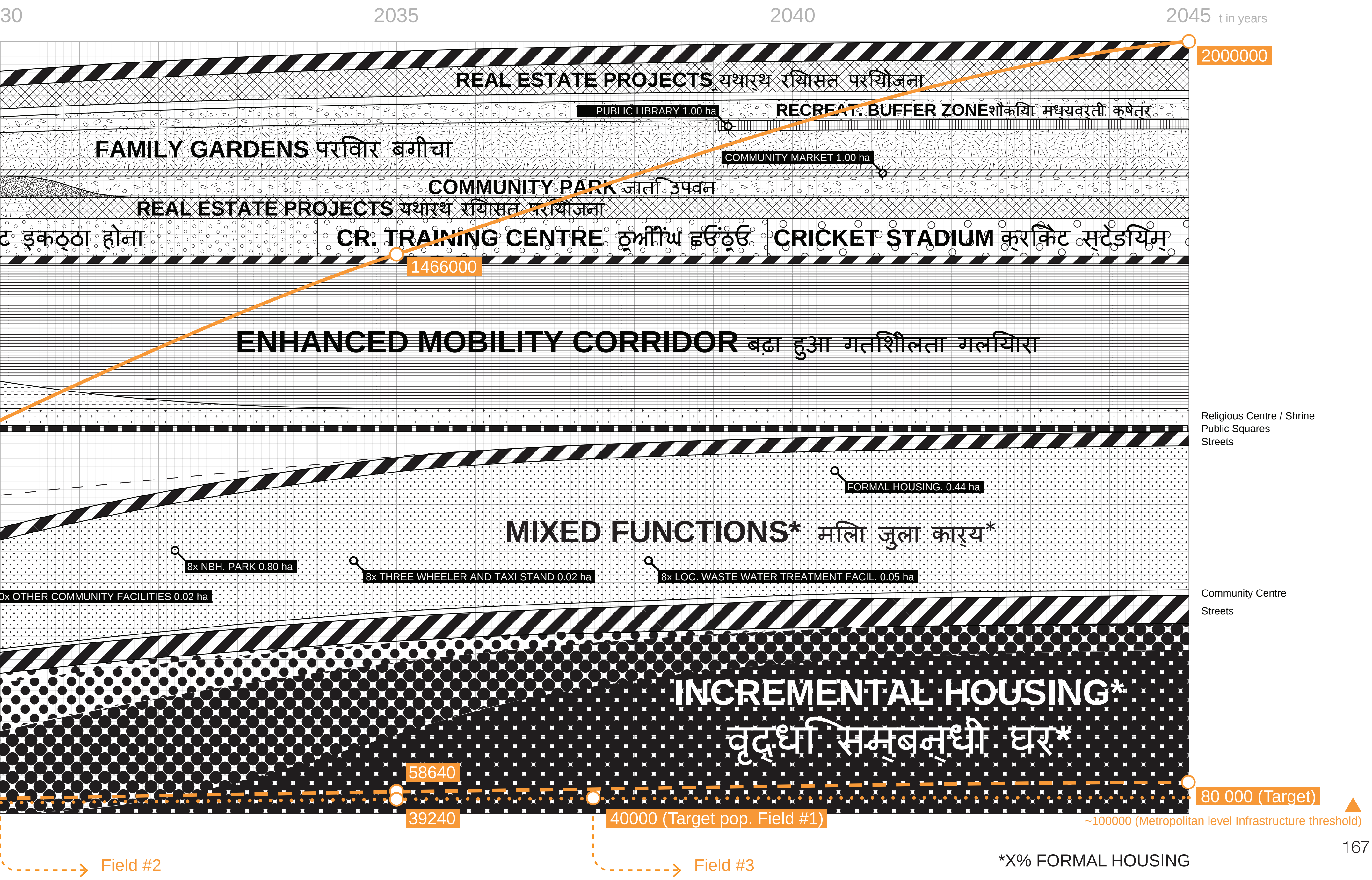
Some experts say that future cultural and architectural heritage will lie within the informal rather than the formal built environment. My strategy could give these future new towns a minimum of cultural idiosyncrasy. Therefore the implantation of self-built districts into top-down master plans could not only provide appropriate living space for the very poor, but could also be an enrichment for the whole city. If you think this sounds far-fetched, I have to tell you that this is actually happening in some places already. *Haus Khaz Village* for example, a small settlement located in the middle of a large park in Delhi, India, is such a place. Today it is one of the most vibrant areas in town, with rooftop-bars, cafés many shops and an active night life. Also many young artist and fashion designers are having their ateliers and galleries there. When I visited Haus Khaz Village in 2014 there was even a huge street art festival. And guess what? The whole settlement started as an illegal self-built settlement.

4 cf. David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, 2015 , p. 166ff.

Haus Khaz Village, Deer Park, Delhi, India
(Photo: Google maps, 07.01.2016)

TIME / ALLOCATION FIELD #1 ਠੌਓ / ਅਲ਼ਲੌਛਅਠੌਂ ਢਇਲਦ #੧




30
2035
2040
2045 t in years
2000000
REAL ESTATE PROJECTS यथार्थ रियासत परियोजना
PUBLIC LIBRARY 1.00 ha
RECREAT. BUFFER ZONE शौकिया मध्यवर्ती क्षेत्र
FAMILY GARDENS परिवार बगीचा
COMMUNITY MARKET 1.00 ha
COMMUNITY PARK जाति उपवन
REAL ESTATE PROJECTS यथार्थ रियासत परियोजना
ट इकट्ठा होना
CR. TRAINING CENTRE
CRICKET STADIUM क्रिकेट स्टेडियम
1466000
ENHANCED MOBILITY CORRIDOR बढ़ा हुआ गतिशीलता गलियारा
Religious Centre / Shrine
Public Squares
Streets
FORMAL HOUSING. 0.44 ha
MIXED FUNCTIONS* मिला जुला कार्य*
8x NBH. PARK 0.80 ha
8x THREE WHEELER AND TAXI STAND 0.02 ha
8x LOC. WASTE WATER TREATMENT FACIL. 0.05 ha
0x OTHER COMMUNITY FACILITIES 0.02 ha
Community Centre
Streets
INCREMENTAL HOUSING*
वृद्धि सम्बन्धी घर*
58640
39240
40000 (Target pop. Field #1)
80 000 (Target)
~100000 (Metropolitan level Infrastructure threshold)
Field #2
Field #3
*X% FORMAL HOUSING

SUBDIVISION RECEPTOR PATCHES

MACRO STRATEGY (INFORMAL ARMATURES)

MICRO STRATEGY (CODE)

RP Field #1:

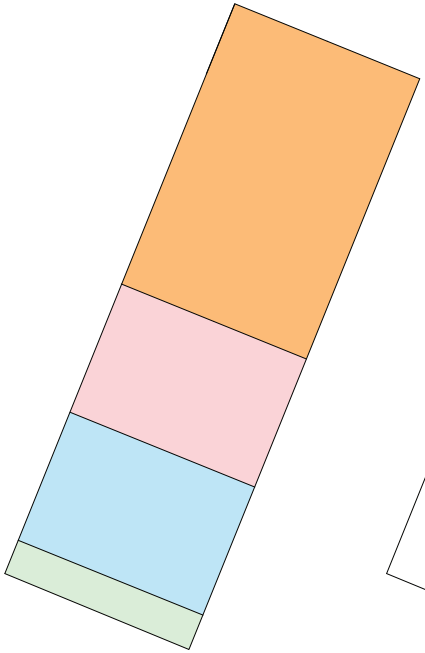
1x Community = 8x Neighbourh. á 40x Cluster á 31x Housing unit

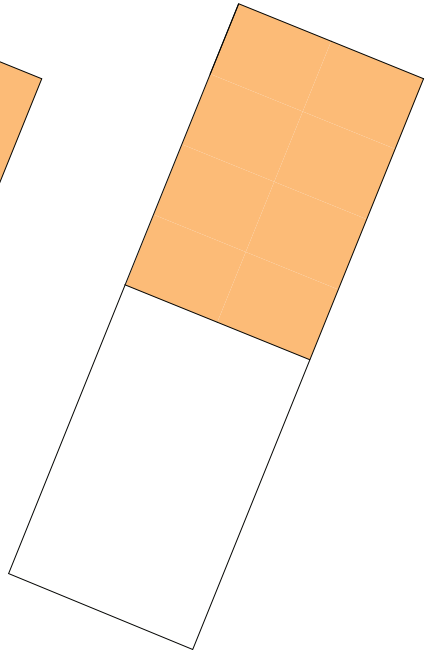
Dwellings: 10.000
Population: 40.000

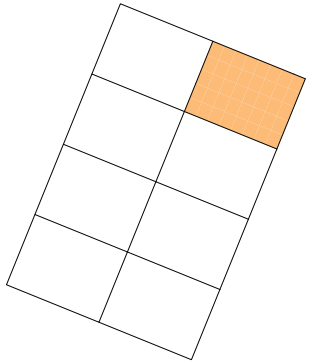
Dwellings: 1.250
Population: 5.000

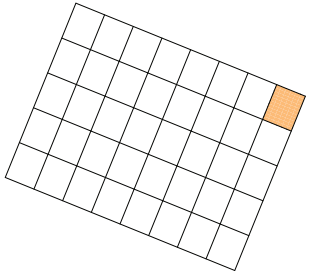
Dwellings:~31
Population: 125

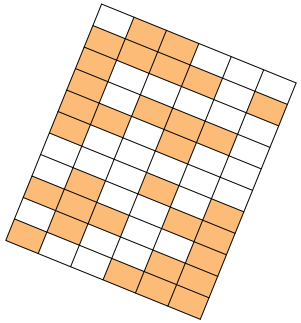
Dwellings:~31
Population: 125



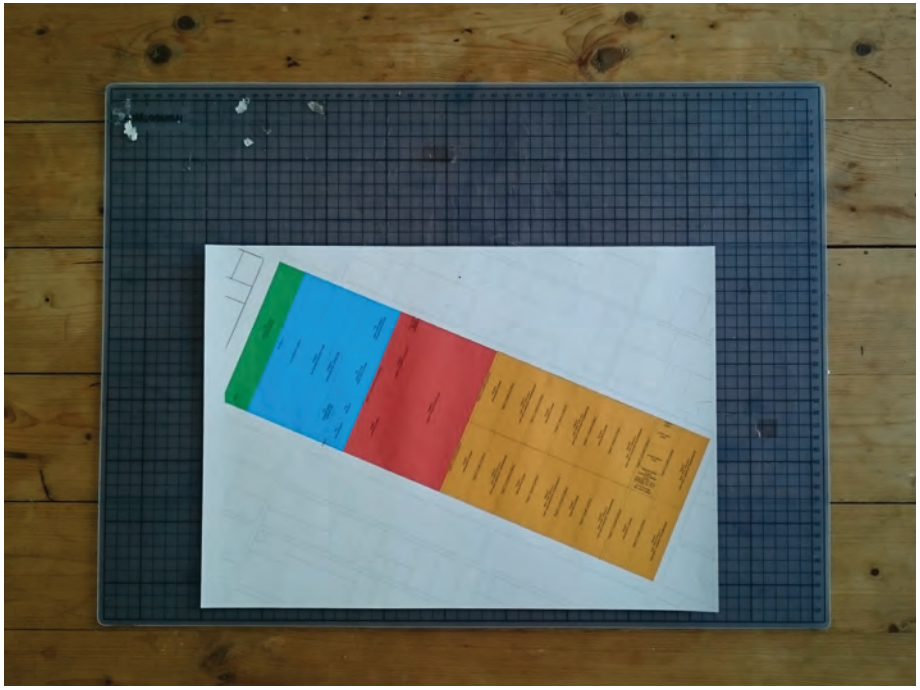




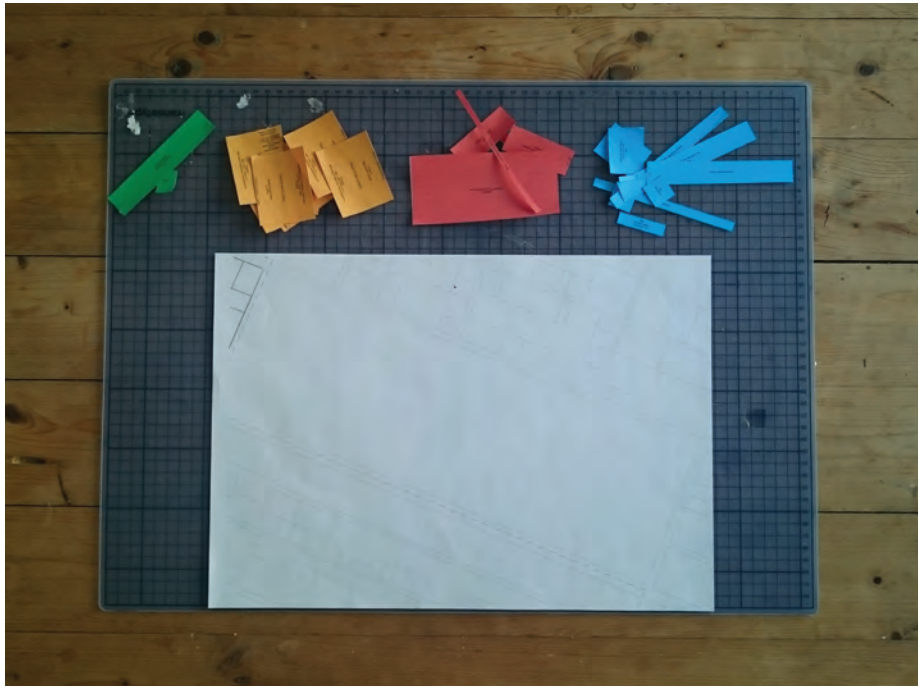




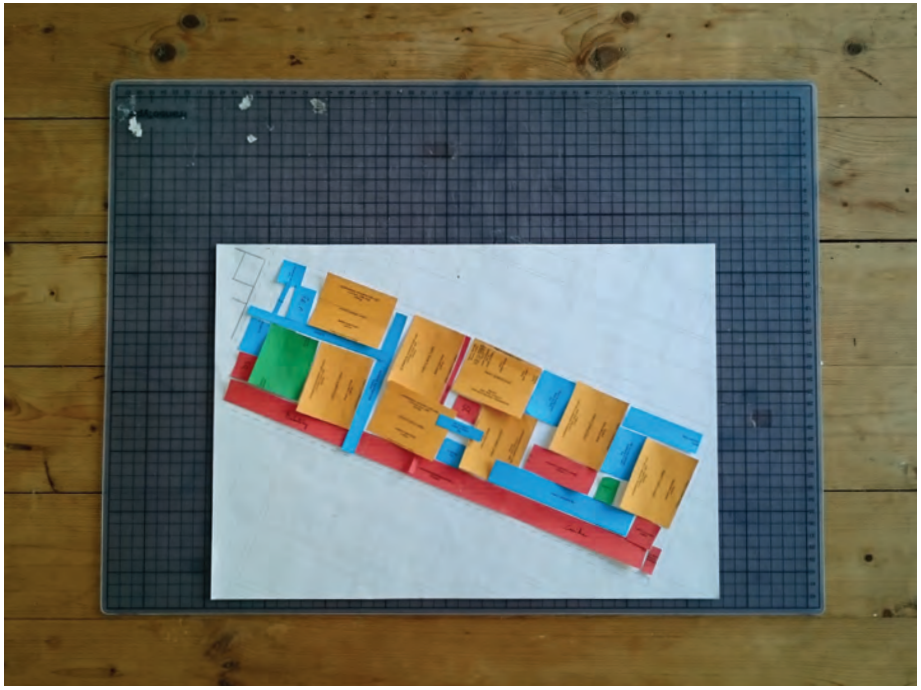
Protector Corridors +
Receptor Patches +
Attractor Corridors +
Transformer Patches



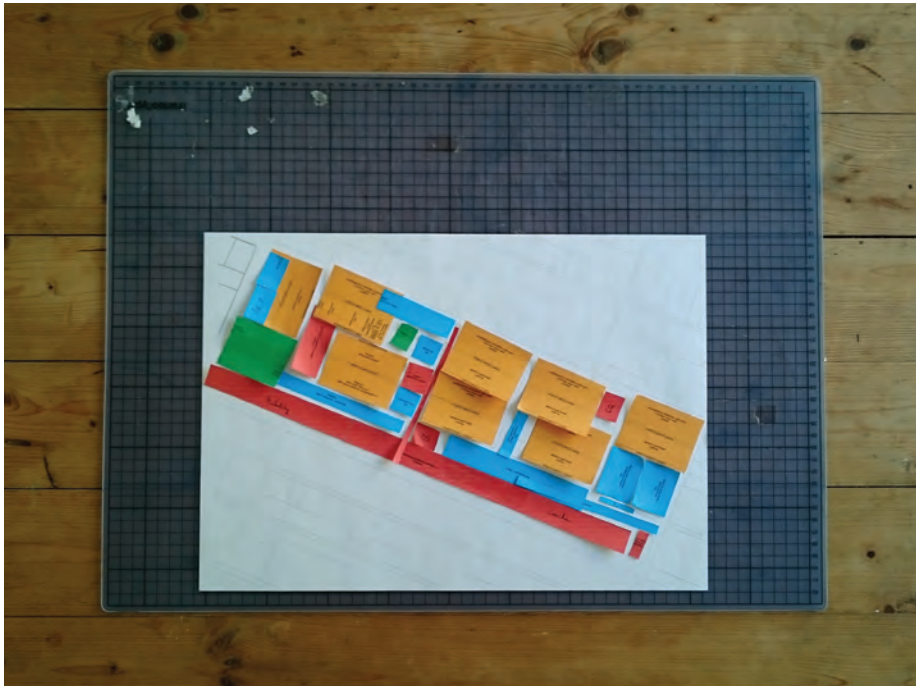
Deconstruction of the program



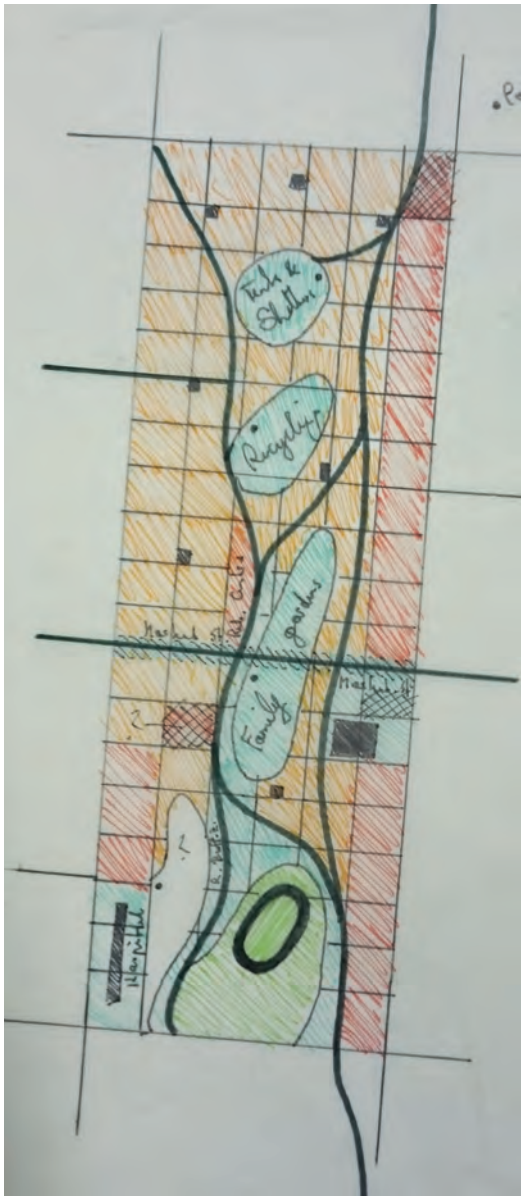
Mixed Arrangement 1



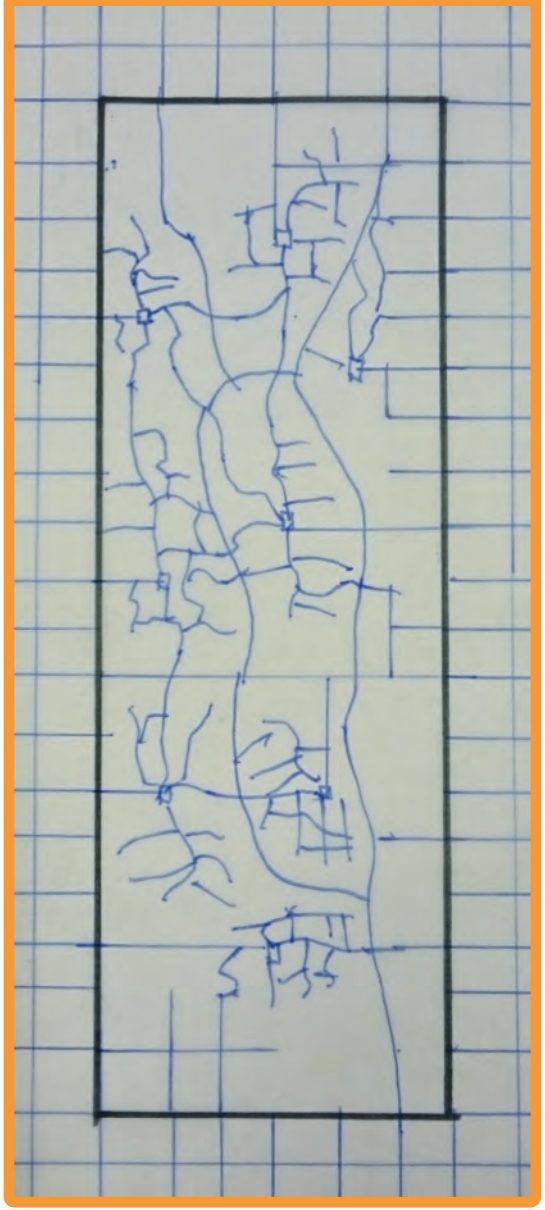
Mixed Arrangement 2

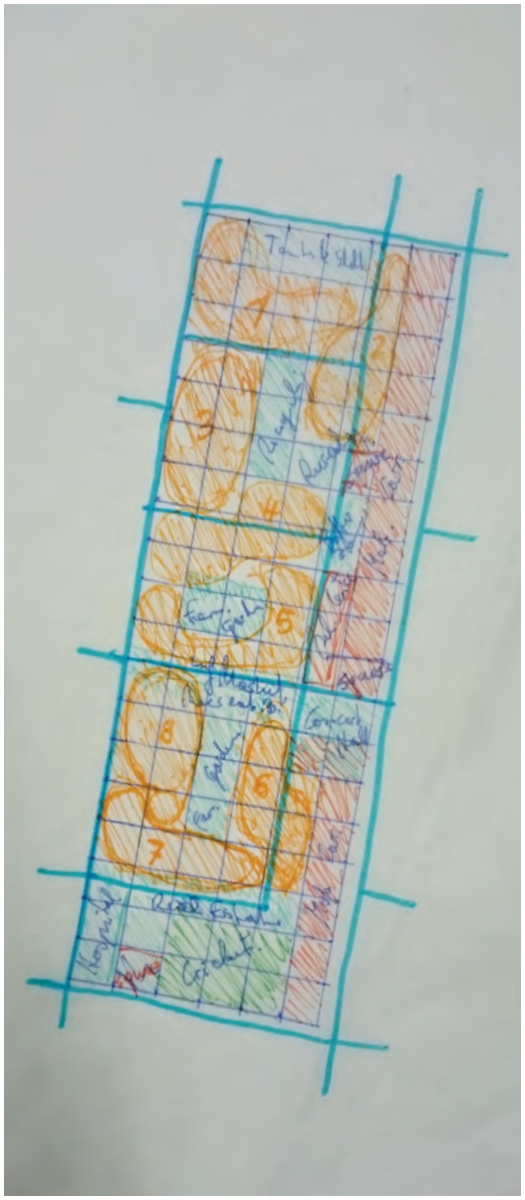


SKETCHES / URBAN LAYOUT FIELD #1

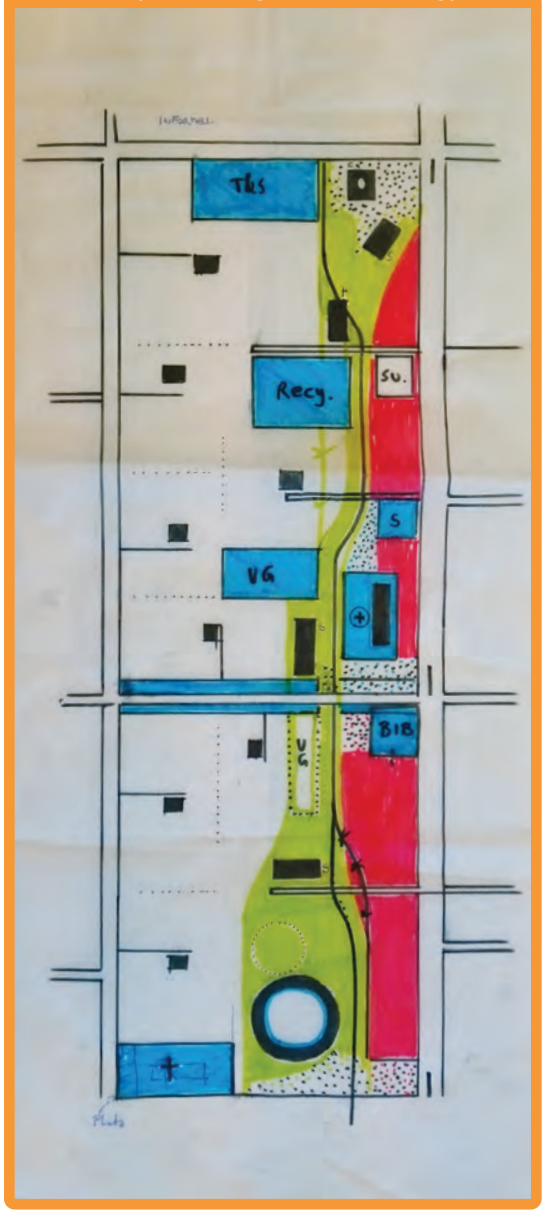


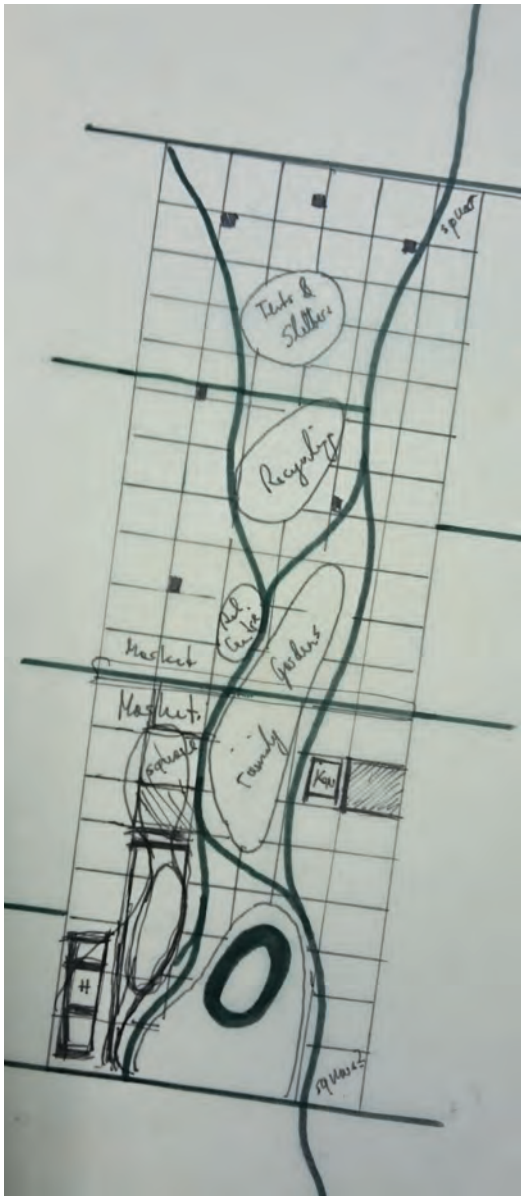
Concept Drawing, Micro strategy

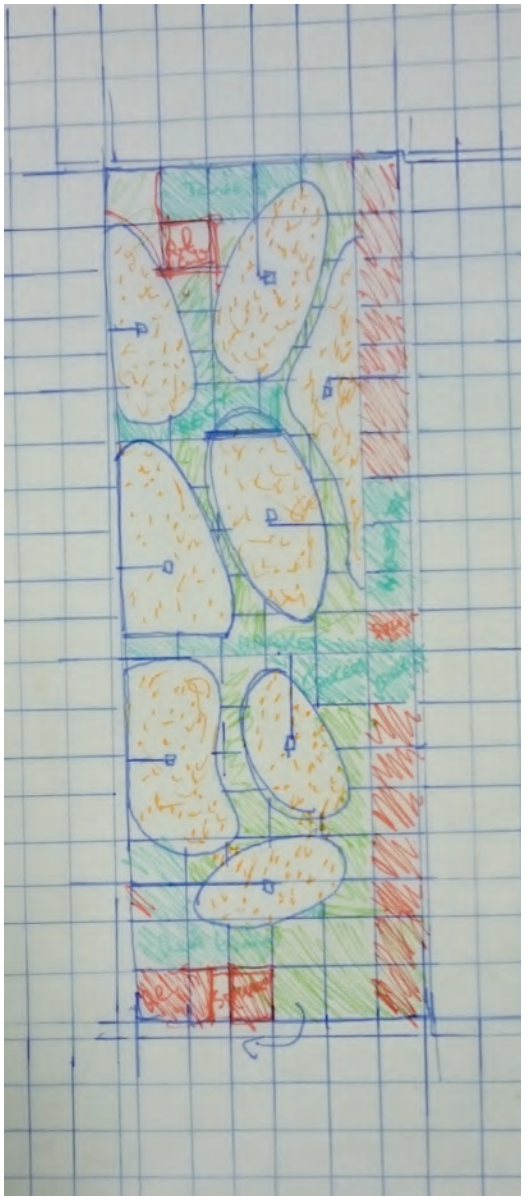




Concept Drawing, Macro strategy

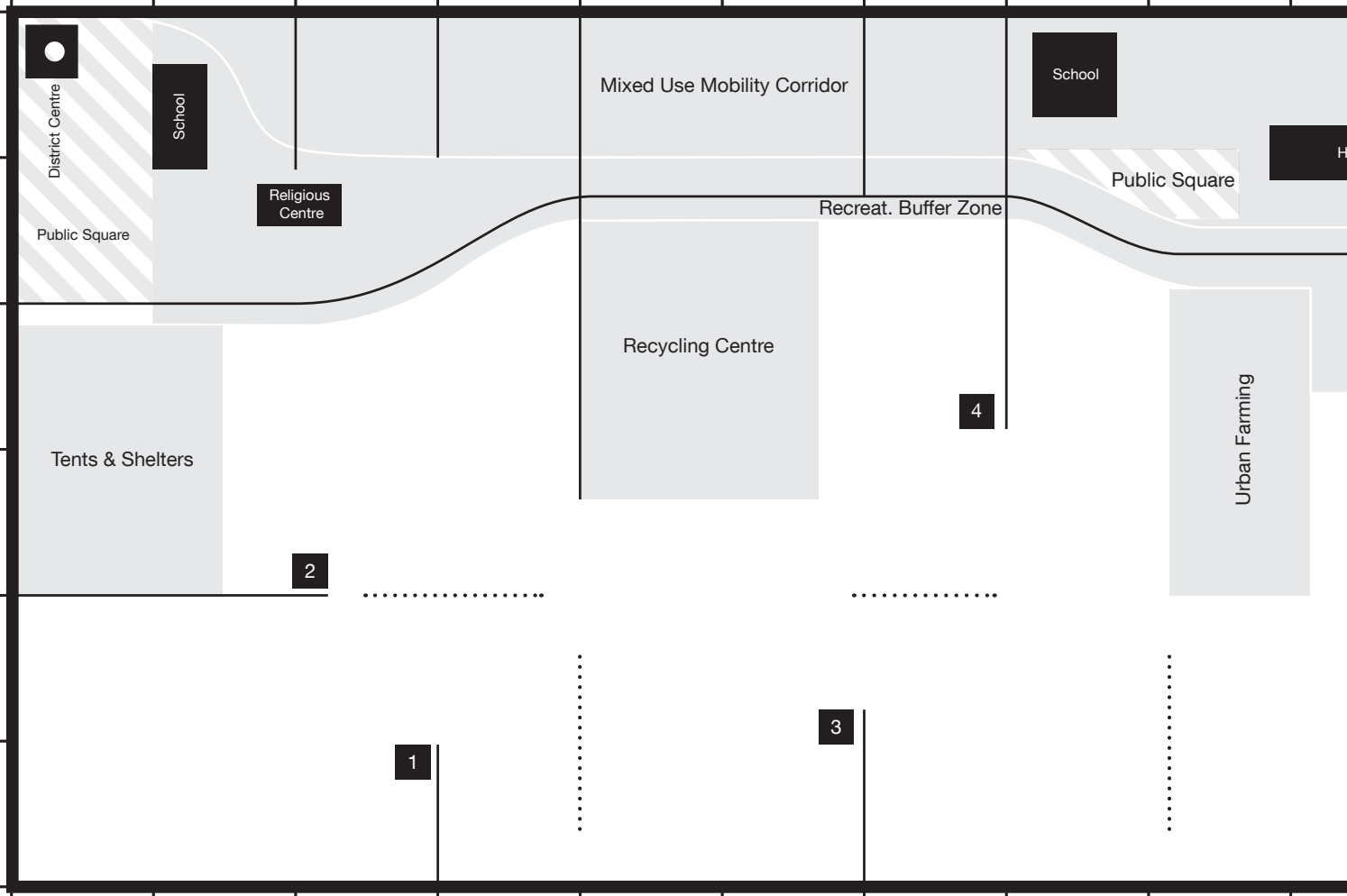






ALLOCATION OF PATCHES AND CORRIDORS - FIELD #1

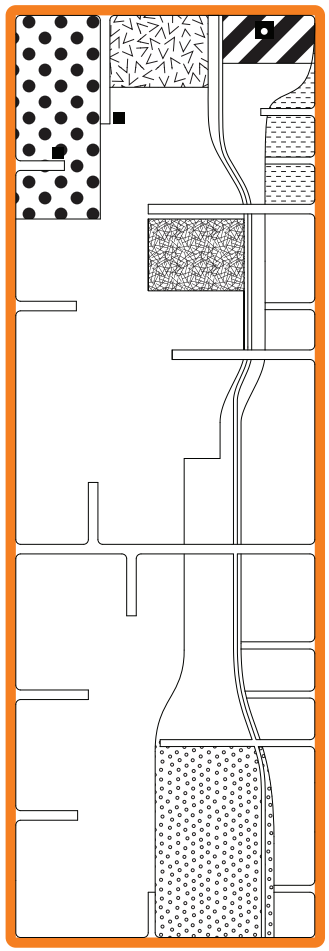
1:5000




Public Square
Library
Mixed Use Mobility Corridor
Public Square
ospital
Public Square
School
Urban Farming
School
Cricket Stadium
Community Market
6
Religious Centre
Community Market
5
7
8
Public Square

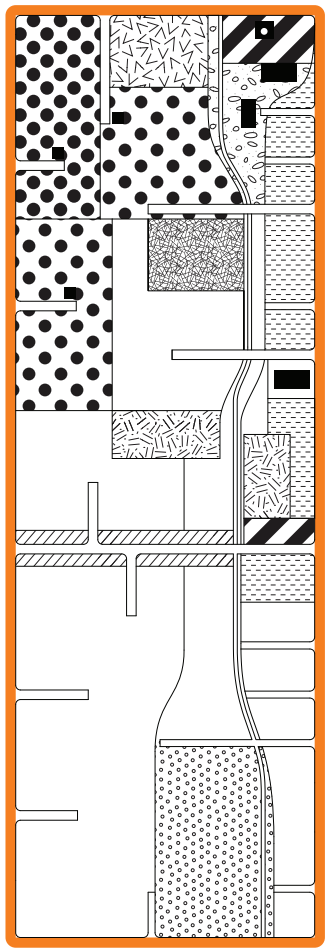
TRANSFORMATION FIELD #1

- INCREMENTAL HOUSING
- PUBLIC SQUARES
- AGRICULTURE
- RELIGIOUS CENTRE
- MOBILITY CORRIDOR
- ENHANCED MOB. CORRIDOR
- SPORTS / CRICKET FIELD
- TENTS AND SHELTERS
- REAL ESTATE
- RECYCLING
- MARKET
- RECREAT. BUFFER ZONE
- URBAN FARMING
- COMMUNITY PARK



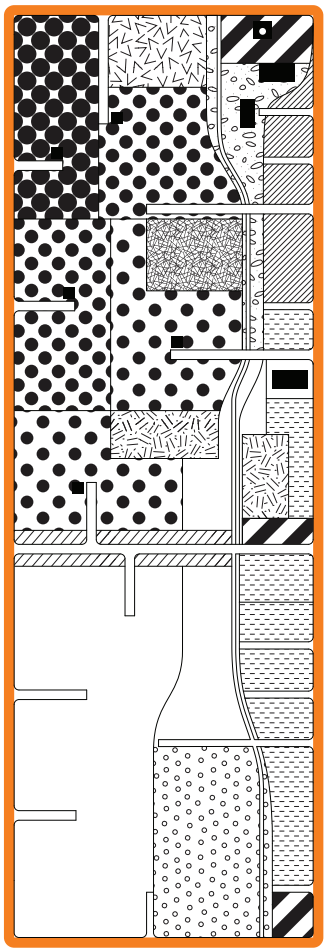
2015

Population: 3,487
Pop/ha: 29
Units total: 726
Informal units: 285
Formal units: 441



2020

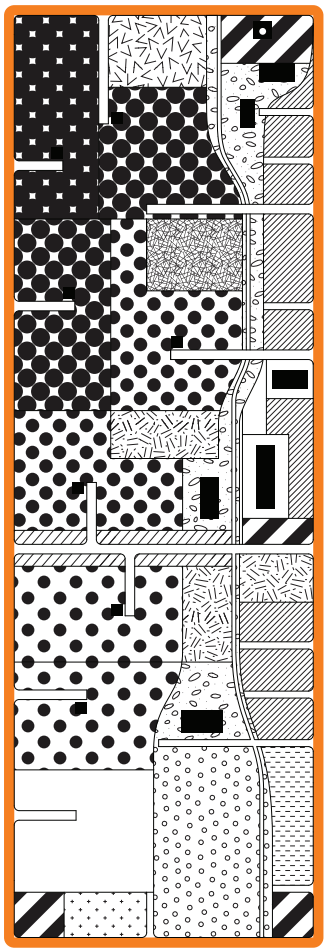
Population: 11,962
Pop/ha: 100
Units total: 2,492
Informal units: 1,194
Formal units: 1,298



2025

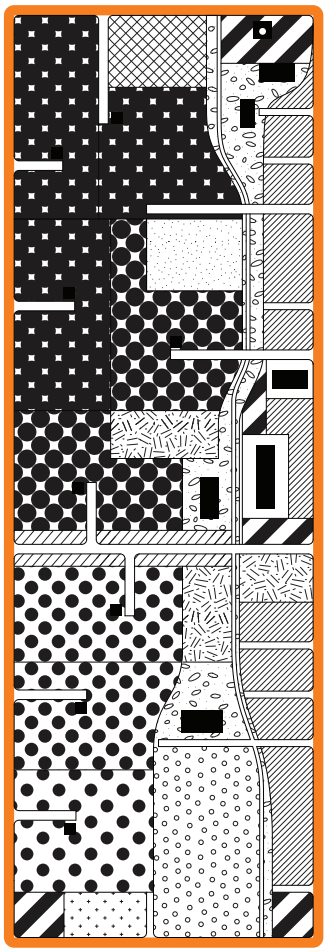
Population: 23,890
Pop/ha: 200
Units total: 4,977
Informal units: 2,806
Formal units: 2,171

1:15000



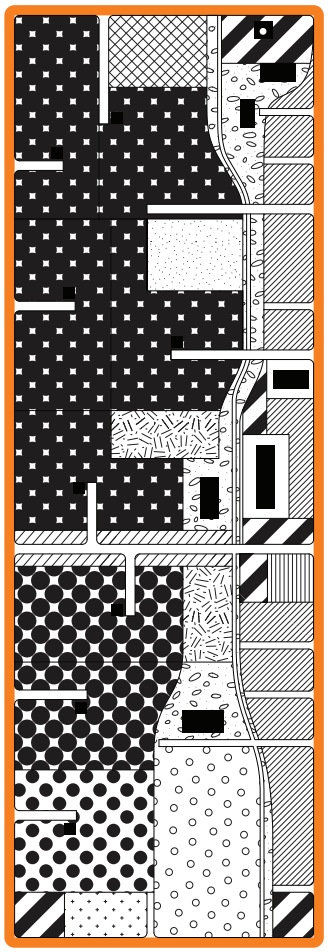
2030

Population: 31,968
Pop/ha: 267
Units total: 6660
Informal units: 4021
Formal units: 2,639



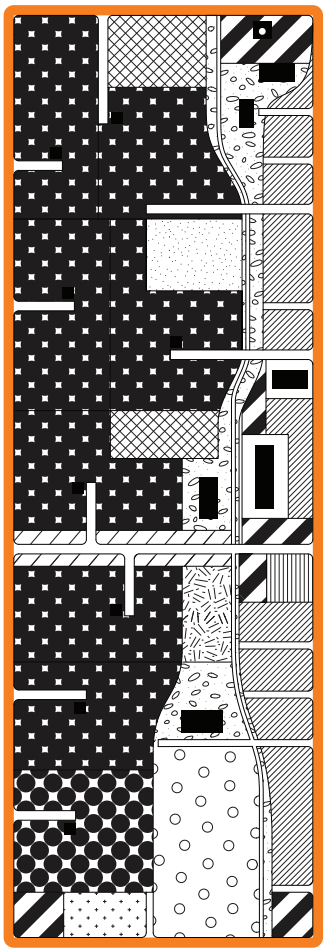
2035

Population: 40,494
Pop/ha: 337
Units total: 8436
Informal units: 4,790
Formal units: 3,646



2040

Population: 42,588
Pop/ha: 355
Units total: 8872
Informal units: 5,050
Formal units: 3,822



2045

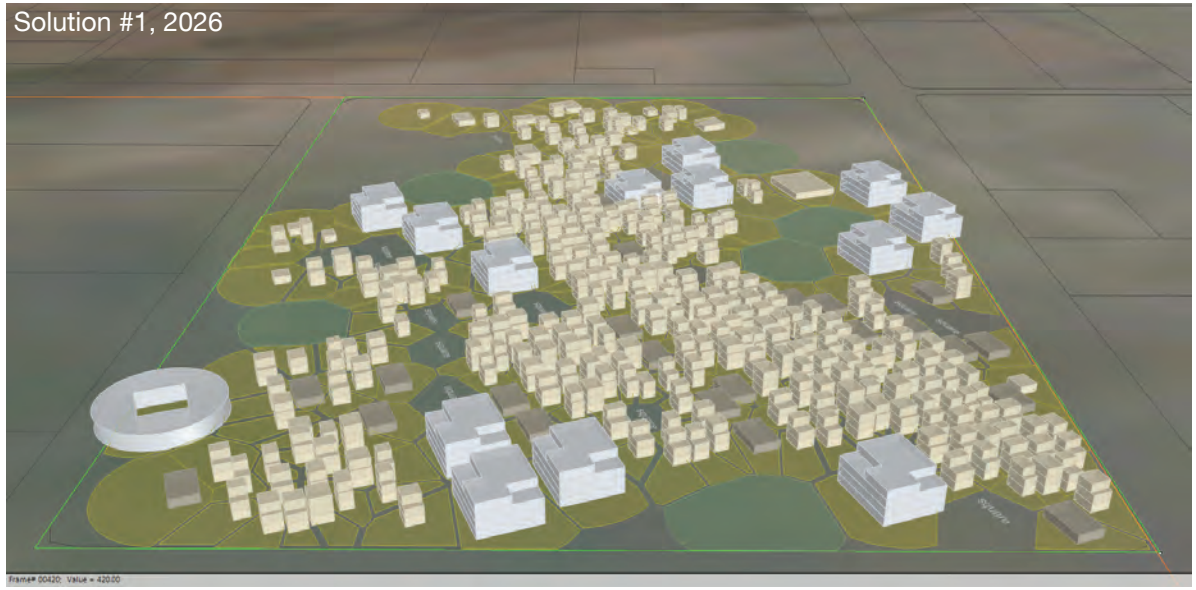
Population: 45,005
Pop/ha: 375
Units total: 9376
Informal units: 5,050
Formal units: 4,326

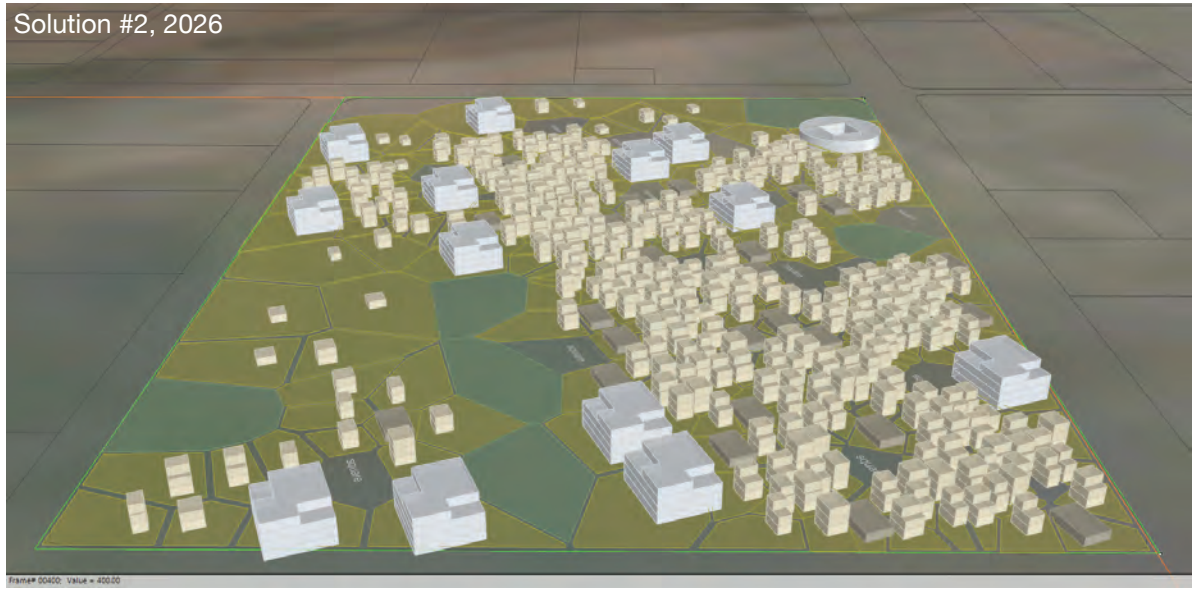
MICRO STRATEGY RULE SET OF GROWTH ON NEIGHBOURHOOD LEVEL

The *Micro Strategy's* purpose is to ensure an orderly colonization and upgrading process within the designated receptor patches. The method is the provision of a rule set - like a building code, but reduced to a minimum amount of rules: As little rules as possible but as many as necessary to ensure a reasonable settlement and consolidation process that allows for the emergence of a functioning urban neighbourhood. In practice, the implementation of these principles would work as follows: At the very beginning, newcomers with the intention of settling are made acquainted with the rule-set. This can happen as easily as simply handing out a sheet of paper (one sheet A4, printed on both sides) or via an App. Those settlers that stick to the rules, will later have the opportunity to legally connect to the city's infrastructure network and become a full formal citizen. (Presumably it could be much harder to unnoticedly wiretap the public grid of future smart cities than before.) This positive perspective, will very likely encourage the settlers to follow the provided protocol of settlement. The envisioned scenario is a win-win situation for both, the city, which steers against the emergence of marginal settlements by providing a favourable alternative to the very poor and the builder-residents, which are occupying land almost as usual, but legally.

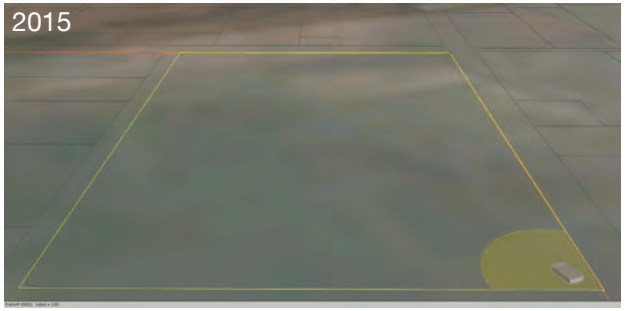
code simulating urban infill on receptor patches

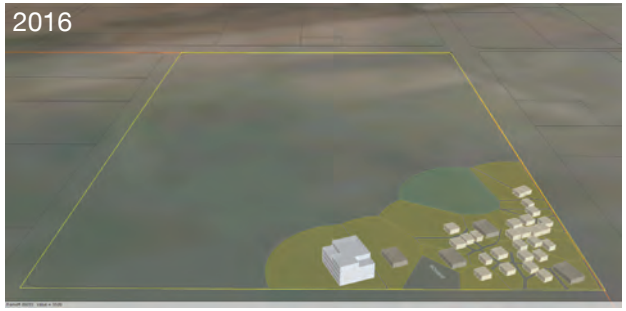
Receptor Patch - Solutions: #1 and #2 (first experiments, May 2015)

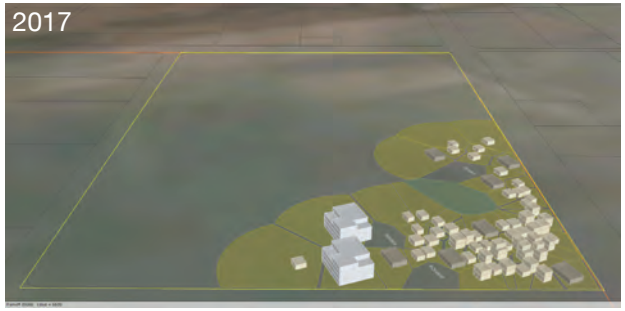


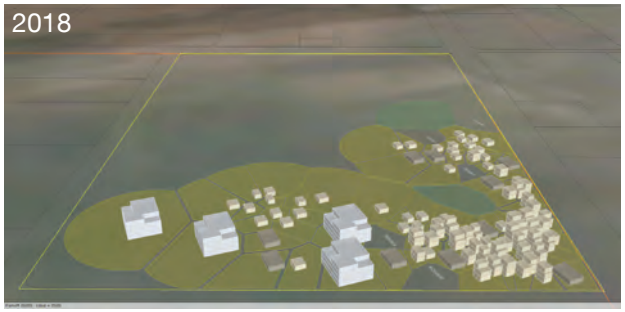


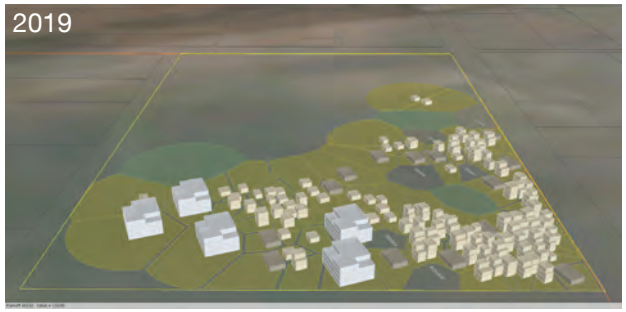
Receptor Patch - Solution: #3 (first experiments, May 2015)

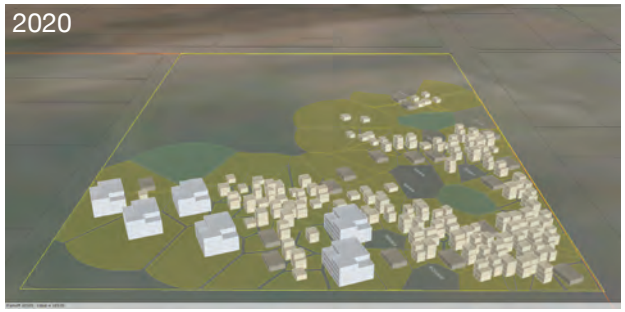


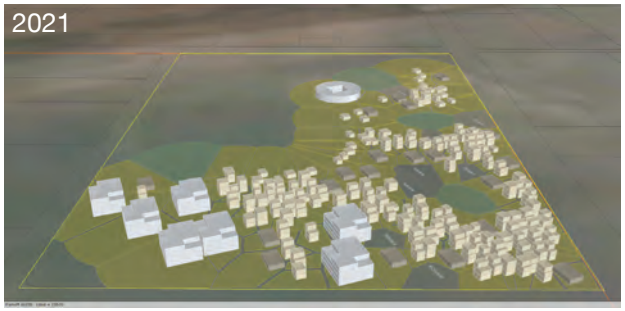


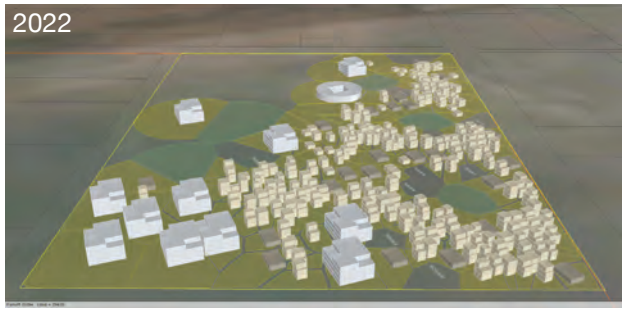


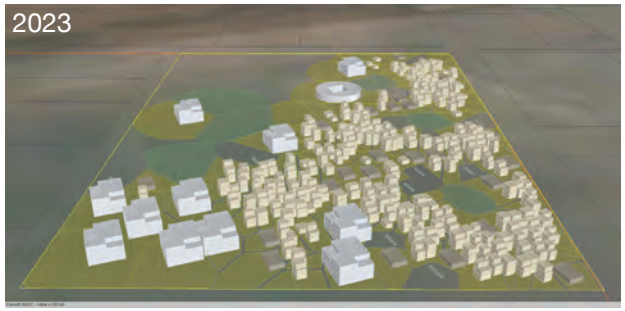


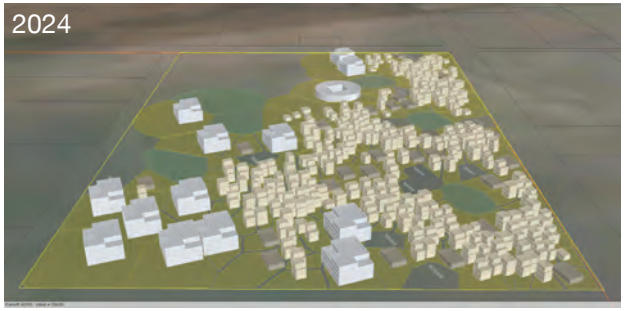




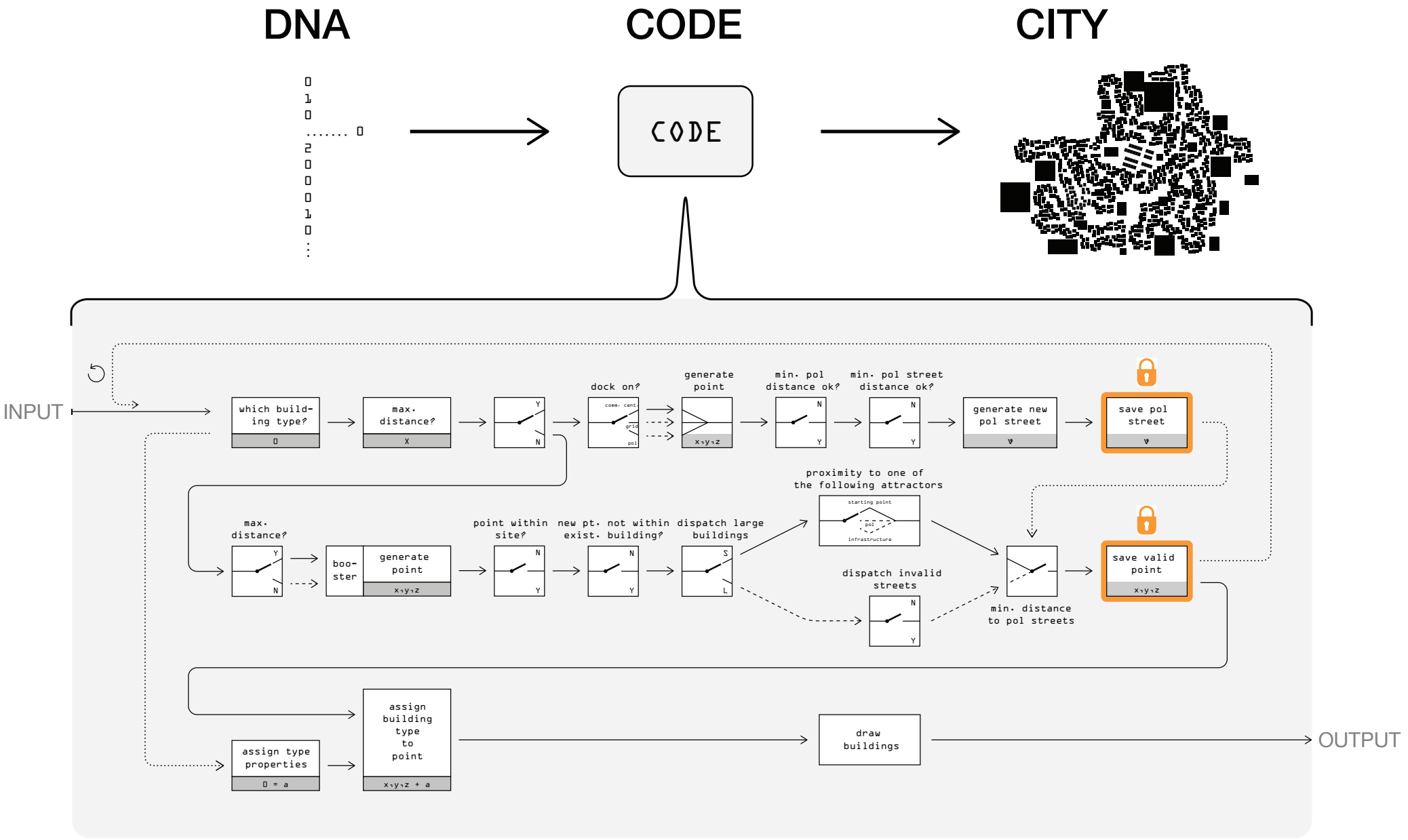








As the rule-set described on the previous pages consists of a series of simple instructions, it is suitable for being translated into a computer code; A code that is not only capable of showing us the resulting urban environment that would occur if the settlers followed the proposed rule-set, but also of simulating the whole upgrading process. On the next page you can find a simplified diagrammatic description of its mode of operation. Most codes require data (parameter) input. In this case, the required data is represented by a numeric string of several hundred digits. The numeric string is actually a sequence of smaller numbers and contains the complete programmatic information regarding the desired self-build neighbourhood. These numbers are interpreted by the actual script (which is constructed as a black box) and translated into a four-dimensional urban arrangement. On this way an infinite number of neighbourhoods can be generated and examined; everyone different and unique, but as they are derived from the same DNA and processed by the same algorithm, nevertheless holding a certain degree of quality.


DNA
CODE
CITY
0
1
0
..... 0
2
0
0
0
1
0
CODE
INPUT
which build-ing type?
0
max. distance?
X
dock on?
generate point
x,y,z
min. pol distance ok?
min. pol street distance ok?
generate new pol street
v
save pol street
v
proximity to one of the following attractors
starting point
pol
infrastructure
max. distance?
boo-ster
generate point
x,y,z
point within site?
new pt. not within exist. building?
dispatch large buildings
S
L
dispatch invalid streets
min. distance to pol streets
save valid point
x,y,z
assign type properties
0 = a
assign building type to point
x,y,z + a
draw buildings
OUTPUT

Possible catalogue of urban rules on neighbourhood level

PURCHASE

1

Plots are sold separately to different individuals only. Exceptions are possible.

NUMBER OF INF. UNITS

1250

The maximum number of informal housing units is limited to 1250 per per patch.

NUMBER OF FORM. UNITS

378

Additionally there have to be 30% formal housing units within the patch.

TOTAL AREA

7,35(ha)

One 'Receptor Patch' has a total area of:

SIZE (INFORMAL PLOT)

30-40m²

The size of plots dedicated for the erection of an incremental housing unit varies between:

WIDTH (INFORMAL PLOT)

>4,2m

No side of the plot must be shorter than 4,2m.

ACCESS

Each building must have direct access to the road and its integrated infrastructure network (water, electricity, sewage, power, ICT).

LIGHT

2

Each building must have at least two open facades to guarantee natural light from two sides and cross-ventilation.

MIN. DISTANCES

3m

Buildings have to keep certain min. distances to other urban components depending on its height.(Single informal dwellings typically 3m.)

DEAD ENDS

Houses must not create dead ends on roads of Category I,II,III and IV (until the full capacity of the associated sewage syst. is reached).

PLOT COVERAGE (INF.)

75%

Informal buildings may occupy a maximum of 75% of the plot area.

PLOT COVERAGE (FORM.)

40%

Formal buildings may occupy a maximum of 40% of the plot area.

FORMAL OPEN SPACE

100%

of the open space within formal (real estate) projects has to remain public.

PERMEABILITY

50%

of the open plot surface has to be made of permeable materials.

AANGANWARIS

x2

For every 400 increment. housing units erected, 1 Aanganwari has to be built. (0,02ha)

FORMAL HOUSING PROJ.

x4

For every 250 increment. housing units erected, 1 form. housing proj. is built.

NEIGHBOURHOOD PARK

x1

For every 250 increment. housing units erected, 1 neighbourhood park is built. (0,8ha)

NURSERY

x1

For every 250 increment. housing units erected, 1 nursery is built. (0,02)

TAXI & THREE-WHEELER

x1

For every 1250 increment. housing units erected, 1 rickshaw & taxi stand has to be built.(0,02ha)

RELIGIOUS CENTRE

x2

For every 417 increment. housing units erected, 1 religious centre has to be built.(0,2ha)

OTHER COMM. FACILIT.

x1

For every 625 increment. housing units erected, 1 'Other Community Facility' has to be built. (0,02ha)

PRIMARY SCHOOL

x1

For every 625 increment. housing units erected, 1 Primary School has to be built.(1,00ha)

SQUARE

x40

For every cluster (~31 increm. housing units), 1 small (semi-)public square has to be built. (0,15ha?)

DOCKING

The infrastructure network can either be extended by docking on the existing formal GRID, the COMM. CENT. (HUB I, max. x8), or at an already established POL (HUB II, max. x4)

PLOT LOCATION

40m

An increment. housing unit may only be built within a certain radius around HUB II (center of POL).

INFRASTR. EXTENSION

All sewage construction work is DIY. (except comm.cent. - publ.grid and formal projects)
If all docking stations (HUB II) are engaged, a new POL (incl. HUB II) has to be established.

REMAINING LAND

is turned into public green space or private gardens.

STREET CATEGORIES

I: car, pub.transp.
II: car, bicycle
III: car, bicycle
IV: car, bicycle
V: pedestr, bicycle

INCREMENTAL HOUSING TYPOLOGIES

The strategy allows and encourages the use of all different kinds of reasonable incremental housing schemes.

FACILITATORS

The whole process of settlement and consolidation is steered and guided by a group of experienced professionals.

PUBLIC BONUS

0,5

In exchange for public space, buildings can exceed the height regulations to a maximum of 0,5 of the FAR.

FAR (INFORMAL)

2,6

The maximum FAR of single incremental dwellings is limited to:

PATCH CLUSTERING

A building / function may only be situated adjacent to pre-existing components (considering min. distances)

SHARED WALLS

Buildings should share walls with existing buildings if possible.

MORPHOLOGY OF ALLOTMENT

The street / infrastruct. network can form a grid (rectangular), but does not have to necessarily.

FAR (FORMAL)

2,6

The maximum FAR of formal buildings is limited to:

DIY GROUND OPENING

The ‘POI settlers’ are responsible for creating a road track with infrastructure to their POI together.

INDIVIDUAL HOOKUP

Every single dweller is responsible for the establishment of his own connection to the public infrastructure system. Every dweller can connect when he’s ready to.

HEIGHT (INFORMAL)

13m

Single informal dwellings, may not exceed a height of 4 storeys or:

HEIGHT (FORMAL)

20m

Formal buildings may not exceed a height of 6 storeys or:

RIGHT TO STAY

100

Newcomers get the right to stay for 100 years. And the prerogative to buy the plot, but with consequence of full service charges

CUT RATE

In the time between connecting to the public infrastructure network and purchase of the inhabited plot:
cut-rate prices for public services

REVENUE

The more people own a plot, the more pay taxes. Tax revenues are used to improve the public realm and infrastructure network.

SPECULATION

Speculation in informal premises is not allowed!

REVENUE FROM REAL ESTATE PROJECTS

Real estate project developers are in charge of providing high standard public allotment (public realm).

ADAPTATION

If necessary, the DNA of the settlement can be extended or fine-tuned when applied on other cities to fit the local requirements.

...

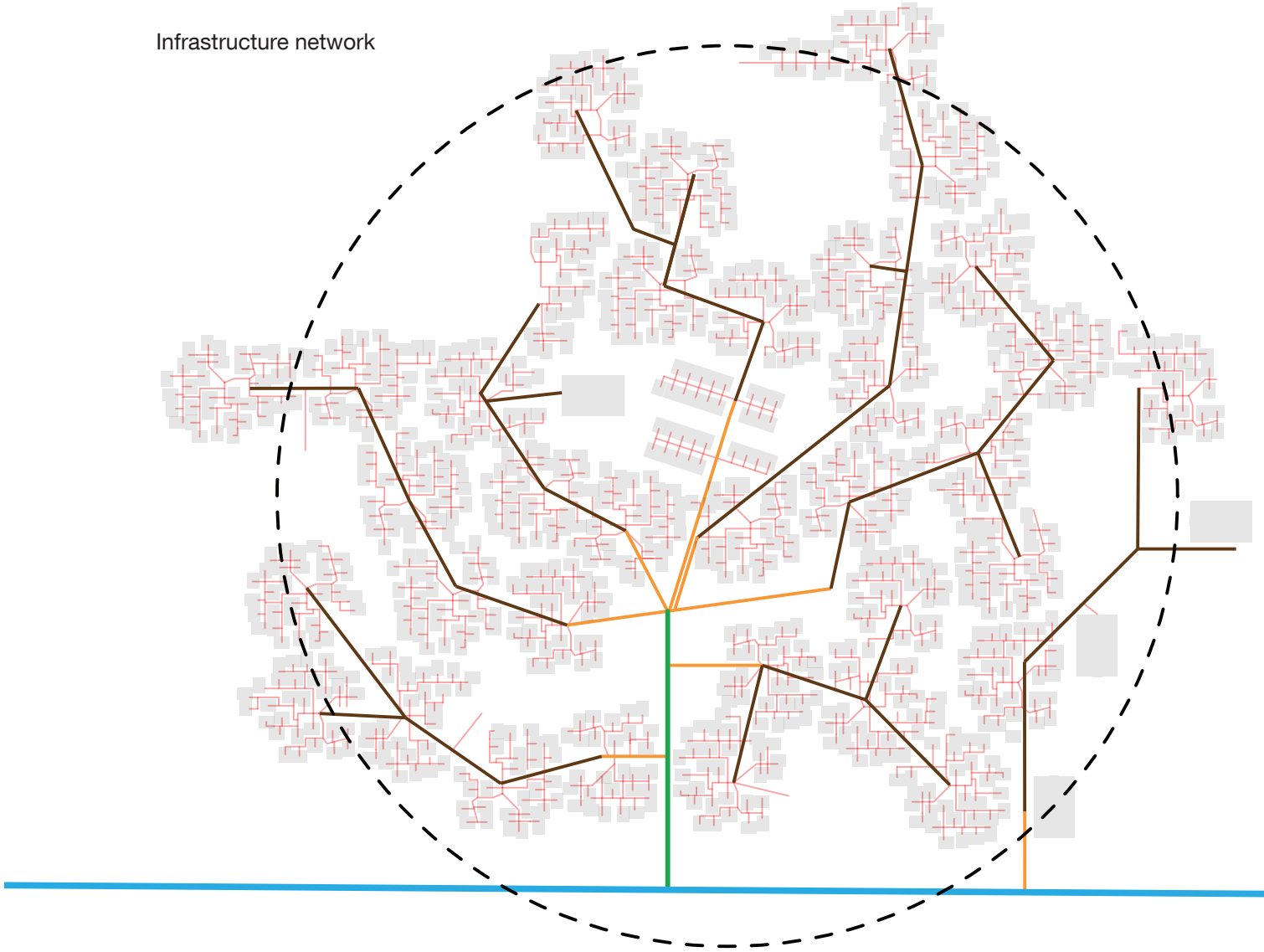
...

ROAD / SEWAGE SYSTEM

Introducing hierarchy

The pattern of urban growth on neighbourhood level : The urban development area “Field #1” contains eight neighbourhoods á 1250 informal housing units (by default). The algorithm providing a framework for the urban growth and defining the morphology of these neighbourhoods is based on the growth of a branching sewage system, simultaneously constituting a basic road network. A hierarchy of five categories is introduced, enabling each and every housing unit to get access to the sewage, water, electric, ICT and road system. This is one of the key requirements necessary to enable the project development area to transform into a full-fledged district, featuring all amenities a formal city district usually offers.

Infrastructure network



ROAD AND SEWAGE SYSTEM

Category	Description	Capacity	Traffic type	Max. Branches	Width (h=10 or 12)
I	Formal sewage and road grid	-	Pedestrian, car, bicycle, public transport	-	30 - 65 m
II	Streets and sewers connecting Community Center to Cat. I	1250 units	Pedestrian, car, bicycle	8	15 m
III	Streets and sewers connecting Pols to Community Center	156 units	Pedestrian, car, bicycle	4	8,0 -10,0 m
IV	Streets and sewers connecting Pols	125 units	Pedestrian, car, bicycle	31	4,8 - 5,7 m
V	Streets and sewers connecting within Pols	1 unit	Pedestrian, bicycle	0	2,4 - 2,9 m

ROAD / SEWAGE SYSTEM

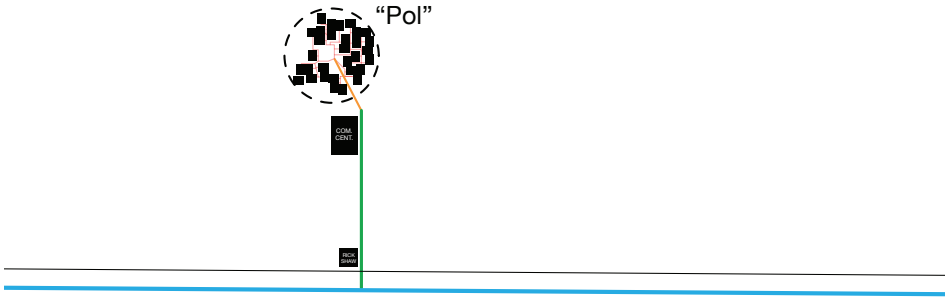
Introducing hierarchy

(Photo by Markus Tomaselli)

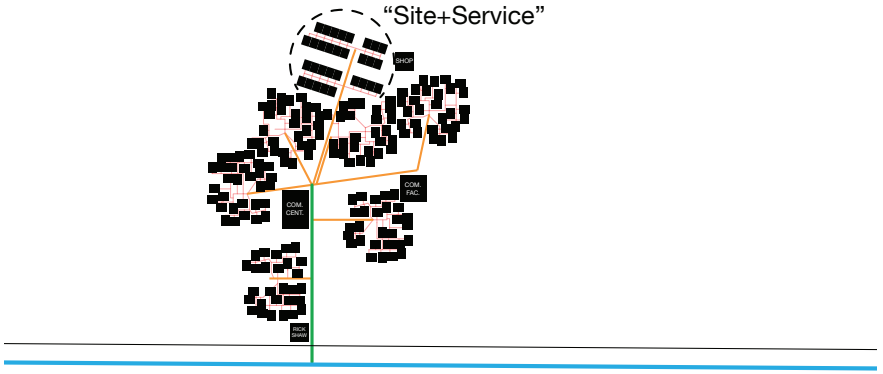
Sewage hub on Pol-square
(max. 4 extensions, max. ~31 branches)

GROWTH SIMULATION “PUR”

2015

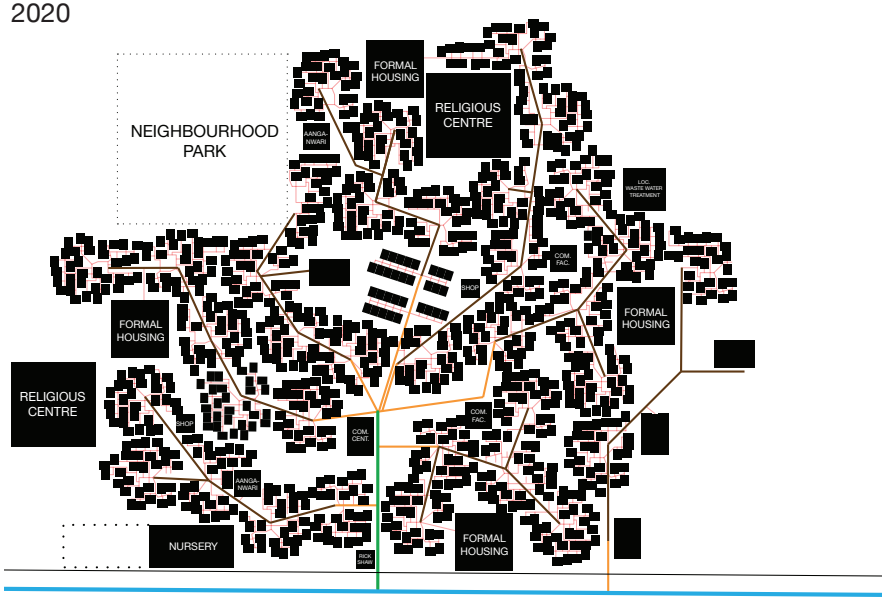


2016



2017

2020



Typical Neighbourhood “PUR”

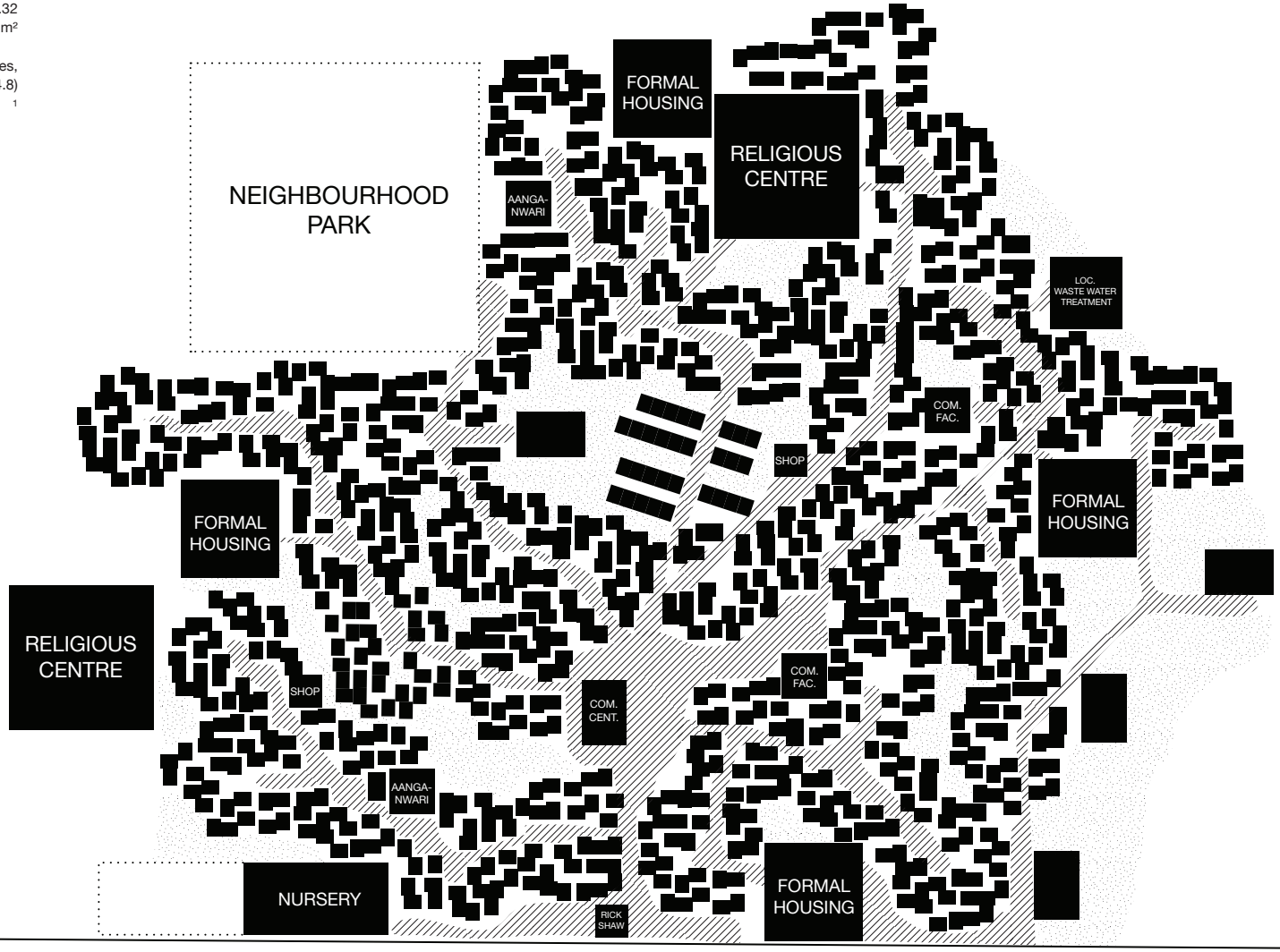
Status of Consolidation, 2025

Site Area: 6.94 ha
Population: 4,637 (4,234 informal + 403 formal)
Housing Units: 966 (882 informal + 84 formal)
Density (FAR): 1.08
Population Density: 668 pph
Housing Density: 139 dph
Total Gross Floor Area (GFA): 75,256 m²
Site occupation Ratio: 0.32
Target carpet area per resident: 11 m²

(all numbers are average figures, average household size in Gujarat: 4.8) [1]

Comparison [2, 3]

	Grand Str., Manhattan	Dharavi, Mumbai	Prinzgasse, Vienna
Density (FAR):	3.50	2.00	1.01
Population Density:	541 pph	3148 pph	-
Housing Density:	148 dph	630 dph	-



1 http://dhsprogram.com/publications/publication-frind3-dhs-final-reports.cfm (07.01.2016)
2 http://densityatlas.org/ (07.01.2016)
3 Dietmar Eberle, Eberhard Tröger, Dichte Atmosphäre, Über die bauliche Dichte und ihre Bedingungen in der mitteleuropäischen Stadt., Birkhäuser, Basel, 2015, p. 339ff.

CHAPTER V
Result

POSSIBLE SCENARIO
DHOLERA, FIELD #1

In this chapter, finally, the macro strategy and the micro strategy are braught together. Applied on Dholera's previously introduced Field #1, one possible scenario is illustrated. On the basis of seven sequences á five years, the urban develeopment process of the prospective self-built-district is illustraten on the following pages.

As mentioned before, the *macro strategy's* main purpose is to structure the site and reserve public space for future needs, by dividing it into patches and corridors. Whereas, the *micro strategy* provides a ruleset for the erection of the self constructed neighbourhoods, being established in-between the provided framework.

In this specific case study, the site is basically divided into three stripes (red, green, orange). The green corridor in the middle acts as mediator between the formal *attractor corridor* (red) in the East and the self-settled *receptor patches* (orange) in the West. The green corridor can be characterised as neutral, yet common ground; an intermediary area, accommodating various public facilities, acting as stewards and serving both, the formal as well as the self-constructed city. This green zone manages the transition between the busy high-access-corridor (red) and the self-constructed residential areas (orange). A series of transformative patches and public squares is arranged along this green promenade; at first predominantly addressing the needs of the semi-informal settlers, but then as the district matures, they are being more and more formalised, interlocking the self-constructed district with its formal urban environment.

Connecting both types of fundamentally different urban areas, the green zone acts as urban glue. But in order to counteract undesirable occupation, it acts as a distinct boundary as well.

ATTRACTOR CORRIDOR

PROTECTOR CORRIDOR

TRANSFORMER PATCHES

RECEPTOR PATCHES

STEWARDS

"THE GREEN ZONE ACTS AS URBAN GLUE, BUT ALSO CONSTITUTES A DISTINCT BOUNDARY."

Colour code and urbanistic references used on the following pages:

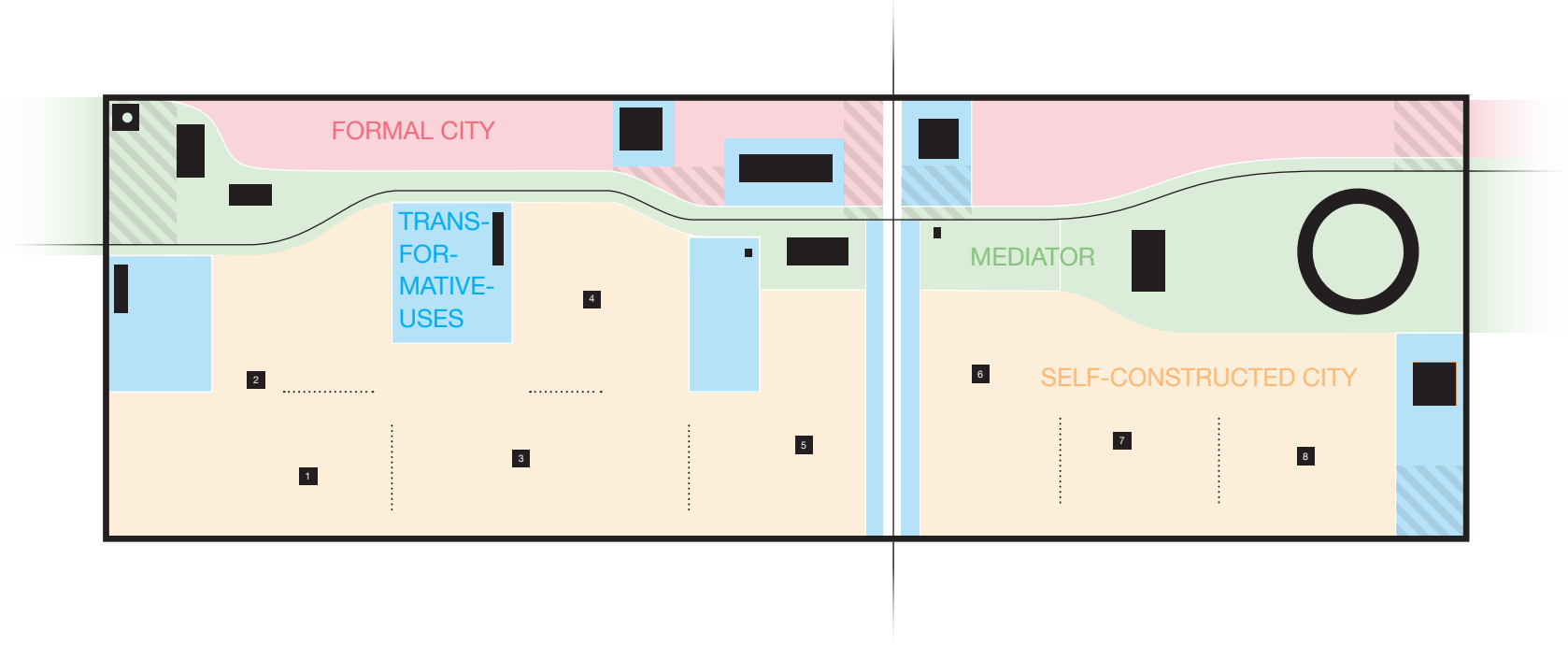
1:10000

Reference = Michigan Avenue, Chicago

High Access Corridor

Reference = Nostrand Avenue, Brooklyn, NY

Residential Area



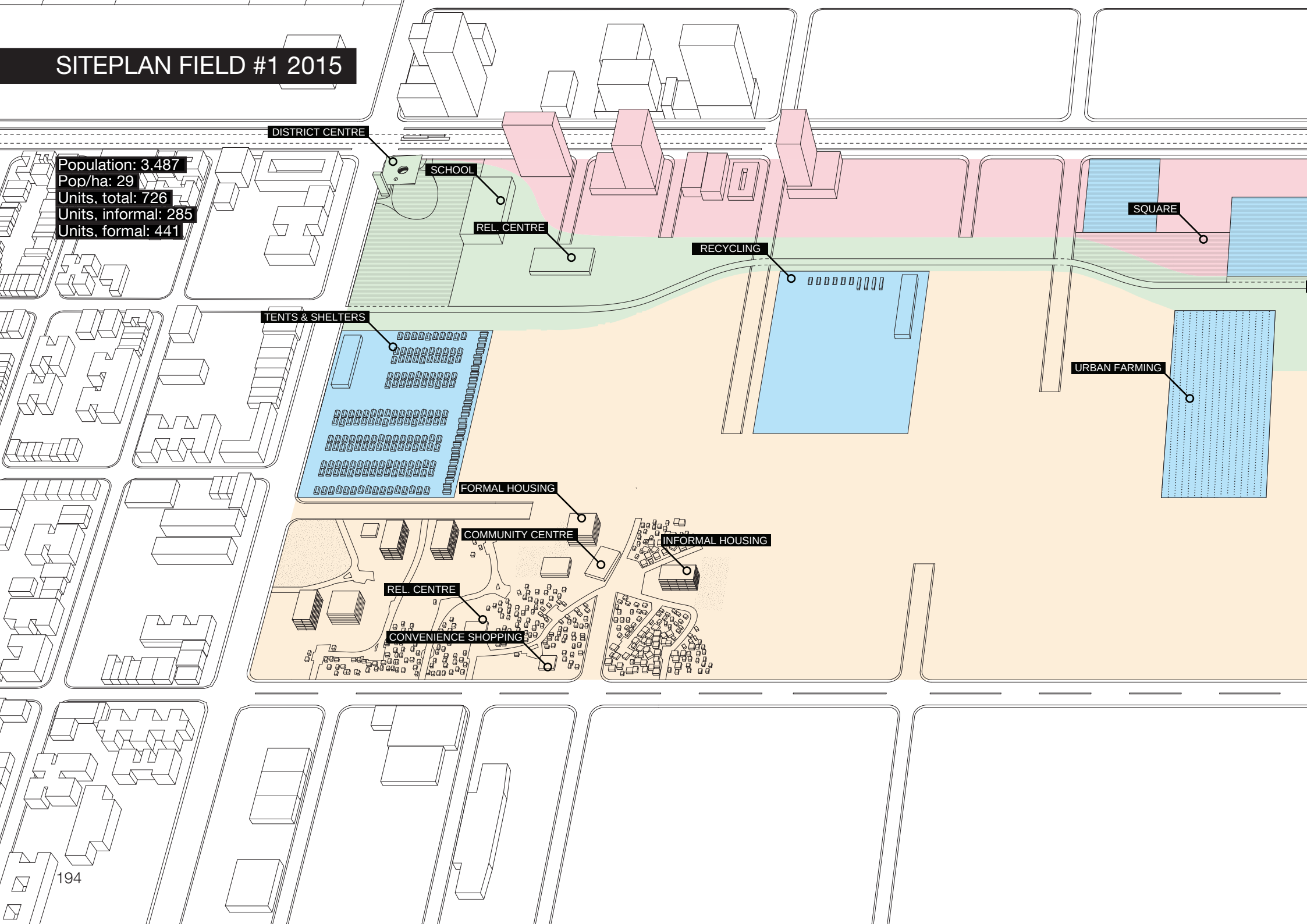
High Access Corridor

Grand Street, Manhattan, NY

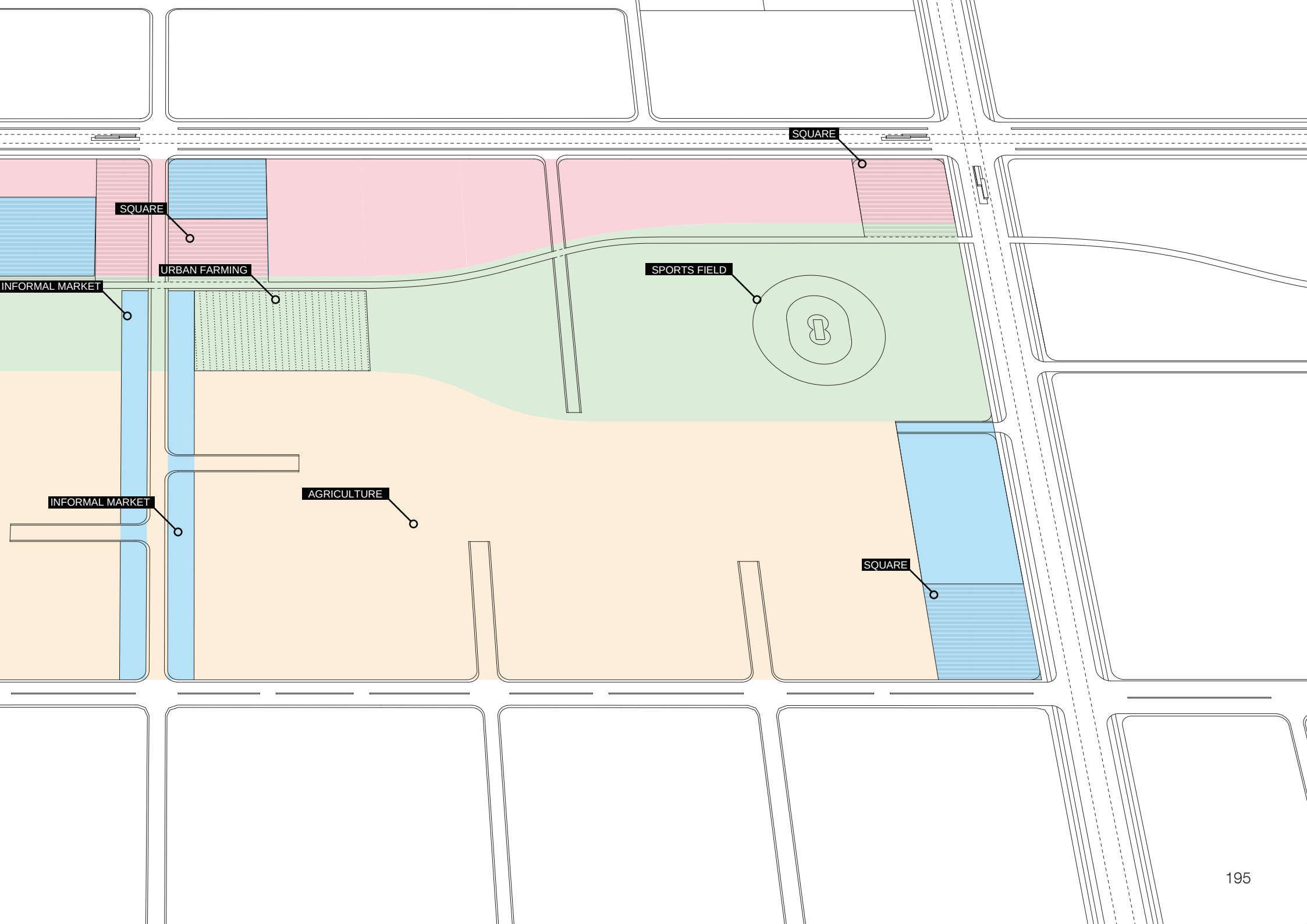
Residential Area

Reference = Nostrand Avenue, Brooklyn, NY

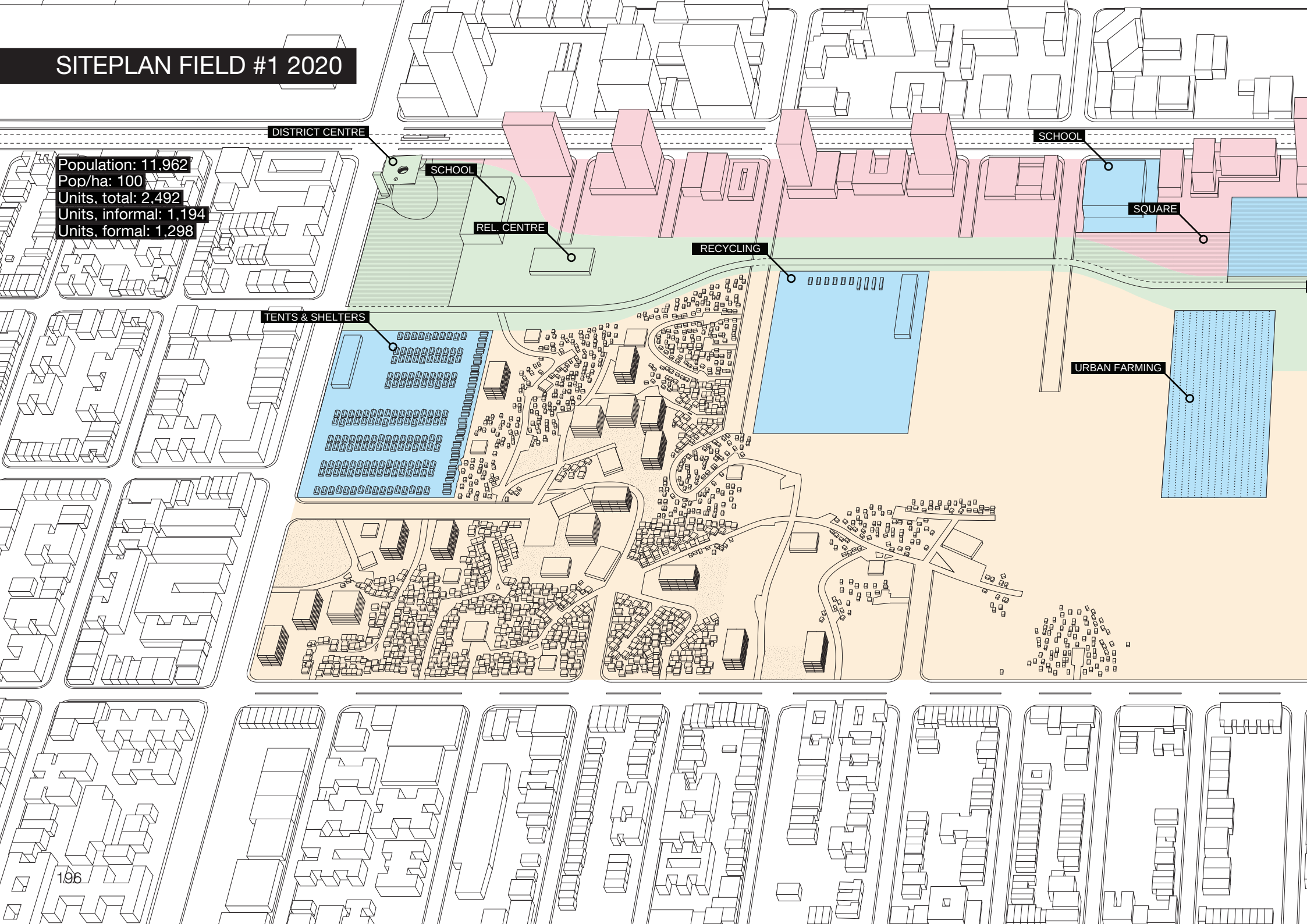
SITEPLAN FIELD #1 2015



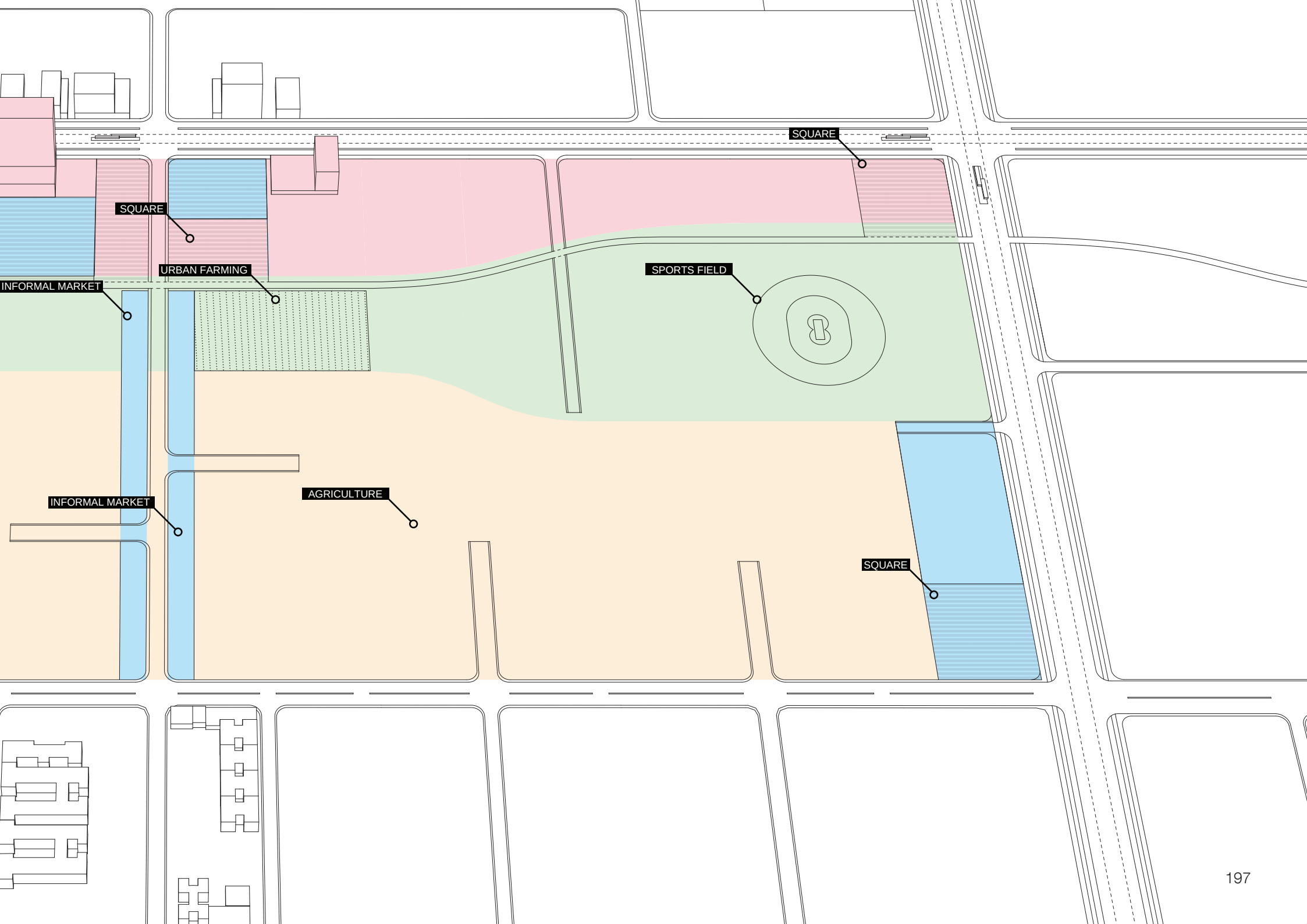
Population: 3,487
Pop/ha: 29
Units, total: 726
Units, informal: 285
Units, formal: 441


SQUARE
SQUARE
URBAN FARMING
INFORMAL MARKET
SPORTS FIELD
INFORMAL MARKET
AGRICULTURE
SQUARE

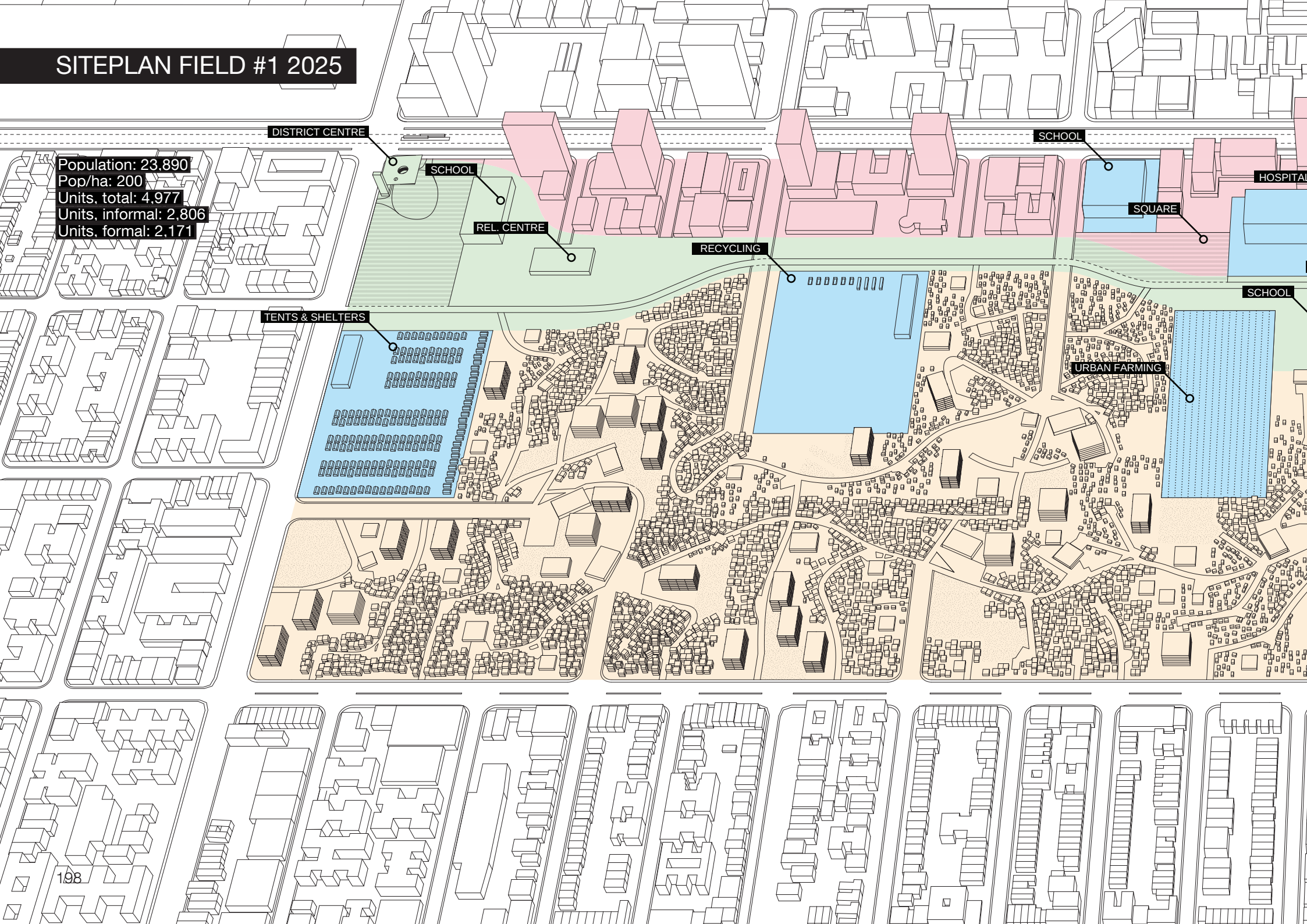
SITEPLAN FIELD #1 2020

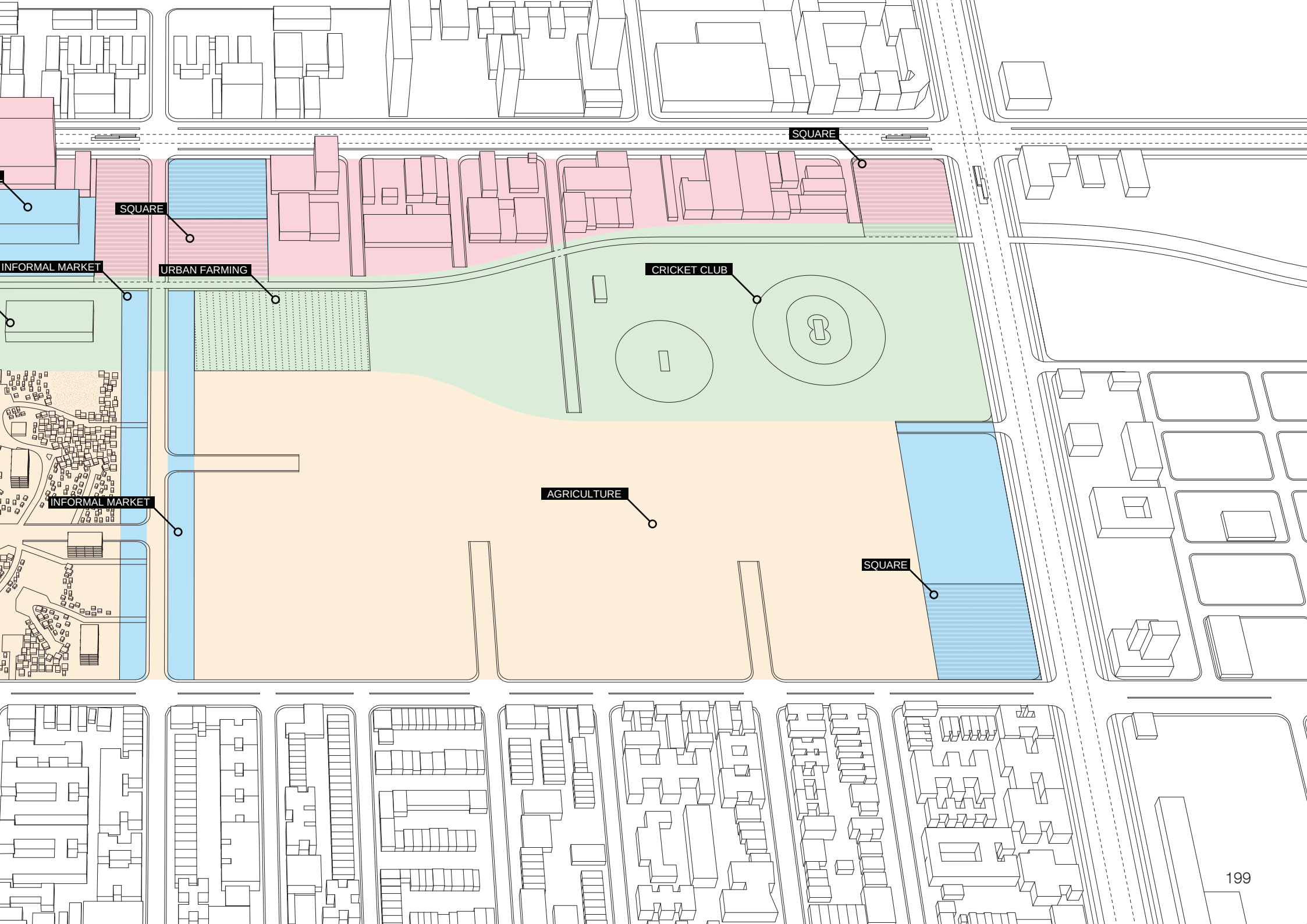


Population: 11,962
Pop/ha: 100
Units, total: 2,492
Units, informal: 1,194
Units, formal: 1,298

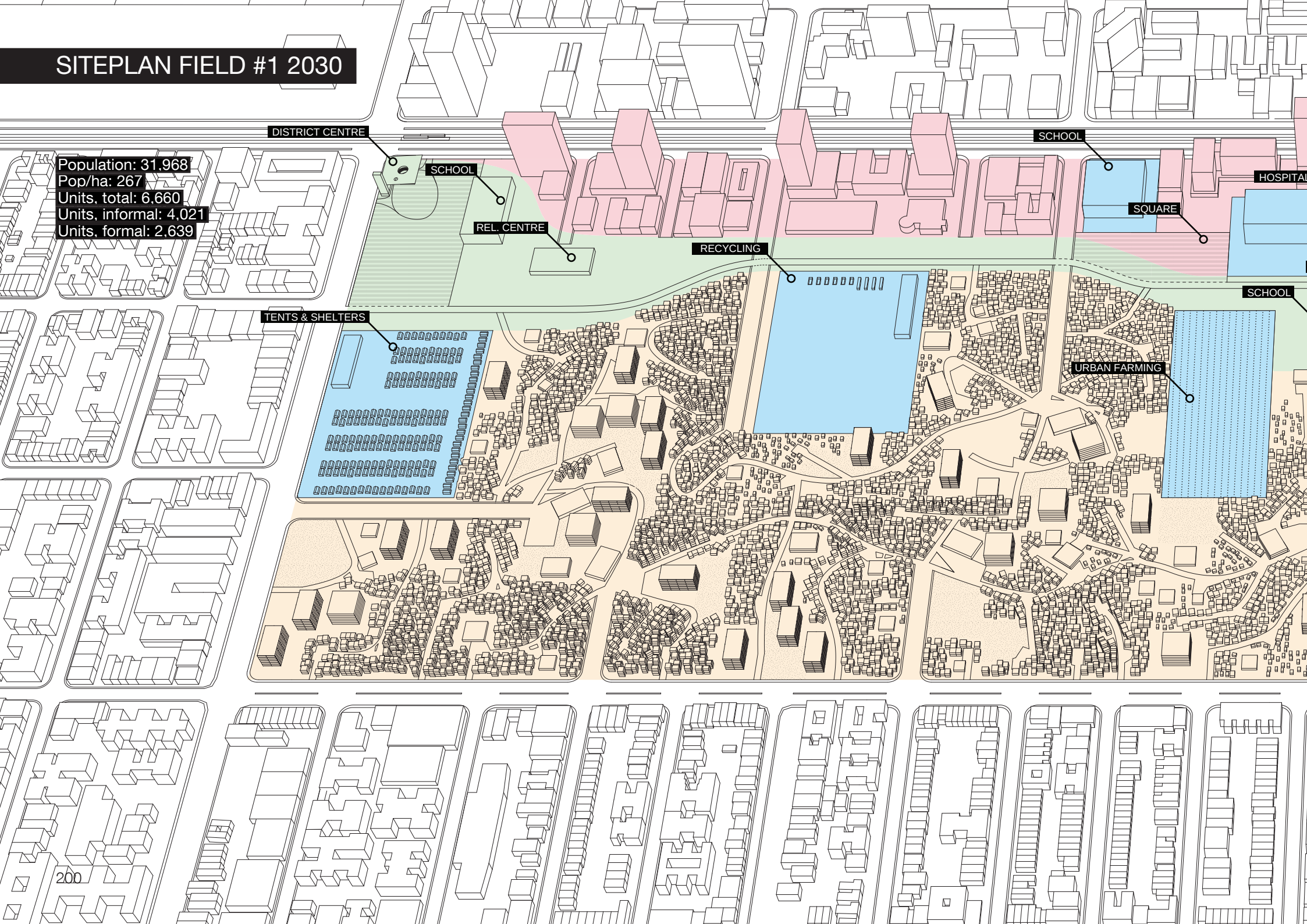

SQUARE
SQUARE
URBAN FARMING
INFORMAL MARKET
SPORTS FIELD
INFORMAL MARKET
AGRICULTURE
SQUARE

SITEPLAN FIELD #1 2025



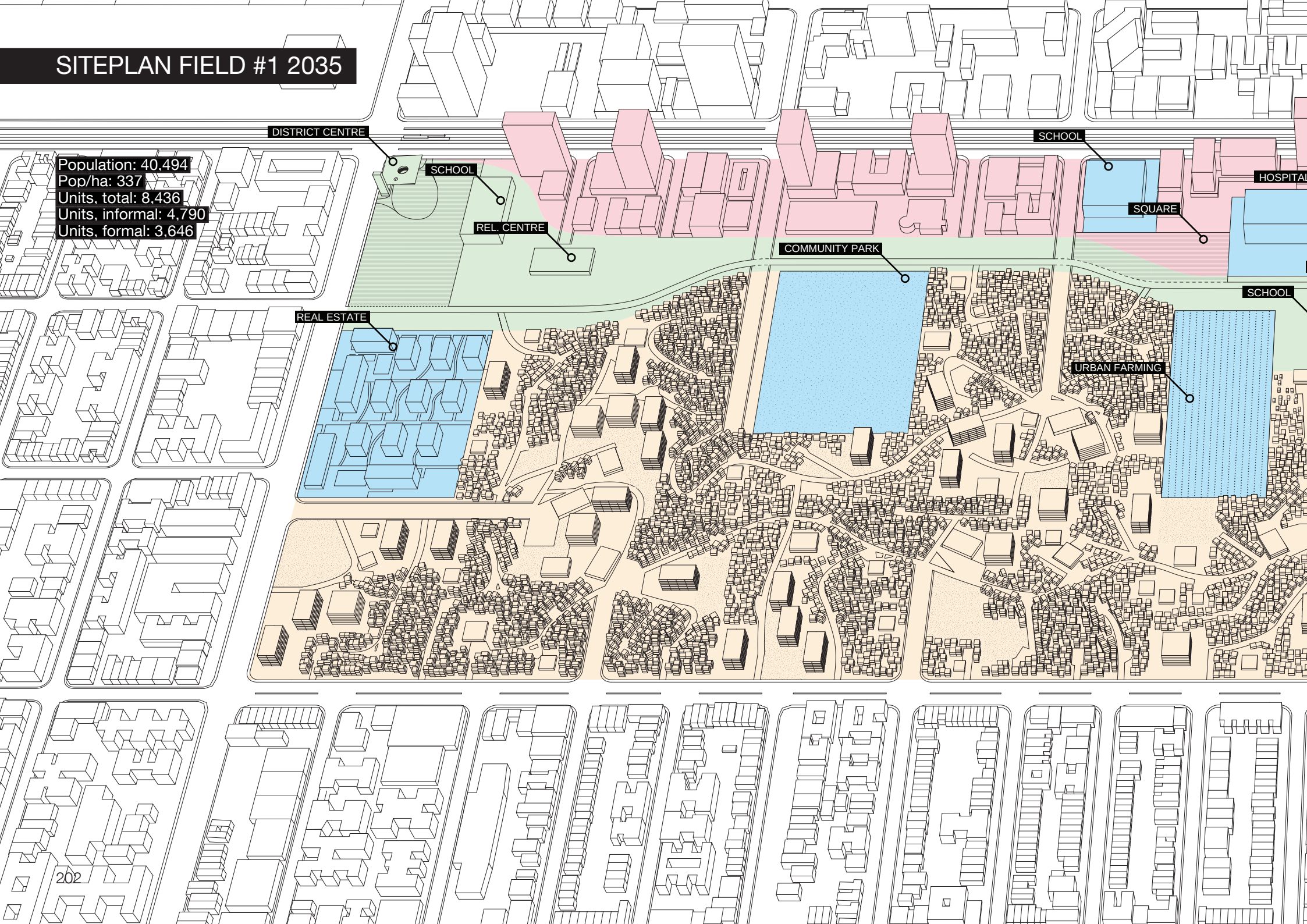

SQUARE
SQUARE
INFORMAL MARKET
URBAN FARMING
CRICKET CLUB
INFORMAL MARKET
AGRICULTURE
SQUARE

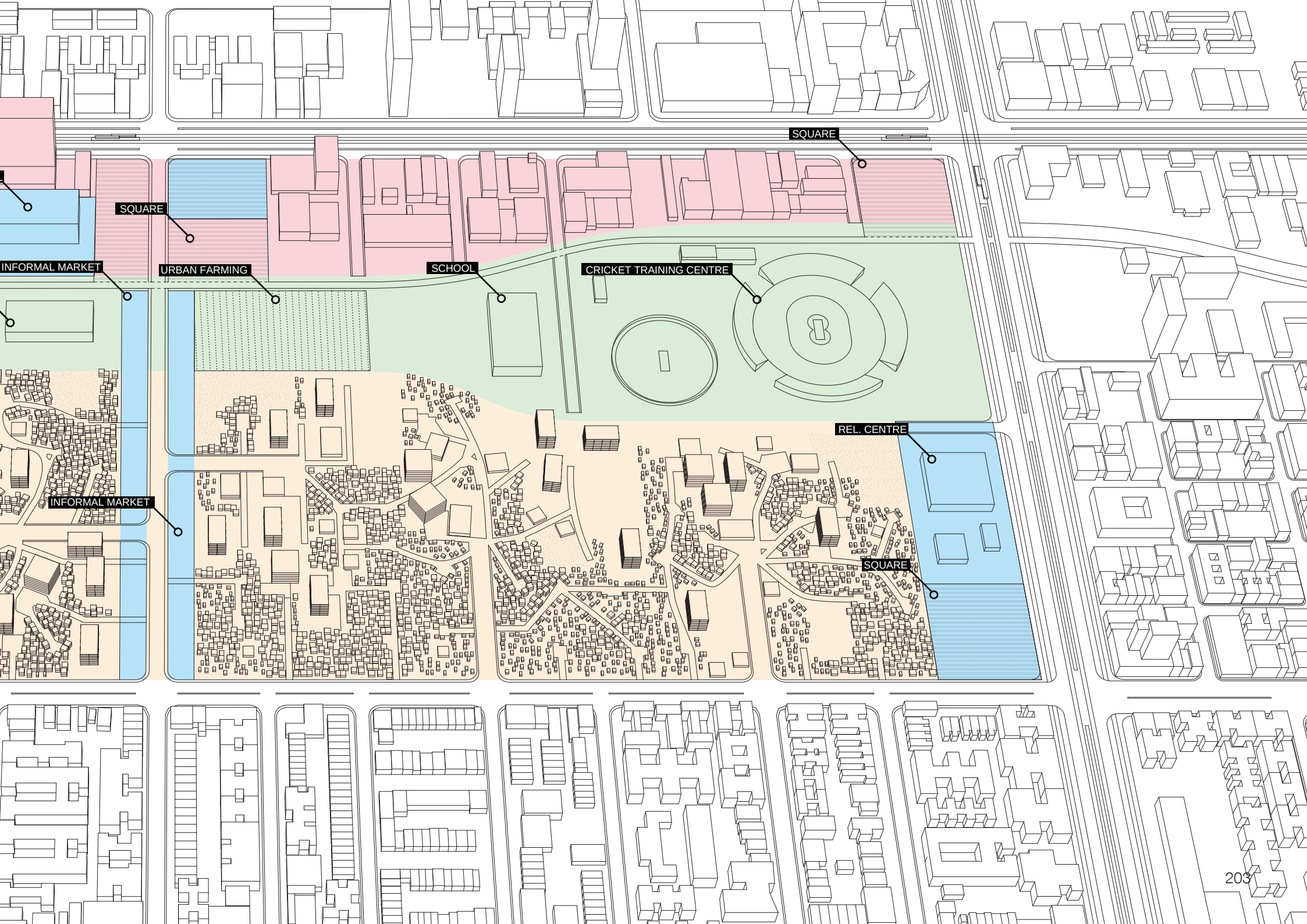
SITEPLAN FIELD #1 2030



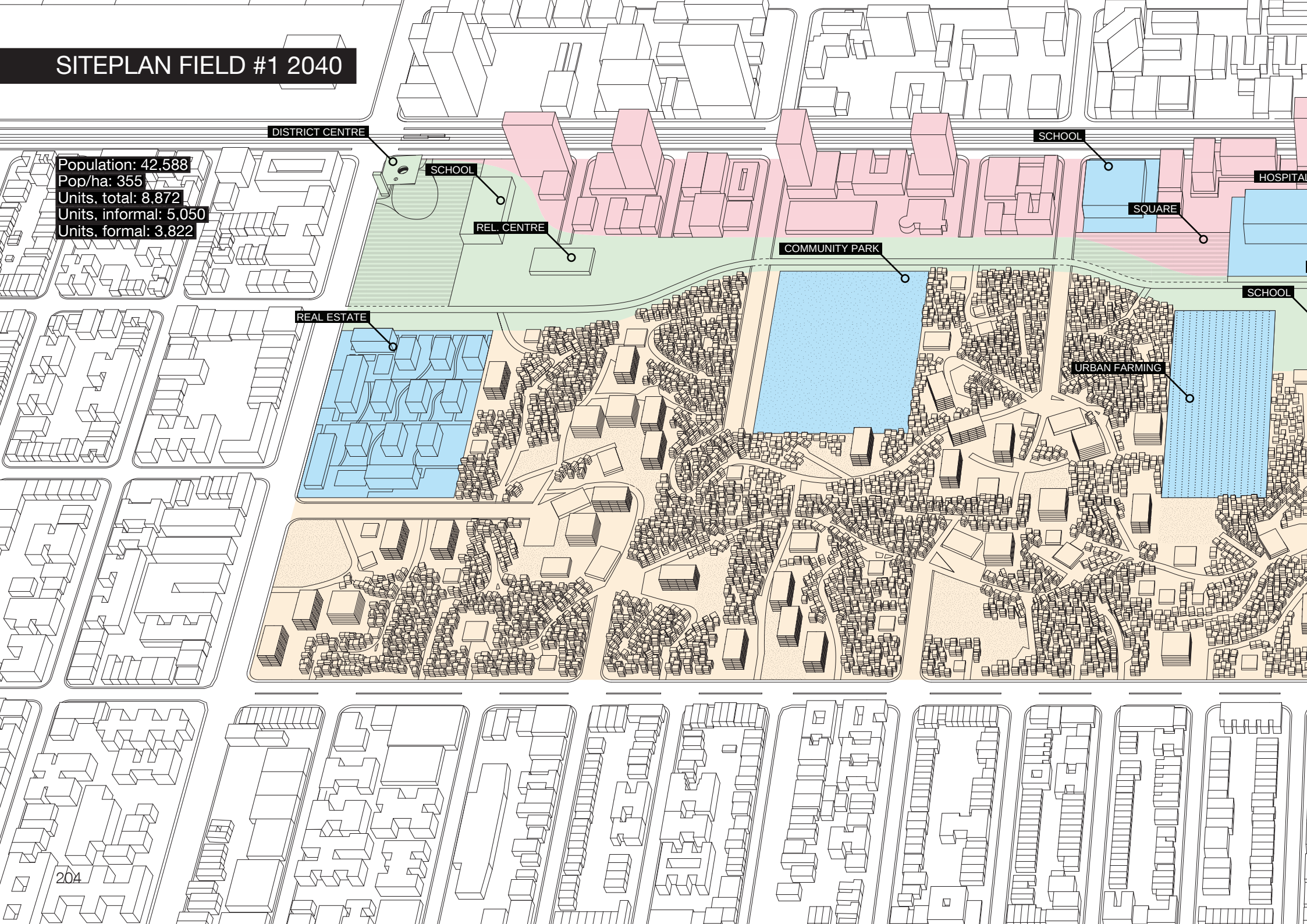

SQUARE
SQUARE
INFORMAL MARKET
URBAN FARMING
SCHOOL
CRICKET CLUB
REL. CENTRE
INFORMAL MARKET
AGRICULTURE
SQUARE

SITEPLAN FIELD #1 2035



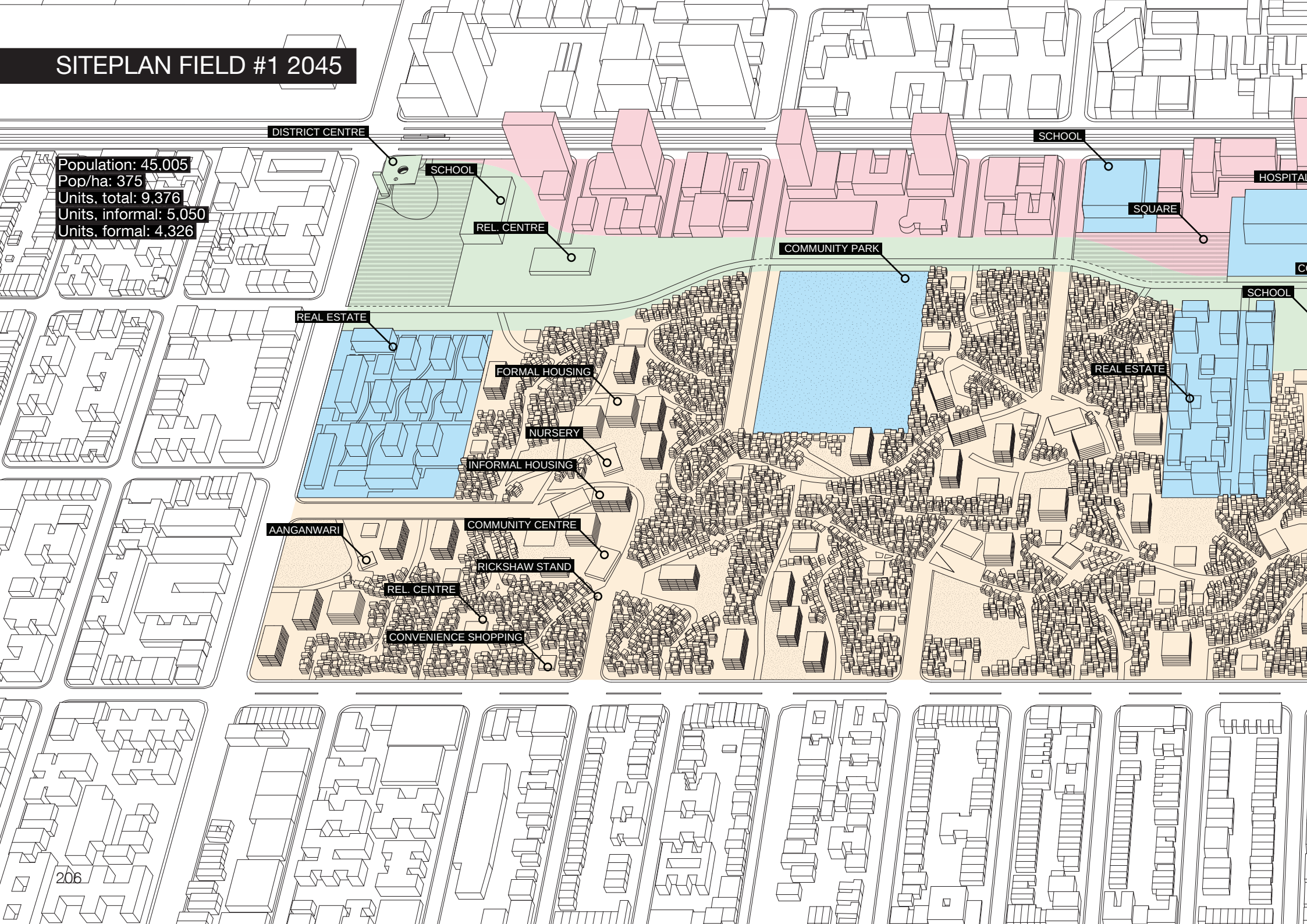

SQUARE
SQUARE
INFORMAL MARKET
URBAN FARMING
SCHOOL
CRICKET TRAINING CENTRE
REL. CENTRE
INFORMAL MARKET
SQUARE

SITEPLAN FIELD #1 2040




LIBRARY
SQUARE
SQUARE
INFORMAL MARKET
URBAN FARMING
SCHOOL
CRICKET STADIUM
REL. CENTRE
INFORMAL MARKET
SQUARE

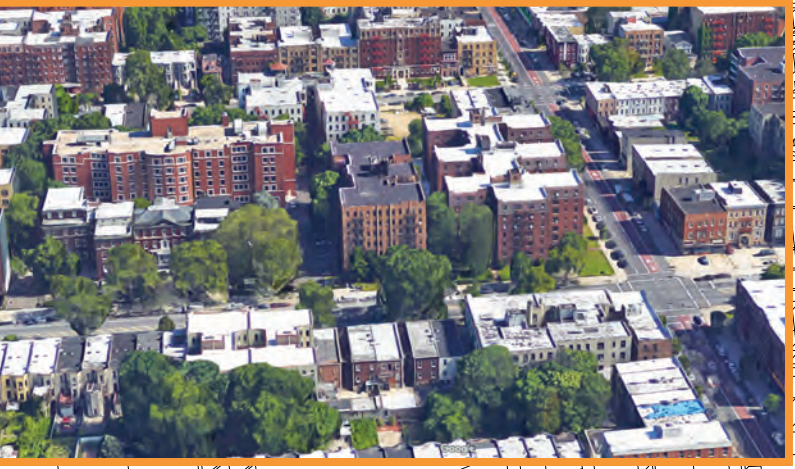
SITEPLAN FIELD #1 2045



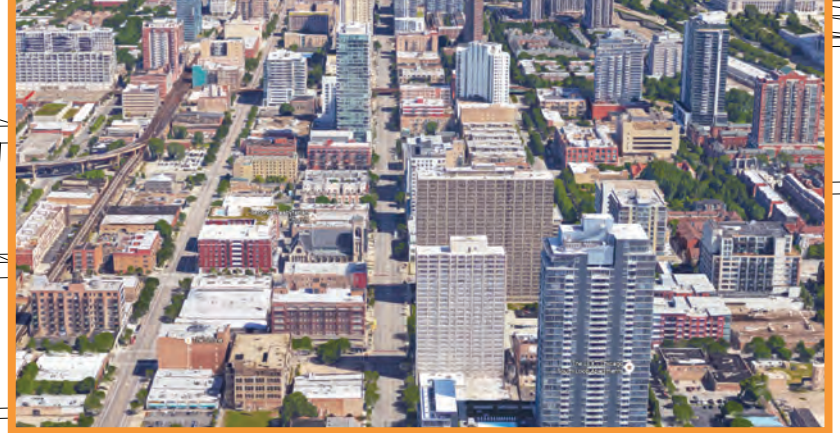

LIBRARY
SQUARE
SQUARE
OMMUNITY MARKET
URBAN FARMING
SCHOOL
CRICKET STADIUM
REL. CENTRE
COMMUNITY MARKET
SQUARE

PERSPECTIVE FIELD #1

Reference, Residential Area: Nostrand Avenue, Brooklyn, NY



Reference, High Access Corridor: Grand Street, Manhattan, NY



Reference, High Access Corridor: Michigan Avenue, Chicago

CONCLUSION

The sheer magnitude of the current population growth will soon exceed everything previously seen, and will demand heavy intervention, creativity and courage in order to head for novel and first and foremost fast ways of creating new cities. The Indian goal to build 100 smart cities and to perform an urban rejuvenation of 500 cities might sound megalomaniac, but in my opinion it is basically an adequate answer; an answer of an emerging nation, currently in a critical phase of change that has recognized that it has to act quickly. According to a recent study, India will face a housing shortage of 30 million dwelling units by 2020 already.[1] This lets us assume that India's urbanization plans are well-intentioned, but gaining momentum rather slowly. As we can imagine, creating adequate urban living space for supposedly 350 million people - this is much more than the whole population of the United States of America (313,900,000) – moving to Indian cities by the year 2030, is a highly ambitious (some might even say impossible) endeavour because it means that urban living space has to be created for about 64,000 people every day for the next fifteen years. This enormous demand of urban living space can only be met by informal housing strategies, as formal city planning is a rather slow process, and therefore not the appropriate single instrument. As the urban housing market will very likely not be able to meet the demand for cheap housing opportunities, future Indian cities could benefit a lot from a certain degree of controlled informality in order to prevent uncontrolled informal sprawl. I know that the image of a future Indian city that consists of parts from both worlds, the formal (top down) as well as the deliberate informal (bottom up) is not what the politicians in charge want to see. Certainly this would not be the simple reproduction of the orderly western new town; however, something more original and independent could evolve; not just in means of sole formalism, but much more in respect of India's idiosyncrasy, embracing its very own culture, society and situation. It could be the starting point for a city more unique and more convenient, considering local tradition and the needs of the urban poor instead of focussing on the implementation of

1 http://www.amitabhkant.in (07.01.2016)

(photo by Gregor Doblinger)

ecologically worthwhile but cost intensive technology as the one and only aspect of future city planning. For the implementation of such a city it would make sense to develop an exemplary urban strategy. Exactly like the mentioned GIFT (Gujarat International Finance Tec-City) represents the archetype on which all future Indian smart cities are going to be modelled in terms of applied smart city technologies, another model strategy could be established, defining framework conditions that allow specifically semi-informal living space to emerge and controllably grow up to a liveable and valuable urban quarter; much faster and much more able to react to current needs and local conditions. But most important, guided and constantly monitored by stewards (e.g. NGOs) acting as confidant of the settlers, steering the upgrading and integration process and bringing the whole concept onto an official level, which increases the acceptance as a recognized way of city making among politicians as it has already happened in other parts of the world. Summing up, the proposed concept is trying to provide an urban solution tailored especially for those Indian cities which are growing within this particular period of economic and societal change, all facing similar challenges.

REFERENCES

BIBLIOGRAPHY

architheses “Armut - Poverty”, 2007

archplus 185 “Indischer Inselurbanismus”, 2007

archplus 211/212 “Think Global Build Social”, 2013

Dietmar Eberle, Eberhard Tröger, Dichte Atmosphäre, Über die bauliche Dichte und ihre Bedingungen in der mitteleuropäischen Stadt., Birkhäuser, Basel, 2015

Mimar - Architecture in Development 28, 1988

Michelle Provoost: New Towns for the 21st Century - the Planned vs. the Unplanned City, SUN, 2010

Robert Neuwirth: Shadow Cities, A Billion Squatters, A new urban World, Routledge, 2004

David Gouverneur: Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City, Routledge, 2015

Oliver Elser and Michael Rieper: Housing Models. Experimentation and Everyday Life, Künstlerhaus Wien, 2008

Sangeet Sharma: Corb’s Capitol - A journey through Chandigarh Architecture, 2009

Eckhart Ribbeck: Informal Modernism - Spontaneous Building in Mexico-City, 2002

Mike Davis: Planet of Slums, Berlin, 2006

ONLINE RESOURCES

Final Development Plan DSIRDA - Report 1, Dholera Special Investment Region Development Authority, Sept. 10 2012
http://dholerasir.com/pdf/2.%20DP%20Report%201.pdf (08.01.2016)

Final Development Plan DSIRDA - Report 2 - General Development Control Regulations, Dholera Special Investment Region Development Authority, Sept 10 2012 http://dholerasir.com/pdf/3.%20DP%20Report%202%20-%20GDCR.pdf (08.01.2016)

Kanika Agarwal, Residential Cluster, Ahmedabad: Housing based on the traditional Pols, 2009
http://www.plea2009.arc.ulaval.ca/Papers/1.CHALLENGE/1.2%20City/POSTER/1-2-22-PLEA2009Quebec.pdf (08.01.2016)

The Challenge of Slums – Global report on human settlements(.pdf), UN-HABITAT, Earthscan Publications Ltd London, 2003
http://mirror.unhabitat.org/pmss/listItemDetails.aspx?publicationID=1156 (08.01.2016)

Official population clock,
http://www.indiastat.com/default.aspx (08.01.2016)

UN World Population prospects, the 2015 revision, Graphs,
http://esa.un.org/unpd/wpp/Graphs/ United Nations (05.12.2015)

UN World Urbanization prospects, the 2014 revision, United Nations, New York, 2014
http://esa.un.org/unpd/wup/highlights/wup2014-highlights.pdf (05.12.2015)

Dollar a Day Revisited Report, Ravallion, Chen & Sangraula, The World Bank - Washington DC, 2008
http://core.ac.uk/download/files/153/6645038.pdf (05.12.2015)

http://en.wikipedia.org/wiki/Poverty_in_India (13.10.2014)

http://en.wikipedia.org/wiki/India_State_Hunger_Index (13.10.2014)

”India – New Global Poverty Estimates”, World Bank
http://web.worldbank.org/archive/website01291/WEB/0__CO-59.HTM (13.10.2014)

http://en.wikipedia.org/wiki/List_of_Indian_states_and_territories_by_Human_Development_Index (13.10.2014)

ONLINE RESOURCES

http://de.wikipedia.org/wiki/Indien (14.10.2014)

http://de.wikipedia.org/wiki/Mumbai#Wohnsituation (14.10.2014)

http://en.wikipedia.org/wiki/United_Prosperity_(organisation) (07.01.2016)

Millennium Development Goals India Country Report 2015, Government of India, 2015
http://mospi.nic.in/Mospi_New/upload/mdg_26feb15.pdf (08.01.2016)

By 2017, India's slum population will rise to 104 million, Article, Times of India, from 20.08.2013
http://timesofindia.indiatimes.com/india/By-2017-Indias-slum-population-will-rise-to-104-million/
articleshow/21927474.cms?referral=PM2 (07.01.2016)

India set to become world's most populous country by 2022: U.N., Article, Reuters, from 29.07.2015
http://www.reuters.com/article/2015/07/29/us-global-population-idUSKCN0Q325K20150729 (07.01.2016)

Ahmedabad, India, Pol houses (residential cluster)
http://architectureindevelopment.org/project.php?id=492 (14.04.2015)

https://stats.oecd.org/glossary/detail.asp?ID=1351 (07.01.2016)

http://www.gdrc.org/uem/squatters/s-and-s.html (08.01.2016)

Reinhard Goethert: Incremental Housing – The new site & services, Global Urban Lectures Series
http://unhabitat.org/incremental-housing-the-new-site-services-reinhard-goethert-massachusetts-institute-of-technology/ (08.01.2016)

Janice Perlman: Urban Informality – Marginal or Mainstream?, Global Urban Lectures Series
http://unhabitat.org/urban-informality-marginal-or-mainstream-janice-perlman-the-megacities-project/ (08.01.2016)

Urban Planning for City Leaders, United Nations Human Settlements Programme (UN-Habitat), Nairobi, 2013
http://unhabitat.org/books/urban-planning-for-city-leaders/ (08.01.2016)

Smart Price House Grundbau und Siedler, IBA Hamburg, 2013
http://www.iba-hamburg.de/fileadmin/Mediathek/Whitepaper/130612_Grundbau_und_Siedler.pdf (07.01.2016)

ONLINE RESOURCES

https://de.wikipedia.org/wiki/Brasilia#Einwohnerentwicklung (07.01.2016)

en.wikipedia.org/wiki/Brasilia (07.01.2016)

https://de.wikipedia.org/wiki/Brasilia#Einwohnerentwicklung (07.01.2016)

Is India's 100 smart cities project a recipe for social apartheid?, Article, The Guardian, from 07.05.2015
http://www.theguardian.com/cities/2015/may/07/india-100-smart-cities-project-social-apartheid (07.01.2016)

https://en.wikipedia.org/wiki/AECOM (22.06.2015)

http://www.amitabhkant.in (07.01.2016)

http://dhsprogram.com/publications/publication-frind3-dhs-final-reports.cfm (07.01.2016)

http://densityatlas.org/ (07.01.2016)

FURTHER READING AND SOURCES OF INSPIRATION

Building Brazil - The Proactive Urban Renewal of Informal Settlements, MAS Urban Design ETH Zürich, Ruby Press, 2012

Brigitte Voykowitsch: Ö1 - Dimensionen - Indische Mega-Cities Wachstum um jeden Preis, 31.10.2013

Farooq Ameen, Contemporary Architecture and City Form, The South Asian Paradigm, Marg Foundation, 1st edition, july 1, 1997

Douglas Saunders: Arrival City: How the Largest Migration in History is Reshaping Our World, 2011

Christopher Alexander, A Pattern Language: Towns, Buildings, Construction, Oxford University Press, New York, 1977
http://library.uniteddiversity.coop/Ecological_Building/A_Pattern_Language.pdf

Emerging & Alternative Economies of Design, Papanek Symposium 2013 - The Social Imperative of Global Design,
Aula der Wissenschaften Vienna, 14. -15. 11. 2013

India-day, Symposium, Technical University Vienna, 2013

“What is a smart City?” The concept of “Smart City” from a global perspective, Symposium, Stadtlabor Vienna, 13.11.2014

Andreas Hofer, Ass.Prof. Dipl.-Ing. Dr.techn. Dr.h.c., “Architektur - Konstruktion - Siedlungsentwicklung”, Lectures,
TU Vienna, Summer semester 2014

Prof. Geetam Tiwari „Mobility and urban planning for 21st century: learnings from self-organising informal settlements in cities“, Lecture,
Diplomatic Academy Vienna, 22.10.2015

Think Global, Build Social! – Architecture for a Better World, Exhibition: AZ W Vienna 15. 03. – 30. 06. 2014

Gary Hustwit, Urbanized, Documentary, 2011

Werner Boote, Population Boom, Documentary, 2013

PICTORIAL SOURCES

All pictures from external sources, are referenced directly on the respective pages.

All other photos and graphics were produced by the author himself.

Book cover:
“No-Stop City”, Andrea Branzi, Archizoom Associati, 1969
Source: http://farm5.static.flickr.com/4001/4271695671_1935c83a77_o.jpg

ACKNOWLEDGEMENT

I would like to thank following people who accompanied me during the creation of this thesis:

My mentors Michael Rieper and Markus Tomaselli who comprehensively guided me through the whole design process, for many interesting discussions and helpful advice.

Sophia von Salisch, for her extraordinary support.

Maria Megina, for valuable advice.

Ian Banerjee, for excellent references to relevant literature.

Matthew Tam, for proof-reading the English texts.

Daniel Wadl, for helping me with the layout.

My fellow students, for the good company during the working process.

In particular I want to thank my parents, for believing in me and having supported me during my entire studies.