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The Why Factory

SLUM BOOSTER

‘A shortcut through history’

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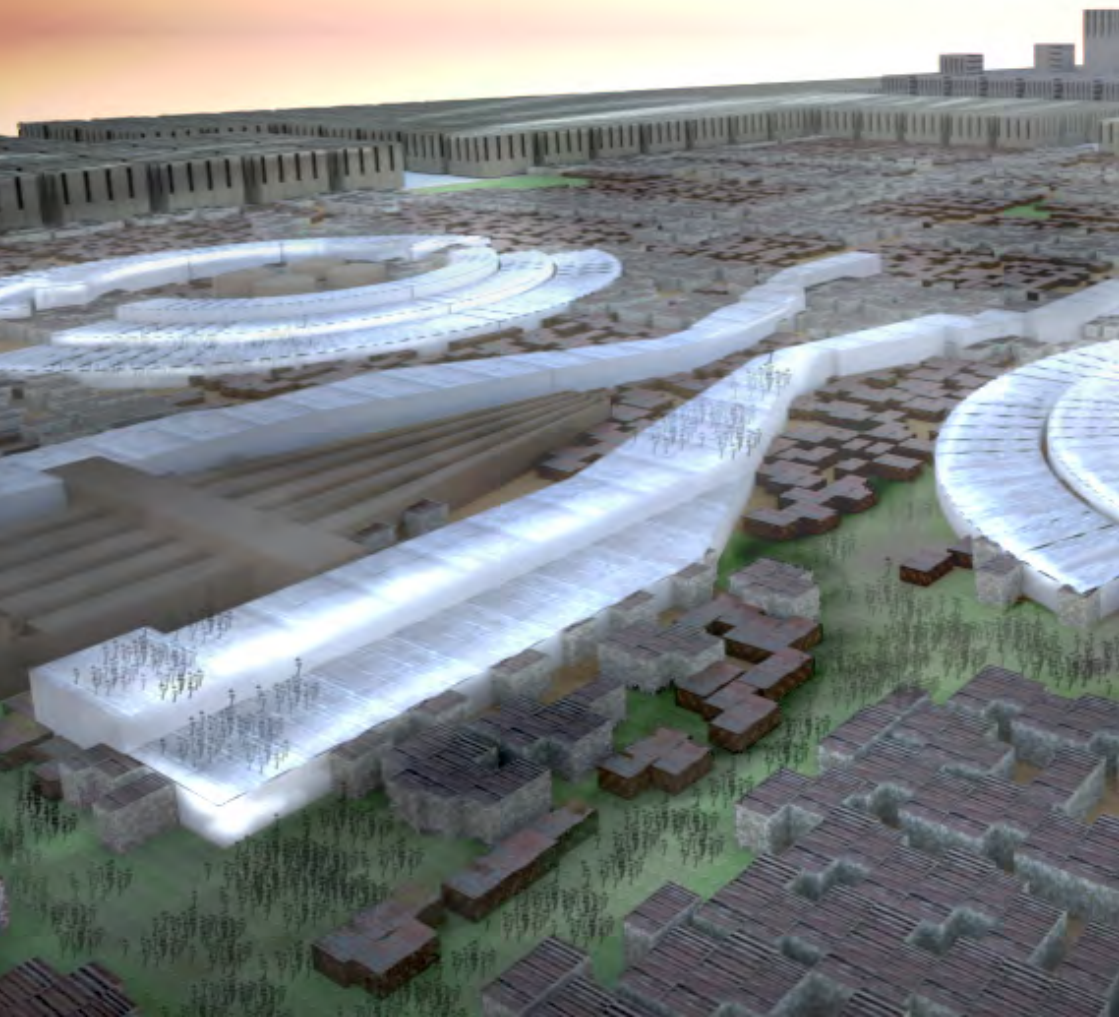
TU Delft

Investigation of reciprocating economic systems to boost informal urban areas into an era of sustained growth.

By 2050 an estimated 2,000,000,000 people, 60% of the worlds Urban Population, will be slum dwellers.[1]

UN-Habitat in challenge of slums 2003 (on economic growth)

“Change life, change society! These precepts mean nothing without the production of an appropriate space”[2]




Henri Lefebvre, the production of space, 1974 Paris

Foreword

Please donate for Malawi, Please donate for water in Bangladesh, please donate for housing in Mumbai, for Nairobi, for Honduras, for Uganda, for Vietnam, for the children of rural refugees of Varanasi, the list is endless. UN-habitat, urban think tanks, amnesty international, oxfam-novib lotteries, foster parents plans, it is and NGO-jungle in the world that we politically correct refer to as emerging economies.

Let's start by stating: all initiatives done with the wealth fare of the anybody at the top of the priority list are good and should be stimulated in anyway possible. This book will in no way try to pursue anything else.

That said, why is there no sustainable/durable solution to the problem of urban poor, it seems with the billions of dollars given in aid yearly there should be some progress and yet in the UN-habitat millennium goals for 2025 no.11 only 100 million poor should be no longer living in a slum, about 5% of the total global slum population.[3]

This book will, through and investigation of reciprocating economic systems, boost urban informal areas into an era of sustained growth and sketch a vision of how the urban poor as the motor will drive the world into the 23rd century.

General history of developed regions of the world tells us that "the west", by "the west" the author means the developed regions of the world, to was once barren place. The middle ages have been long passed, and industrial revolution led the west into a new era. This era has seen an explosion of new technologies; through the automobile which great increase the mobility of personal travel, to the computer revolution making the world smaller and smaller. Globalization is the accepted definition for this phenomenon. The world is getting smaller and smaller. While "the west" has used this development as a way to greatly increase the productivity of its economies, some parts of the world lag begin. These are the areas referred to as emerging economies, second world countries, or third world countries. These countries are balancing on the edge of development. The areas have the potential to grow and evolve like the west, but at this point in time have not yet seen the explosion of commerce. The difficulty in respect to the countries is that some parts of their populations do work like the west, however large parts up 75% live in "sub-standard" conditions[4]. Sub standard in the opinion of the west. The group is referred to as slum dwellers, squatter communities and many other names. The group is estimated to make up about 25% of the global population reaching to almost 2 billion by 2050.[5] This estimation is set of against another estimation that around

75% of the global population will live in urban areas by 2050[5]. There is a direct link between the two. With our growing dependence on global enterprises and urban economic activity, more and more people are moving into urban areas.

The urban economies around the globe fail to absorb new population leaving them in a situation fighting to survive and with no outlook on a better future.

Slum booster is getting into this global urgency, and will make an argument that the cities around the globe could and should expand to account for the total urban population. The entire populations of cities across the globe can experience and explosion of growth, innovation and prosperity. This chain reaction will need a little nudge in the right direction. Slum booster will give the last push.

Finally: the urgency of slums perhaps will never be solved through architecture, or humans in any other field of science. However all little bits help, thus this book has set a course on what some might call utopia, and others might call a fiction. In the end perhaps what is most important to acknowledge is that doing nothing, and proposing nothing, doesn't lead anywhere either.

Table of Contents

1.0 introduction

In the last four centuries the globe has seen an unprecedented development of humanity and its wealth fare. Today's globalization-trend is effectively decreasing the size of the globe. Cities are growing larger and inevitably part of the population is lagging behind. By 2050 70% the worlds population is estimated to live in urban areas.[6]

The reason for this increasing migration towards cities is found in Calvinistic reformation of the Roman Catholic Church into the Protestant Church in the 16th century. Max Weber has shown not only through analysis but through statistics as well the privileged role of Protestants in capitalist organizations. Before the reformation the Roman Catholic Church prohibited that a rich man could gain interest on an investment, it was forbidden by canon law.[7]

"If the poor man becomes destitute, can the rich man who keeps him from dying of hunger, without himself being inconvenienced, demand repayment of more than he advanced? This would be to make time pay; and time, unlike space, was said to be God's domain and not that of men. But time is a given in nature: if money always makes it possible somewhere to finance profitable ventures, a natural law gives to the factors "money + time" the additional value of interest (of a possible share of the possible profit)."[8]

"What reason is there why the income of business should not be larger than that from land owning? Whence do the merchant's profits come except from his own diligence and industry?"[9]

Calvinism came about and it gave precedence in the use of the available recourses to the expansion of enterprises and the increase of capital equipment; in other words, it prefers an increase of wealth to its immediate use. This is a fundamental step in the migration to cities. With the reformation came the possibility to invest and gain profit. Suddenly the city became a place of potential, where farmers and merchants could surpass the status and financial means of the landlords of old.

At the beginning of the 19th century the industrial revolution accelerates the development and the migration towards the city. This development, once it reached the tipping point, has spread across the globe like raging fire. An increased production capacity of companies, because of automated processes in factories, contributed to a great increase in wealth and possibilities. This spawned a higher demand for (new) products and that demand has since never stopped growing.

Thus the urbanization frenzy, the world has seen over the last centuries,

came about. It is clear that not everybody benefits equally, and there have always been bad areas in the cities. However the attraction to the city still remains.

The 'bad' areas of the city have all sorts of names. In L.A it's the projects and in Paris the bains lieux, the developed regions of the world refer to slums, favelas or informal cities in respect to the emerging markets across the globe where the development has a slight arrear.

This book promotes a vision, and this vision will create a shortcut through the history of the developed "west" and boost the informal urban areas (slums) into an era of sustained growth. The slums of the world have two essential advantages over the developed cities, since there are behind in structural development they can leap across centuries of development in decades. In addition, there are many people living in horrid conditions who have all come to the cities for the promise of a better life and endless possibilities to make it big. Because of the motivation and the capacity to learn and develop, the informal urban areas will become the motor of future development.[10] The timing is perfect, as new technologies and globalization have made it easier for entrepreneurs to see the world as their playing field. By activating the potential, these areas can unlock yet another unprecedented growth into the future of humankind.

2. The generic slum

2 Billion people live in slums across the globe, urban informal areas and their inhabitants are a global urgency. However, no project known to date addresses the slum situation on a global generic scale. While vernacular circumstances are inevitably part of the problem, a generic concept should be formed to create a strategy to solve the urgency worldwide. This chapter lays the groundwork for the project to be based upon.

First: Slum defintions
Second: A research into the global slum situation, concluding with a generic slum.
Thirdly: Current initiatives.
Fourthly: Why are the slums?

2.1 Slum definitions

2.1.1 What is a slum dweller?

A slum dweller lives in a substandard situation. They live in a way that excludes them for the chances given to the moderate citizens of countries. In the west to there are many inhabitants living in sub-standard conditions. Around 14.3%[11] of the population of the US was living below the poverty line in 2009. The US is among the richest countries in world and 43.6 million seems like a lot. However, the poverty line for the United States is different to that of Uganda. A person just below the poverty line in the US is a fairly rich man in most parts of the world. The reason for this difference is that the poverty line of western countries is based on a socially accepted economic income and material possessions, which is different for all countries across the globe. This means poor in country A might not be poor in country B. Hence poverty lines are not the right tool asses the global slum urgency. In order to use available data of UN habitat and the World Bank the following definition will be used, as stated in the “world of slums” 2003 publication:

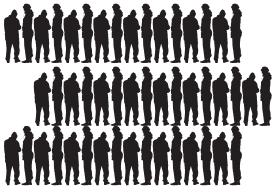
As a result of the expert meeting group (EMG) a slum household is defined as a group of individuals living under the same roof lacking one or more* of the conditions[12] listed on the next page.

- Access to improved water
- Access to improved sanitation facilities
- Sufficient living area, not overcrowded
- Structural quality/durability of dwellings
- Security of tenure

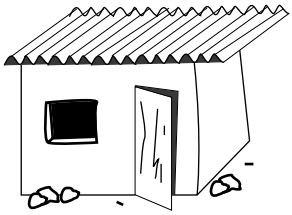
*) According to the situation in a specific city, this definition may be locally adapted. For example, in Rio de Janeiro living area is insufficient for both the middle class and the slum population and is not a good discriminator. Either it could be omitted, or it could be formulated as two or more of the conditions such as overgrowing and durability of housing.

1. Inadequate access to safe water

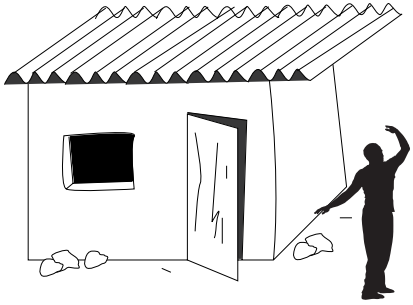
2. Inadequate access to sanitation



4. Overcrowding



3. Poor structural quality of housing



5. Insecure tenure

2.1.2. Three types of slums

There are three different types of slum to be distinguished. This project will focus on the last type, inner city slums. However for a full overview of the slum situation the types are important.

According to the UN 90% of all future urban population growth in the developing regions of the globe will be absorbed by the informal areas, also known as slums. The urgency therefor is predominantly within the cities in developing regions[13].

A. Squatter settlements[14]:

Squatter settlements are generally found near urban rivers and canals, beside railway tracks, on governmental land, or on land with vague tenure status. These settlements consist of non-permanent or semi-permanent housing structures, which are laid out in a haphazard manner. The lack of infrastructure and the illegal tenure of land are their additional characteristics. In many cases, the squatters encroach upon lands, which are hazard-prone.

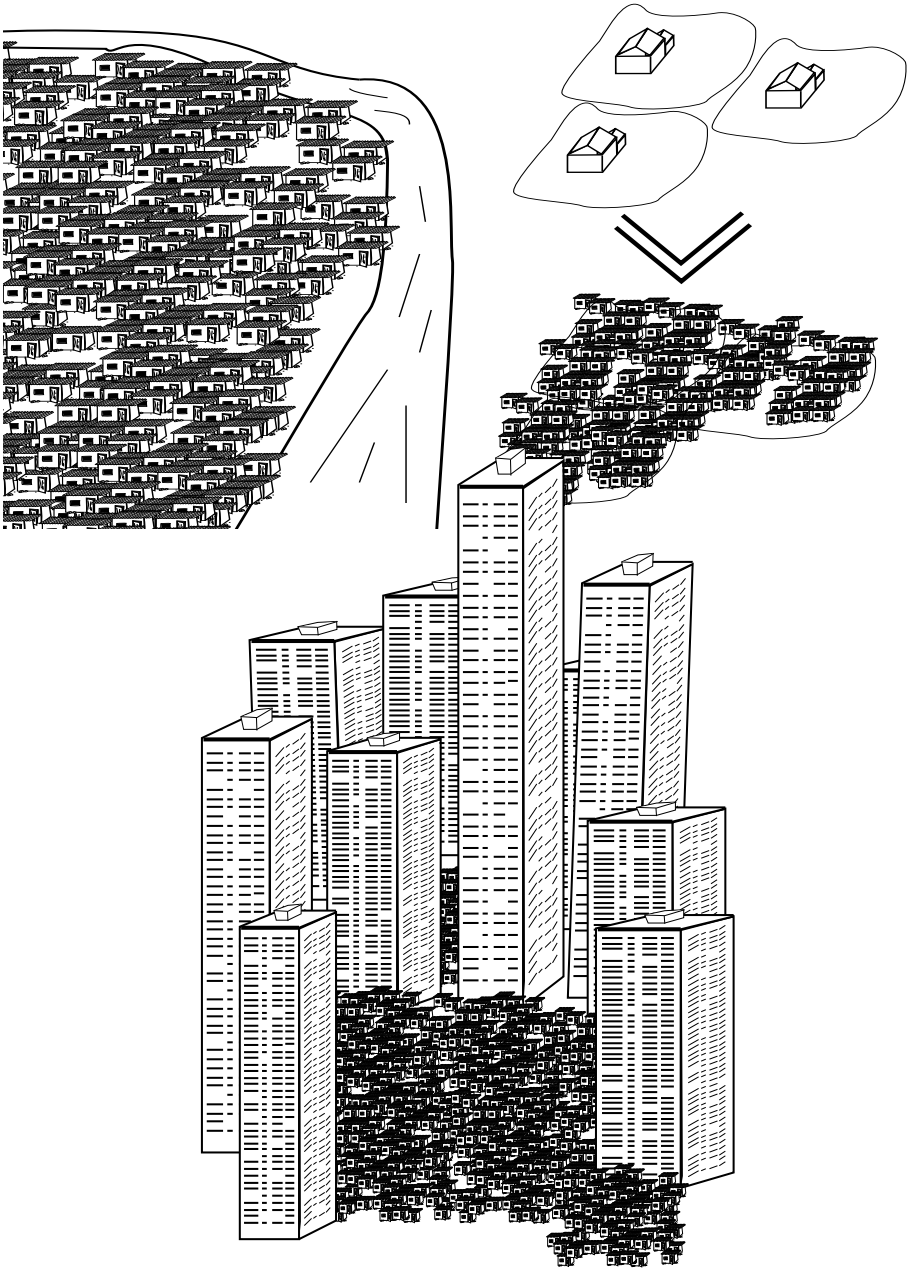
B. Illegal subdivisions[15]:

These are of two types: user-rented and user-purchased. In both cases, unscrupulous entrepreneurs invariably rely on political and bureaucratic patronage or connections to enable them to occupy and subdivide the land on the urban fringe. In the user-rented illegal subdivisions, private owners subdivide land and lease it out to low-income residents for a period ranging from one to ten years. Occasionally, basic infrastructure services like water and electricity are provided. In the user-purchased illegal subdivision, the land is subdivided and sold. Sine the lots are merely demarcated plots without any infrastructure.

C. Inner city slums[16]:

Inner-city slums are usually rental tenements, which have deteriorated for lack of proper and regular maintenance or repair. These are located in the older sections of the cities and are characterized by a low standard of infrastructure and high person-to-floor space ratios.

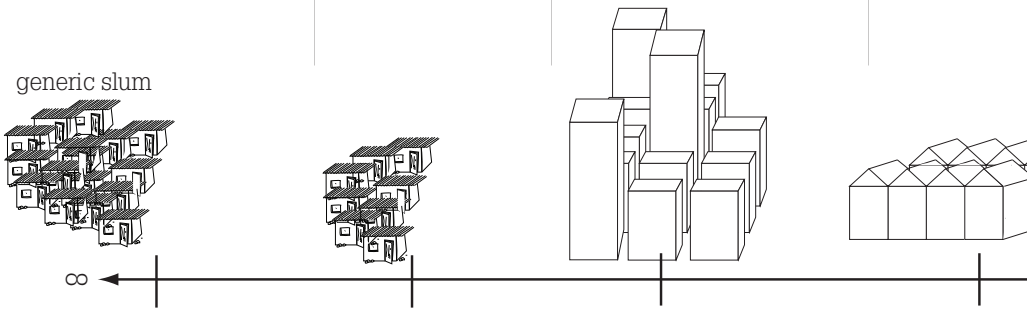
slum types



2.1.3 Prosperity

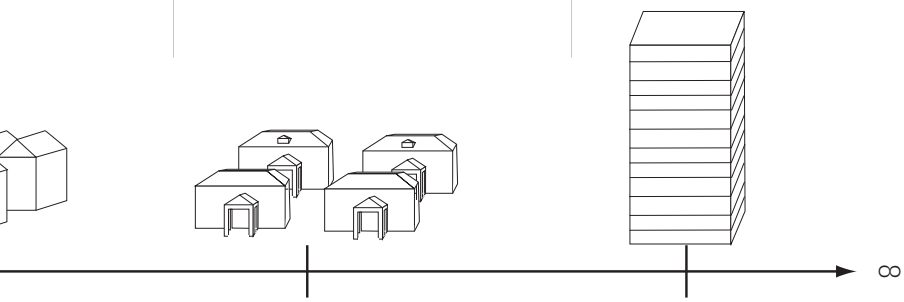
Now slums are clear, the table below indicates five different levels of prosperity. From the generic slum which we see formed in the next paragraphs to extravagant luxury penthouses on park avenue. Prosperity levels are austere when the bear minimum of acceptable livelihood are reached. Next average world cities are described. These figures are courtesy of the Austerity research group of The Why Factory, fall semester 2009. the two top levels are defined as free standing villa's on

properties	**generic slum**[17] **upgraded**	**austerity**[18] the bare minimum for acceptable livelihood	**average w**
density inhabitants/km2	362,318	20,000-50,000	1000-15,00
living area per capita	4 sqm	8 sqm	21,6 sqm
transportation main mode	foot, bike, shared taxi	foot, bike, tram, bus, train	bus, train,
openspace	0,8 sqm	8 sqm nature	8 sqm park
unit price 8 inhabitants	$4,598	$6,500	$37,000
2.000.000.000 slum dwellers	$1,222 Bln	$1,727 bln	$9,833 bln
500.000 slumdwellers	$0.3055 bln	$0.4318 bln	$2.458 bln



plots we see in the urban sprawl[22] in the united states of america, and finally the unreachable luxury of penthouses on park avenue. When this level of prosperity is reached the sky is literally the limit. Holidays on saint barths private planes. etc. These levels of prosperity are used in the development of the slum area. The vision that will be created in chapter 7 could finally see a city-scape that resembles nothing of the slum that once was. It will redefine what we see as urban informal areas. The urban poor are on the threshold of exploding the in the biggest swift of power humanity as seen in this dream.

orld city[19]	**free standing villas**[20]	**extravagant luxury penthouse Park ave.**[21]
0	less then 1,000	30,000
	40+ sqm	80+ sqm
private car,	private car, boat, plane	chauffeur, private jet
k	30 sqm	n/a
	start: $200,000	start $1,500,000
	start: 51,153 bln	start 398,651 bln
	start $12.788 bln	start $99.663 bln



2.2 global slum situation

Try to imagine the world population: 6.9 billion inhabitants and growing. According to the UN by 2050, our planet will have are 8 billion humans residents. 2 billion of those will live in slum-like conditions. That means that one out every 4 people on the globe will live in a slum. If distributed evenly it would mean that out of a family with 2 kids one would live in a slum. Look up and realize that one fourth of families around you, and of all the people living/working in the buildings around you are slum dwellers. They do not have access to adequate water, or sanitation, and live in crowded houses often sharing a single bed with up to five other individuals.[23]
The estimation seems crazy, right? But the world is not distributed evenly across the board. To Asses the global slum situation a thorough inventory of slums in needed. The inventory starts with global population growth, urban and slum population percentages. This gives an idea of where slums are most prevalent.

Three continental areas, south America and the Caribbean, sub-saharan Africa and south central Asia, where slum percentages are the highest are according to UN-estimations, also the places with strongest population growth. The UN estimates that the informal urban areas, slums, will absorb 90% of the population growth. This general outline of the slum situation is the starting point for an investigation of slums worldwide. [24]

2.2.1 To create the generic slum

To create a generic slum one mist asses the global slum situation. This is firstly a statistical endeavor. The selection is based on population growth and estimated slum percentages. Second, the areas are chosen for their geographic location. The three regions chosen are on the three continents where slums are most prevalent.

By looking at representative areas in three different continents with the largest amount of slum dwellers, the situation can be assessed on a global scale. From three continental regions, we can show the countries that contribute most to the slum situation, on to cities and specific slums. Each step the selection criteria are similar: according to population percentages and available data. Each city must have at least 2.5 million in habitants.

The final assessment goes to areas within the specific slums. The areas are further examined. The in-depth research of three slum areas has four points.

1. Roads/morphology
2. Structures
3. Section
4. Typical floor plan

1. Morphology; all the roads are drawn up in a particular area of each selected slum. Types are defined through width of the roads.
2. Structures: a square area of approx 150 by 150 meters is marked of. Through Google earth images a complete vector map of the area is drawn. The structures in this area are then measured up and processed in a spread sheet. Through this method the average size of structures is estimated.
3. Section: a typical section is drawn up, through the study on different slums in the region.
4. Typical floor plans are found through a literary study.

All data found and estimated lead to the creation of the generic slum. The generic slum is an average of the three areas researched in depth multiplied by how much the specific slum data weights on the generic slum (the indexation). Following morphologic analysis, number of clusters, average house sizes, unit areas, and built density the generic slum is constructed. This generic slum is the base for the rest of the project. Since it represents the global slum situation, it will give an acceptable representation of how the slum will react to the booster.

2.2.2 Data data data

According to the UN by 2030 2 billion people will live in slums across the globe.[25] According to a study done by London school of economics and Deutsche Bank's Altred Herrhausen Society in 2050 75% of the global population will live in cities and/or urbanized areas.[26]

The massive increase of urbanised communities will have it's effects on the respective economics of the areas effected aswell. Citymajors.com[27] has given insights into the capitals GDPs and projected growth.

A list of the status quo and an estimation on the future will be given in the following pages. First for the globe dissected into continental regions secondly selected countries, thirdly cities fourthly three slums, El Libertador in Caracas, Dharavi in Mumbai and Kibera in Nairobi, and conclude in three specific slum areas.

2.2.2.1 Global situation

When talking about estimations caution is always advised. The author here would like to note here that these estimations are based upon UN statistics. Without any doubt other sources will show different values

and perhaps eventually any estimation made could prove to be a fiction.

The table shown here are statistics from the 2003 "challenge of slums" publication by the UN.[27]

The table shows that North America, Latin America and the Caribbean and Europe already pass the 70% urban population mark. More the seventy percent of the inhabitants in these areas live in urbanized areas.

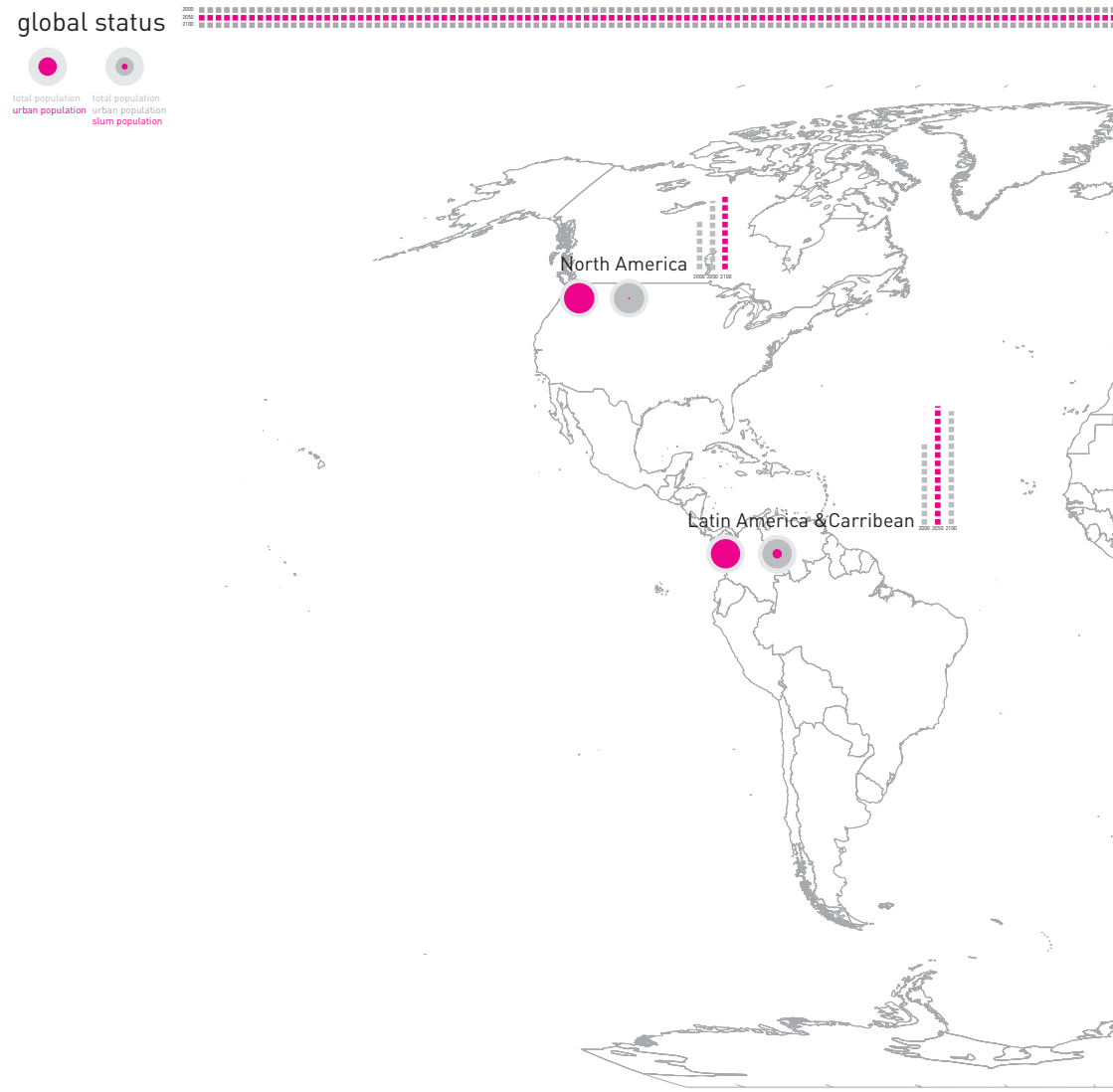
Furthermore one can see that Latin America and the Caribbean, Sub-Saharan Africa and South Central Asia are the top three with the biggest percentage of population living in slum areas, followed closely by Western and Eastern Asia, all five above 30 percent. Additionally one can notice that only North America and Europe have less then 20% of the population living is slum areas. On average of the global urban population 31.6% of the population lives in slum. This means that there is almost a 1 in 3 chance that when living in a city one lives in a slum.

According to UN-habitat this already high percentage will increase further in the coming years, because most of the population growth is expected to be in less developed areas, where a migration to the urban environment is at its peak.

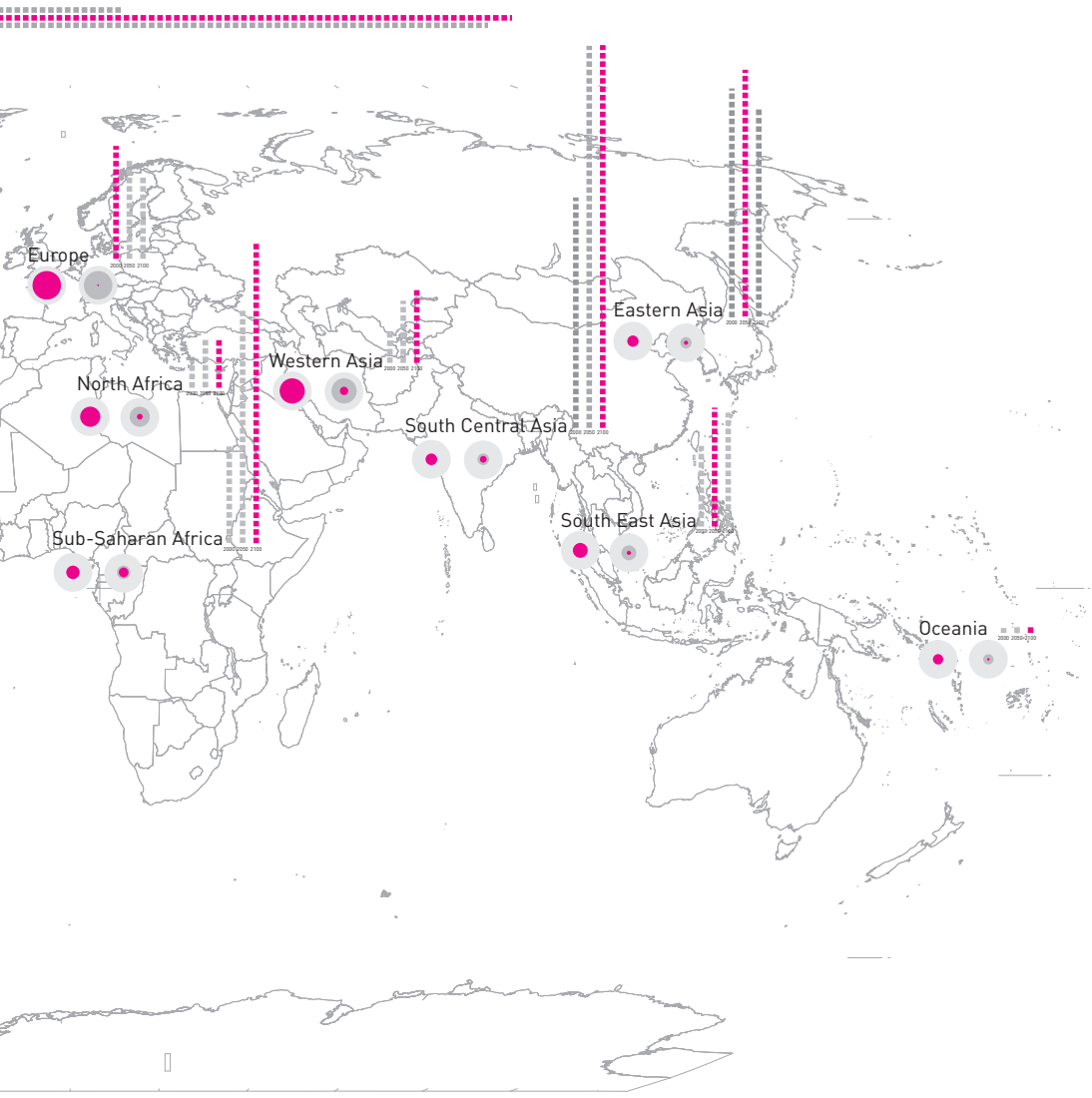
In Addis Ababa, Ethiopia, on a yearly basis 250.000 new migrants come into the city. In four years time 900.000, 90% of the new urban population will try to find a place to live in the slums.[29]

	population thousands	urban population thousands (% of total)	slum population thousands (% of urban pop)
The World	6.134.124	2.923.184 (47,7)	923.986 (31,6)
North America	316.914	245.880 (78,6)	14261 (5,7)
Latin America & carribean	526.657	299.385 (75,8)	127.567 (33.1)
Europe	726.315	534.263 (73.5)	33.062 (5,7)
Nothern Africa	145.581	75.693 (58,0)	21.355 (28,2)
Sub-Saharan Africa	667.022	231.052 (34,6)	193.824 (71,9)
Western Asia	192.445	124.943 (64,9)	41.300 (32.9)
South Central Asia	1.506.725	452.484 (30,0)	262.354 (58,0)
South East Asia	529.764	202.854 (38,3)	56,781 (28,0)
Eastern Asia	1.354.438	533.182 (39,1)	193.824 (32,4)
Oceania	7.755	2.072 (26,7)	499 (24,1)

Global Urban population and relative slum-population by major a



areas


Europe
Eastern Asia
Western Asia
North Africa
South Central Asia
South East Asia
Sub-Saharan Africa
Oceania

2.2.2.2 Regions and countries

A closer look at the data on the map shows that in three regions both estimated population growth and slum percentages are higher then on the rest of the globe.

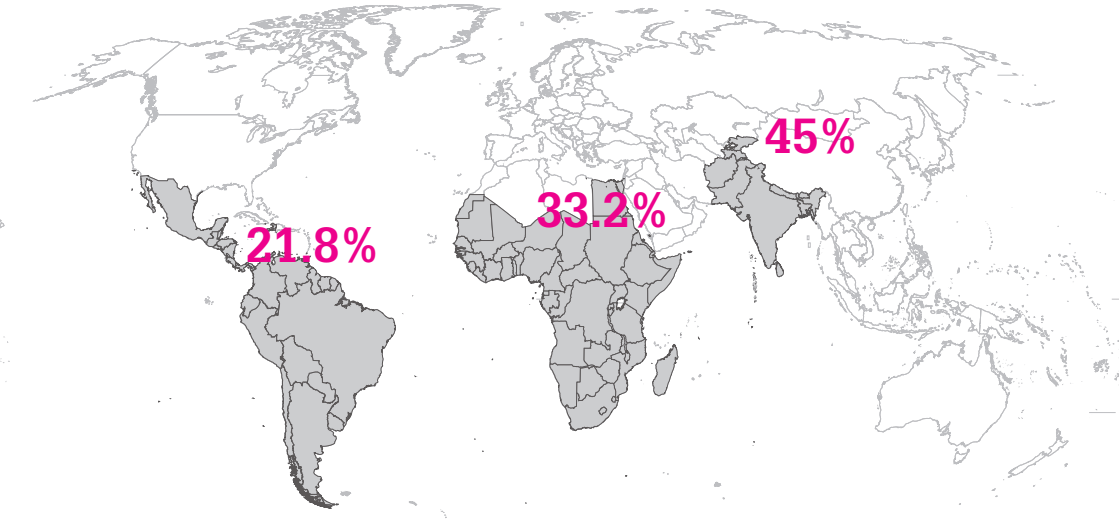
South central Asia, South America and the Caribbean and sub-Saharan Africa are the three regions where population growth and slum percentages are the highest.

In Asia, the absolute slum population is much larger then in Latin America, they relate 2:1 so in the generic slum twice as much Asian properties are found as Latin American properties, this creates an indexation method, which will average the global situation.

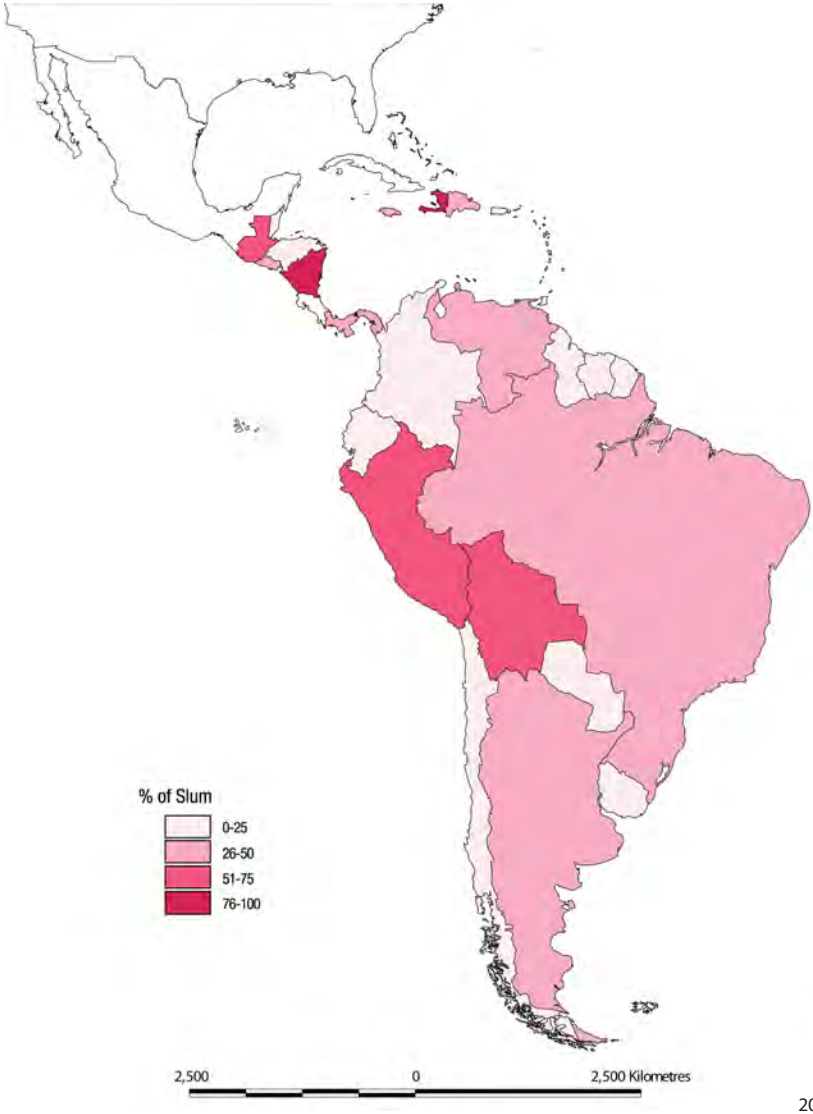
If we take the three regions to be exemplary for the continents they are on, the sum of the regions should divided by each individual region, thereby creating an index.

Latin America and Caribbean	127.567.000	0.218
Sub-Saharan Africa	193.824.000	0.332
South-central Asia	262.354.000	0.450
Totals	583.745.000	1.000

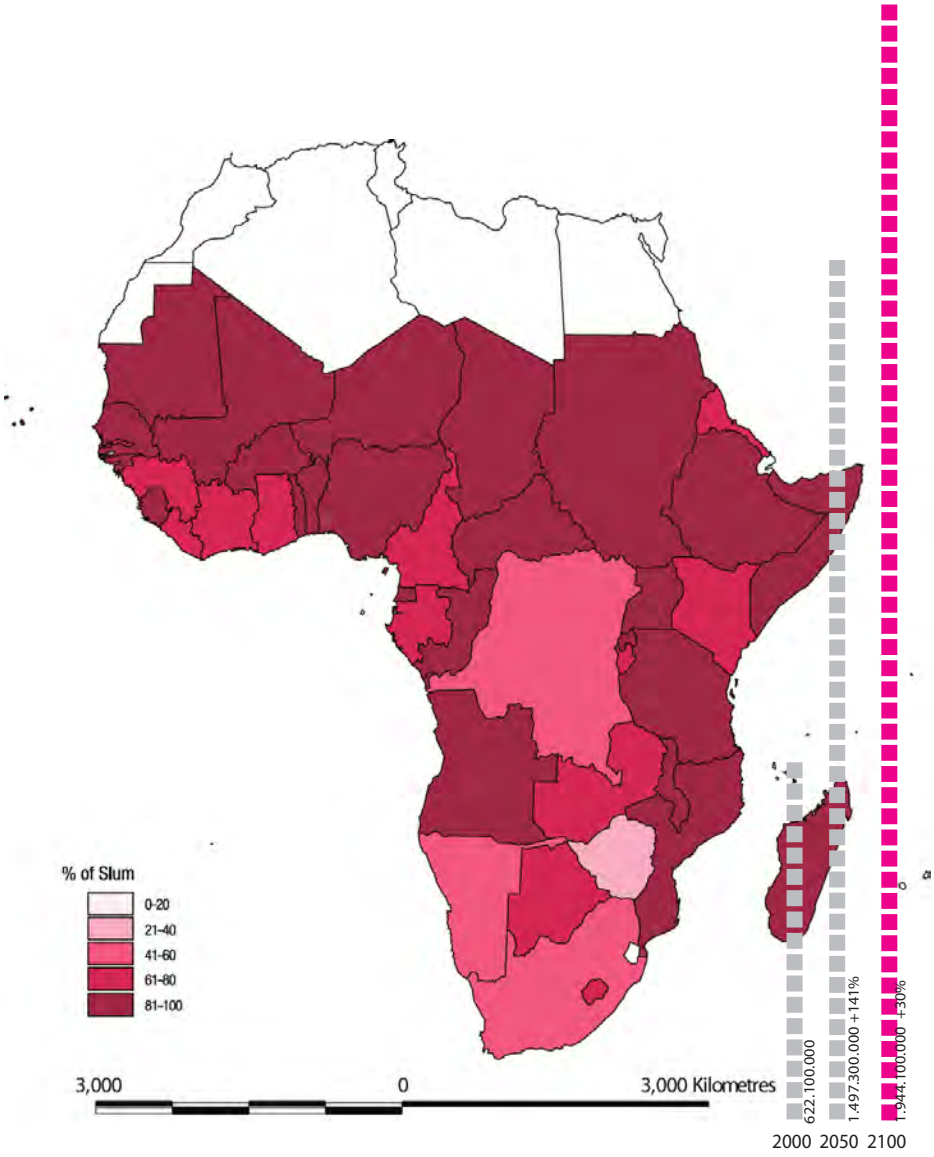
The data of the regions results in three specific countries, namely: Venezuela, Kenya and India. As one shall see in the following data In these countries slums and population growth will form the greatest urgency.



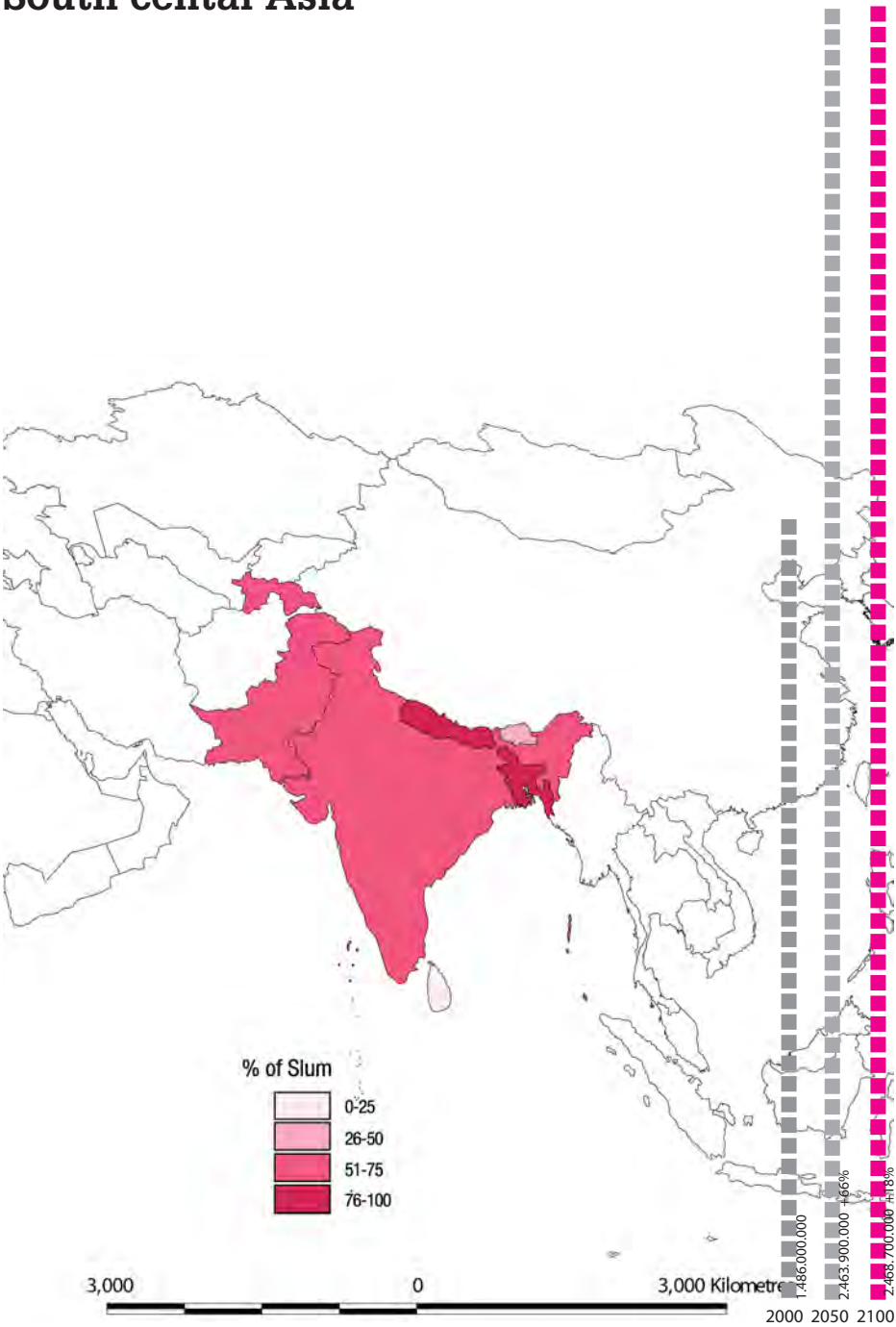
Latin America and Carribean



Sub-saharan Africa



South cental Asia



Venezuela

It's hard to find relevant information in Latin America. Caracas is the home station of Urban Think Tank. This creates for an information pool. The reason for choosing Venezuela is that the Libertador slum is the second largest in the world. The biggest problem in Venezuelan slums is a sanitation deficiency. In the course of the research also the accessibility and structure of the slum dwellings should be high on the priority list.

Kenya

Kenya has 70% of its in habitants living is slums. There is a lot of information at hand for the creation of the generic slum, and Nairobi also has the headquarters of the UN-habitat agency. In Kenya sanitation is the biggest issue. The famous flying toilet is the main way of defecation. People do their thing in a plastic bag which is thrown from the homes into the alleys. This creates a very serious hygienic problem.

India

The country's population will grow with over 400 million inhabitants. And an estimated slum population of 55%. This means that 750 million Indians will live in slums areas. In India also sanitation is the main issue, but overcrowding should not be forgotten. The Indian government has initiated birth control laws, allowing families with one child access to governmental grants.

Venezuela

2000 24.600.000

2100 40.300.000 65%

Kenya

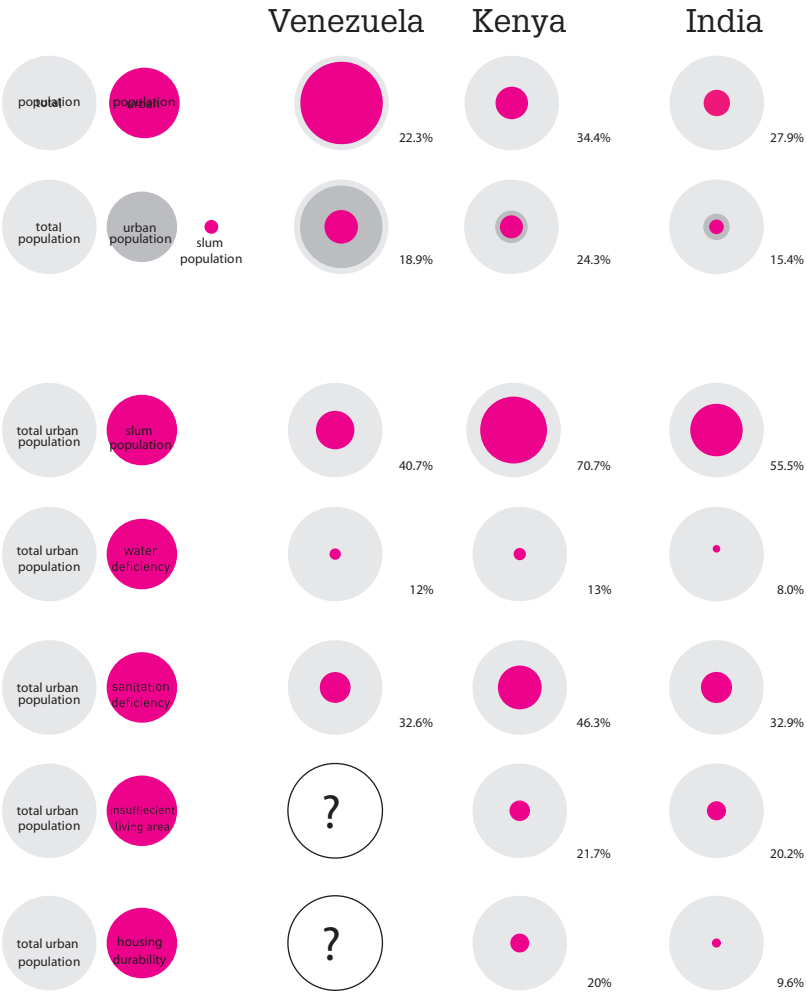
2000 31.293.000

2100 45.830.000 46%

India

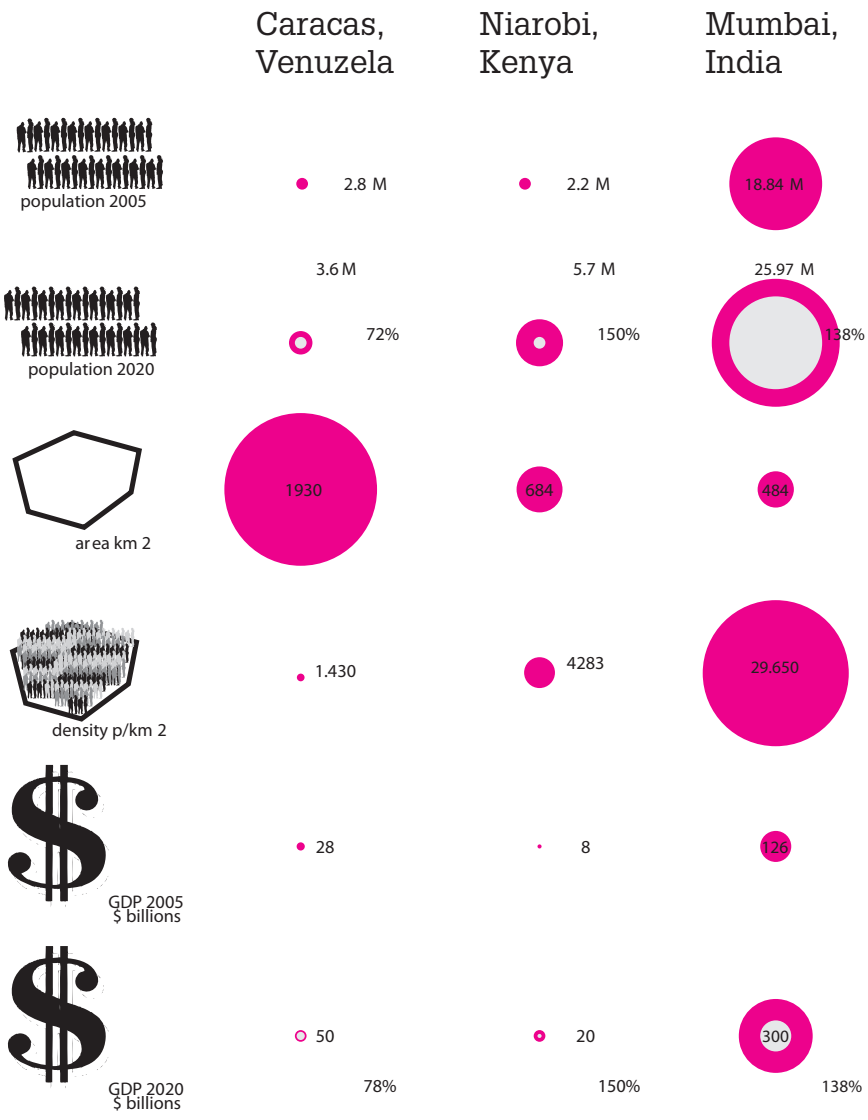
2000 1.016.900.000

2100 1.458.400.000 43%



2.2.2.3 Cities and slums

The investigation continues with cities. An inventory is made including a slum map of each city, and the chosen slum, along with population data, area sizes, density of population, and GDP.[30] The slum map shows in pink where the slum areas of each are. In dark pink the slum that is selected is shown.



Caracas, Venuzela

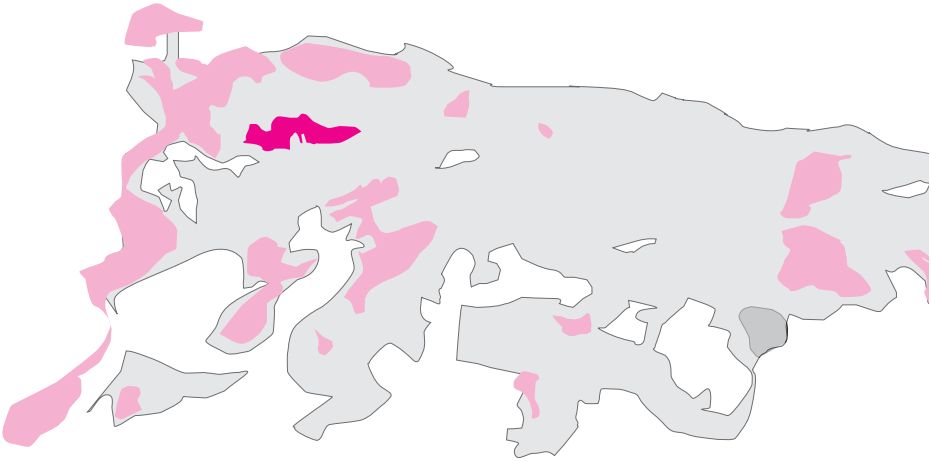


image: Slumsmap of Carcacas

Niarobi, Kenya

image: Slumsmap of Nairobi

Mumbai, India

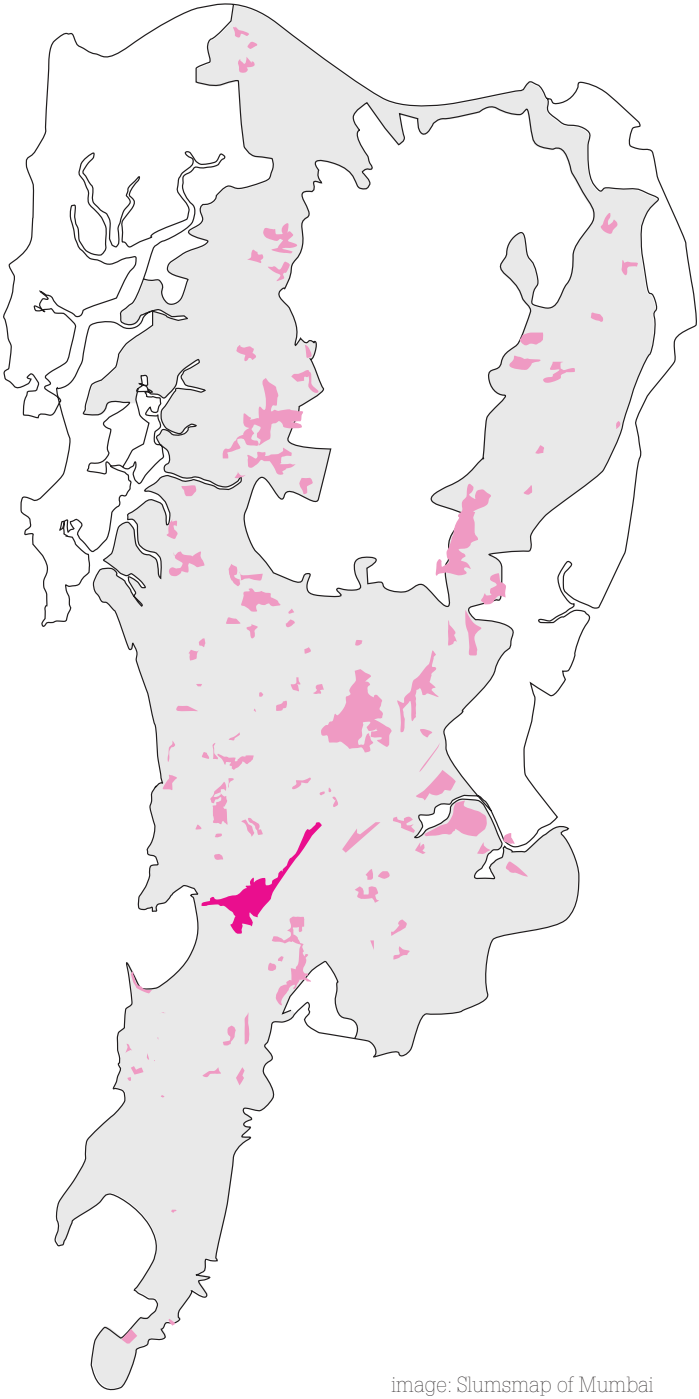


image: Slumsmap of Mumbai

Next the selected slums are examined. First a general inventory is made of each slum, followed by an in depth analysis of a particular area of the slum.

Here follows data of the three selected slums areas. By abstracting this data one can, keeping to the weight given to each area by taking into account the indexation, construct the generic slum.

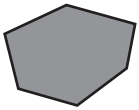
	libertador	kibera	dharavi
 area km^2	3.5	2.54	2.24
 population mln	2,2	0.6 - 1.2	0.8 - 1.1
 annual turnover	n/a	n/a	500-700
real estate value	zero	n/a	600 -750 mln
average income $/ month	360	40-75	40-200
rent $/month	50	15	4
 work	n/a	650 vendors	15.000 factories
 water	n/a	n/a	16.000 taps
 sanitation	n/a	600 toilets	700 toilets

image: satalite image, El Libertador, Kibera, Nairobi source: google earth

image: Kibera diagramatic

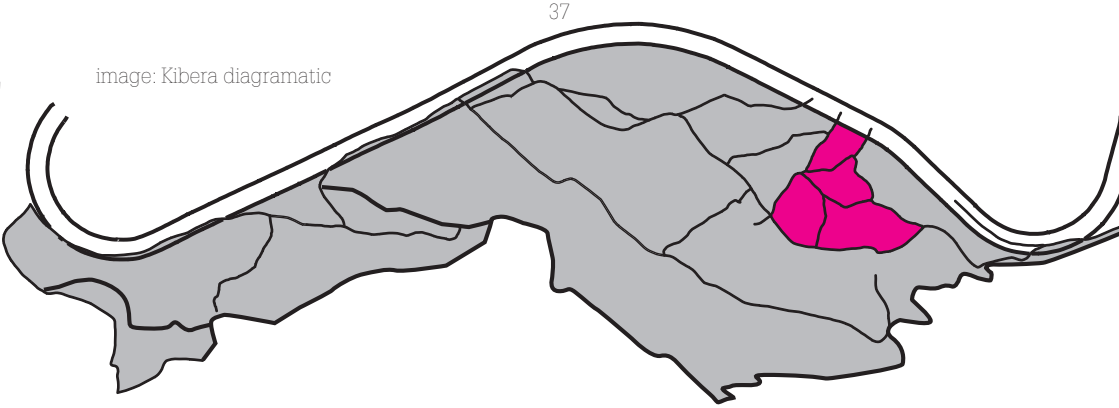


image: Libertador diagramatic

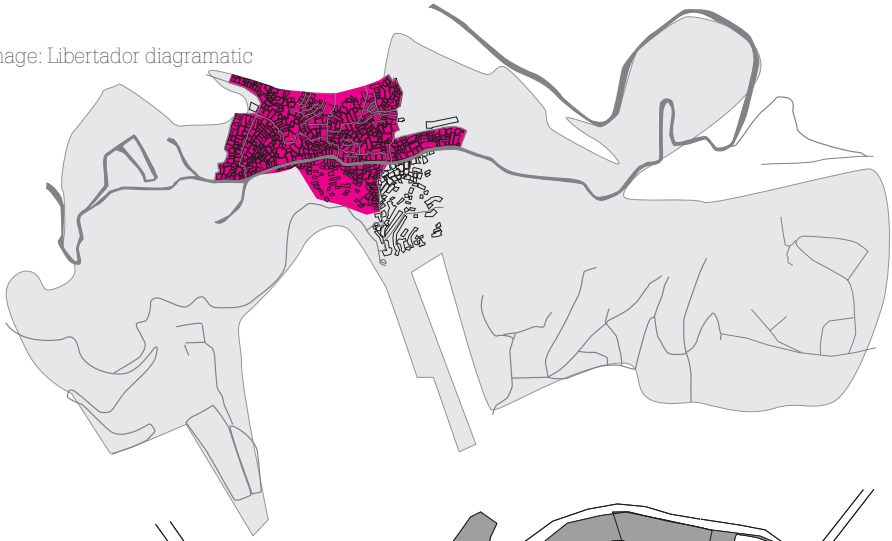
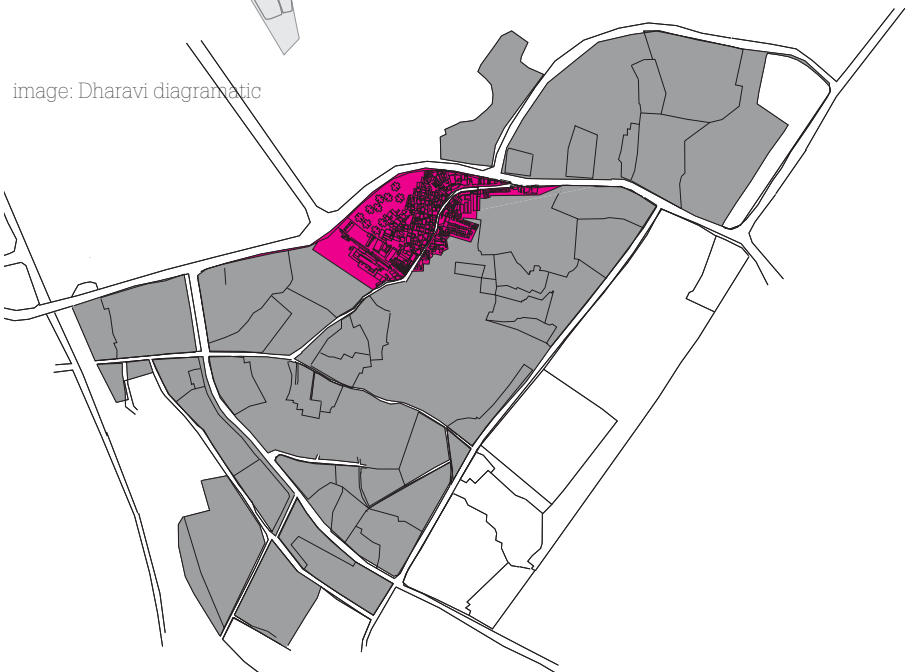
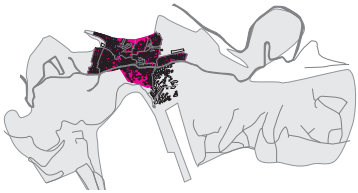


image: Dharavi diagramatic



El Mirador, Libertador, Caracas, Venezuela



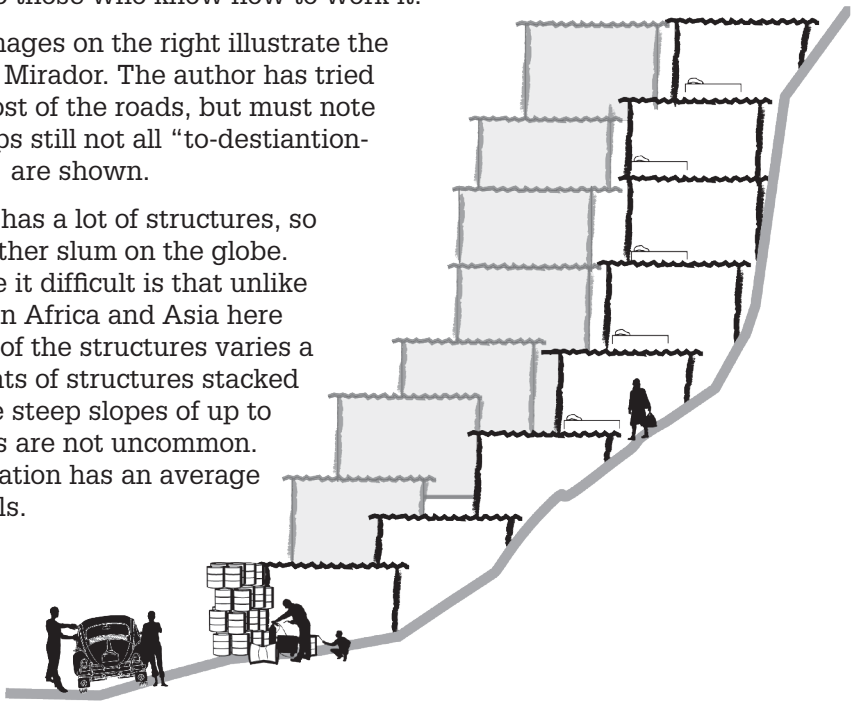
The area El Mirador in the Libertador favela in Caracas is situated on the center North side of the Libertador slum. A highway passes through the mountain underneath it. The name El Mirador means viewpoint, from the location one has a 360 degree view with the city to the North, East and West of it, and one of the main highways into the country escaping its southern boundaries. This area is, as most Latin American favela, first and foremost formed by the natural landscape on which it is located: steep mountain slopes. On the rim of this particular mountain a road gives access to the favela for cars trucks etc.

Next to this main artery a few secondary roads go deeper into the favela, often not suitable for cars, rarely paved.

The third and final network of roads or paths is as informal as the area itself. The small passages we will call “to-destination-alleyways”. It is important to note that these alleyways are actually a dense network and powerful to those who know how to work it.

The two images on the right illustrate the roads in El Mirador. The author has tried to mark most of the roads, but must note that perhaps still not all “to-destiantion-alleyways” are shown.

El mirador has a lot of structures, so does any other slum on the globe. What made it difficult is that unlike the slums in Africa and Asia here the height of the structures varies a lot. Accounts of structures stacked against the steep slopes of up to eight levels are not uncommon. This calculation has an average of five levels.



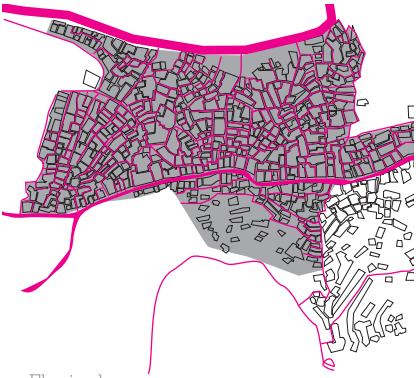


image: El mirador area map

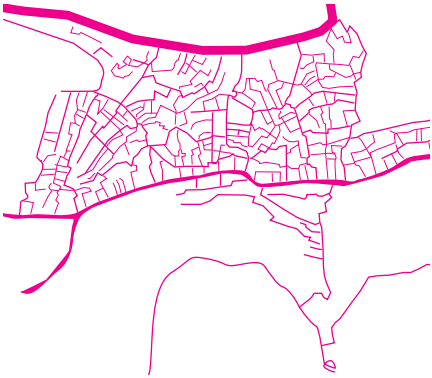
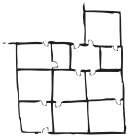
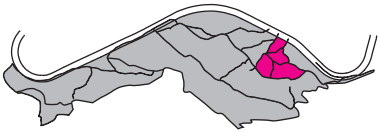


image: El mirador roads map



total built area m2	14.922
FAR (av. 4 level)	2,64
number of cluster	129
average cluster area m2	115.67
average unit area m2	15
number of units	987
average untis/cluster	6.33
biggest cluster m2	468
untis clustered	31

Lani Saba, Kibera, Nairobi, Kenya



This villages within the famous Kibera slum is situated on the far East side of the area. Kibera is made out of 13 smaller areas which are important to the inhabitants. Lani Saba is situated closed to the main center of Nairobi.

Kibera is made up out of 13 villages, each of these villages has its own social hierarchy and they are all lined by roads. The main highway is what separates Kibera from the rest of Nairobi to the north. A fenced of national park to the south makes further exploitation of the lands impossible. Kibera is maintained in between these two borders.

Here also there is the distinction of three different roads is clear. The two images on the right illustrate the roads in Lani Saba. The author has tried to mark most of the roads, but must note that perhaps still not all “to-destiantion-alleyways” are shown.

This is the densest of the three areas researched. The entire area has a built/open space ratio of 0.84. Which means only 16% of the available ground is not built upon and used for traffic and open space.

Due to the way of building, mostly mud and metal sheets going higher then one level is an uncommon site in Kibera.

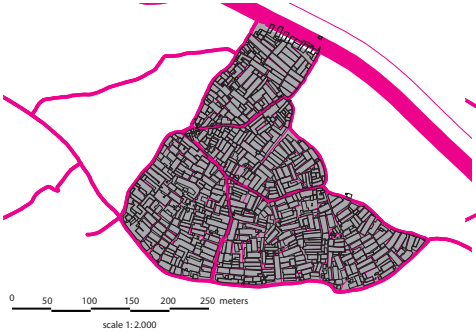


image: Lani Saba area map

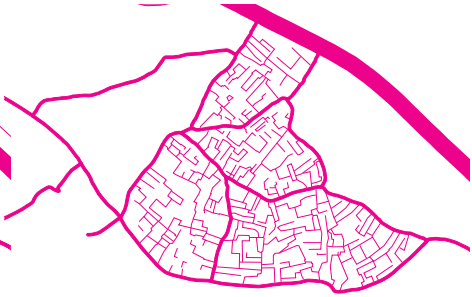
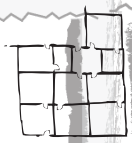


image: Lani Saba roads map

total built area m2	18.972
FAR (av. 1 level)	0,84
number of clusters	266
average cluster area m2	71.86
average unit area m2	9
number of units	2108
average untis/cluster	7.98
biggest cluster m2	370
units clustered	41



Koli Wada, Dharavi, Mumbai, India

This area was the original village which Dharavi ingested. In the era of british ruling in India this villages was where the service labour force lived. It was a small fishing villages, now one of the most expensive pieces of real estate in Mumbai. Dharavi could be worth hundreds of millions if developed into an high density metropolitan area. Koli Wada on the riverside would be where the most exclusive penthouses would rise.

The form of Dharavi is firstly created by the inlet on which banks is was one a small fishing village. Secondly it is positioned between to main arteries, and two railway tracks.

The two railroads and the swamp area which is the final buffer zone between the land and water of the inlet in capsule dharavi. This create a distinct border between the slum and non slum area.

As Bombay (now Mumbai) expanded the area now called Dharavi was completely enveloped by formal urban structures. Beyond the water the city has kept own growing. Dharavi now lies within 5 kilometers of the business district.

Here also there is the distinction of three different roads is clear. The two images on the right illustrate the roads in Koli wada.

In India most structures are made out of concrete, this allows for the stacking of levels. Cases have been found where there has been built up to 4 levels. Mostly though two level structures are found, with business on the ground floor and living space on the first floor. This sound luxurious almost, but there are usually multiple families sharing the same rooms.

units go in one cluster, and every unit is inhabited by six people,allowing for 40 people to live under the same roof.

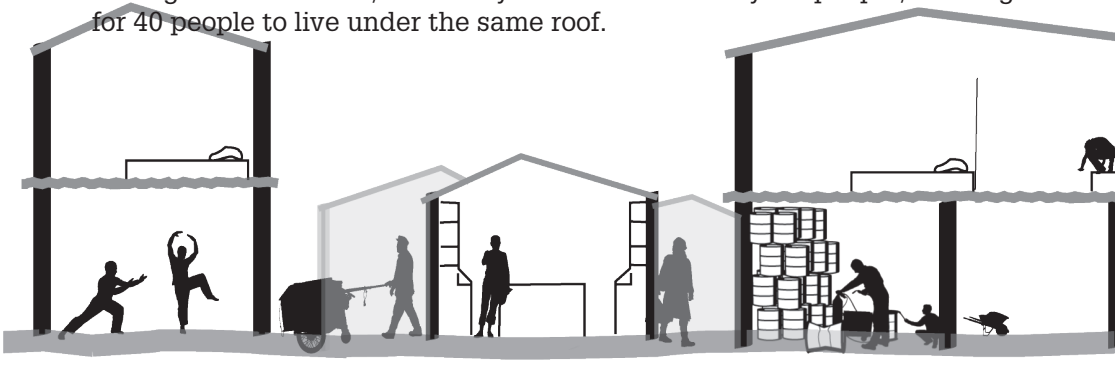


image: Koli Wada area map

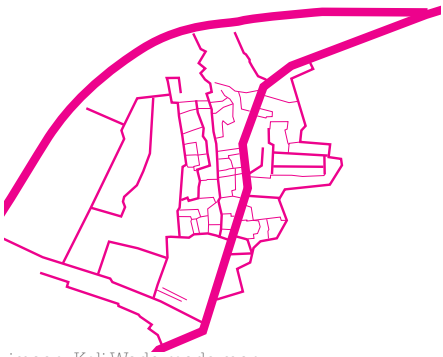
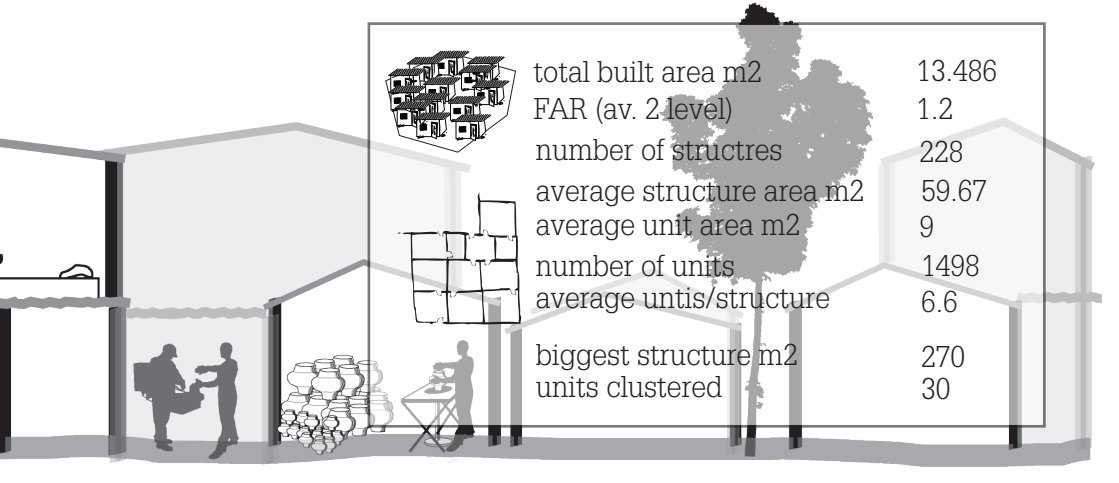
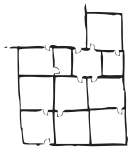


image: Koli Wada roads map



total built area m2	13.486
FAR (av. 2 level)	1.2
number of structres	228
average structure area m2	59.67
average unit area m2	9
number of units	1498
average untis/structure	6.6
biggest structure m2	270
units clustered	30

proposed area m2	22500
total built area m2	15.593
built density index	0,69
number of cluster	219



average cluster area m2	75.94
average unit area m2	10
number of units	1590
average untis/cluster	7.26
biggest cluster m2	344.6
units clustered	34
population	8.443

area 2.77km^2

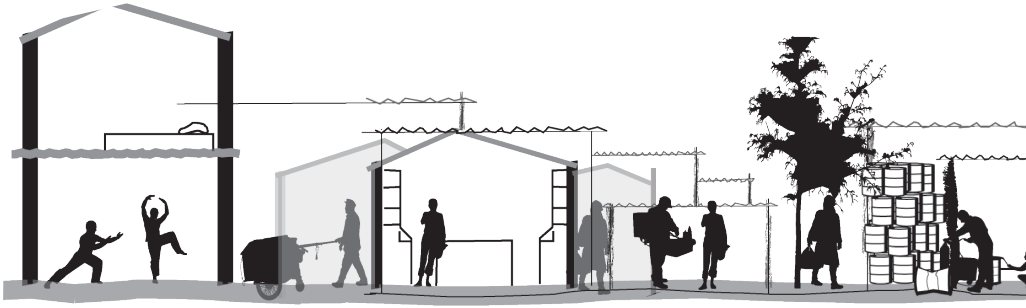
density 362.318 p/km2

annual turnover	130 million???
real estate value	n/a
	25 dollars/month
average income	130 dollar/month
rent	

work n/a

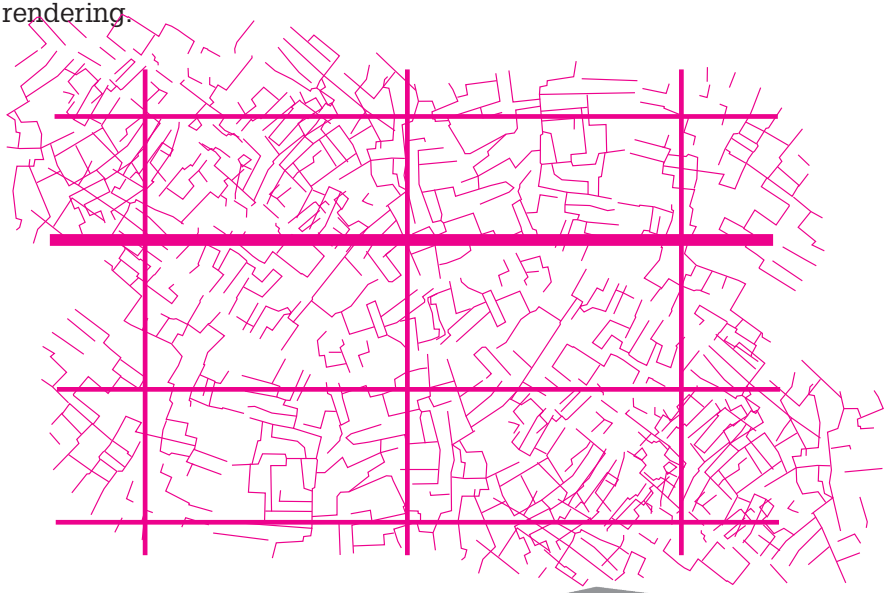
water 5.000 taps
200 vendors

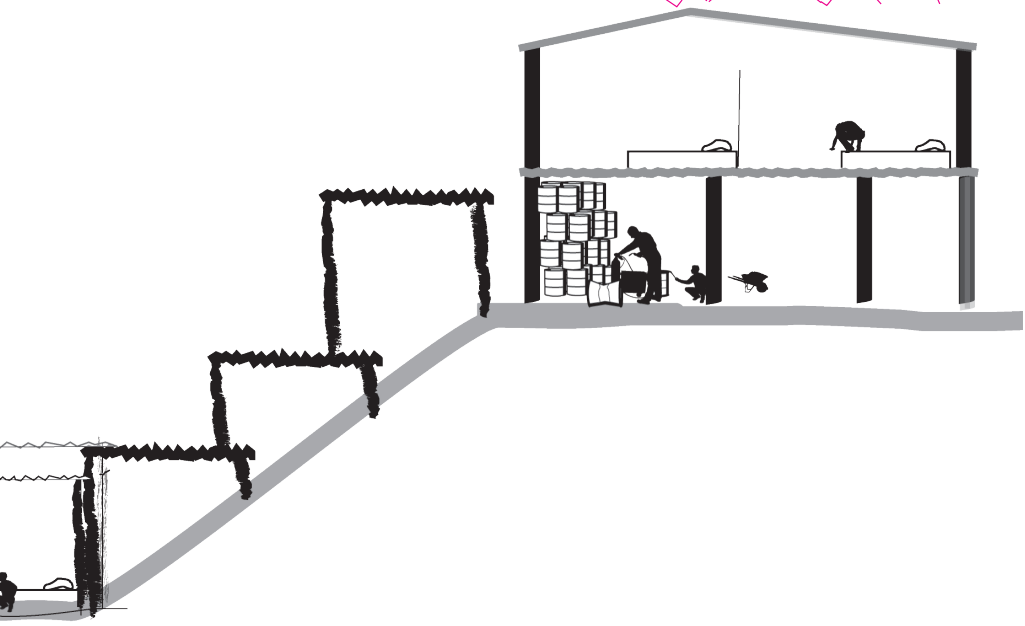
sanitation 650 toilets

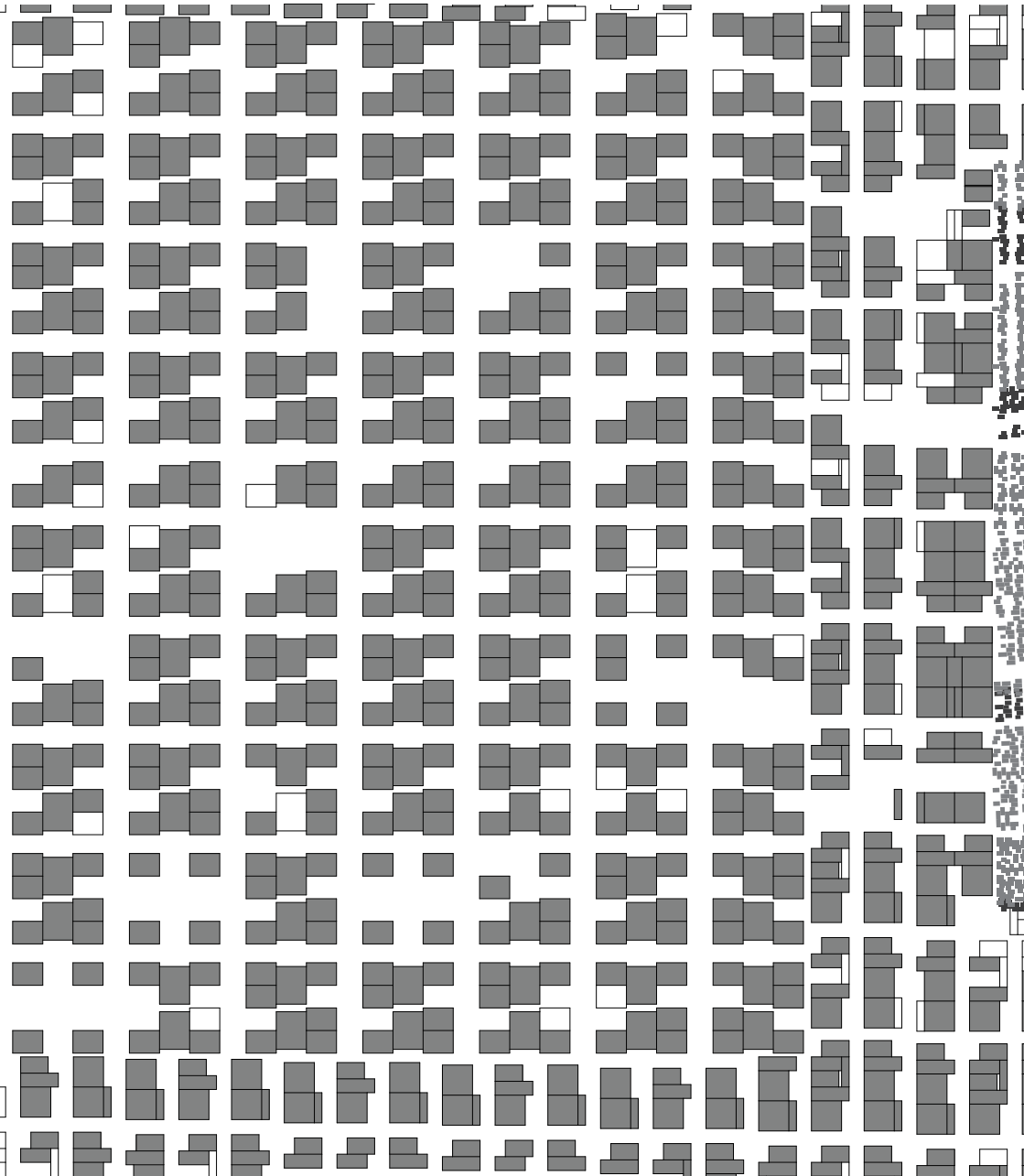


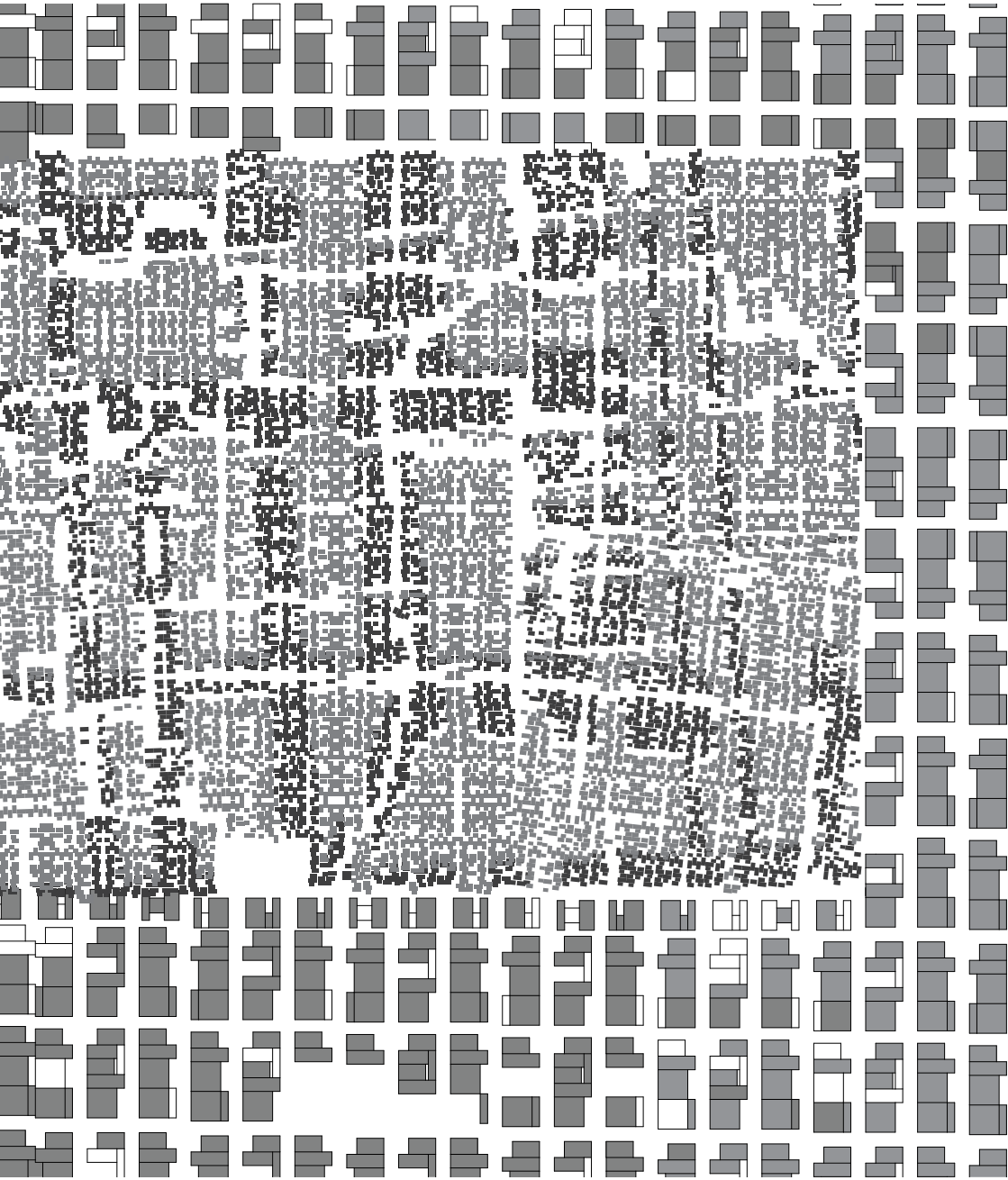
2.2.3 Slum modeling

The research of the three slum areas has led to the following generic data. This is abstraction level allows for a generic solution. It is comprised of all data found weighted by the indexation, according to the global slum situation, and can be seen as generic slum data. On the following page the plan view of the slum is showed, followed by a 3D rendering.





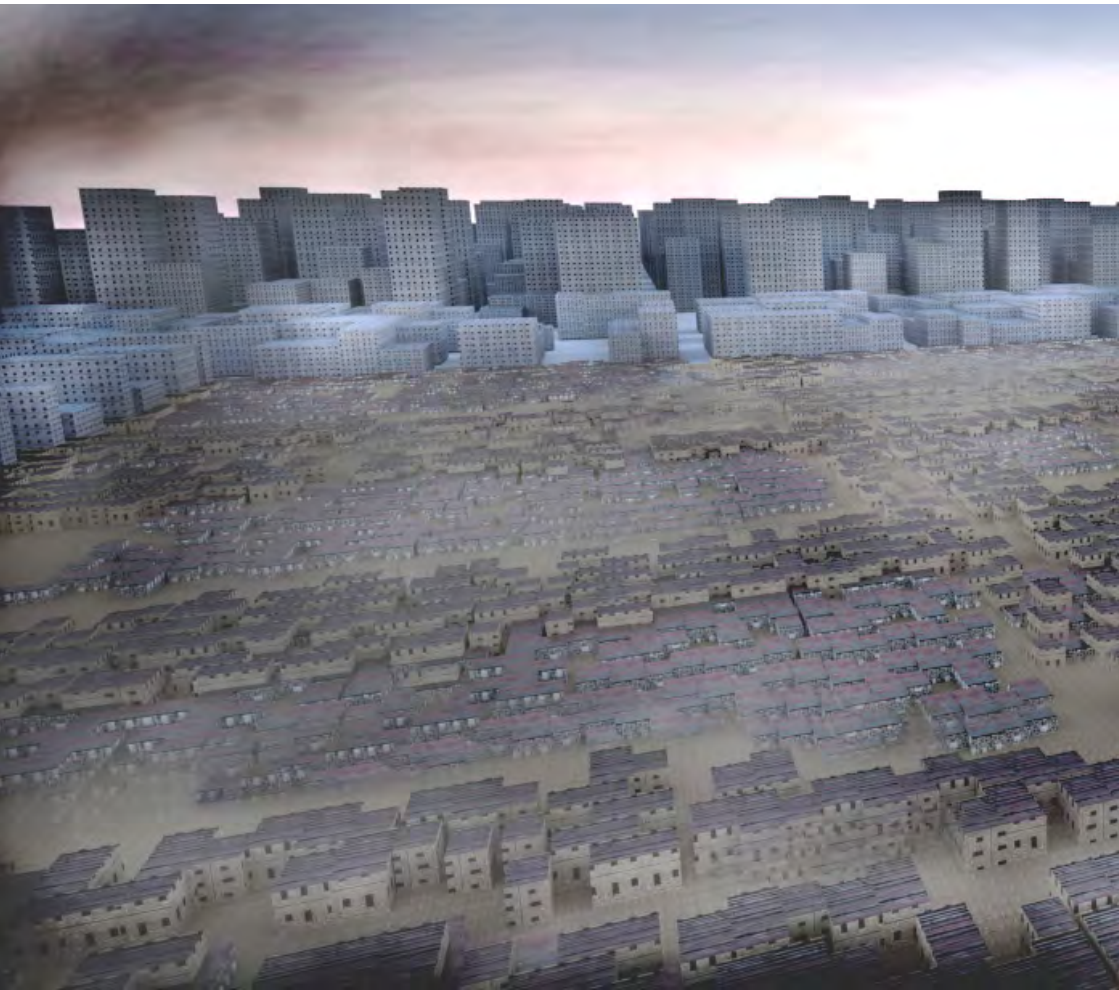




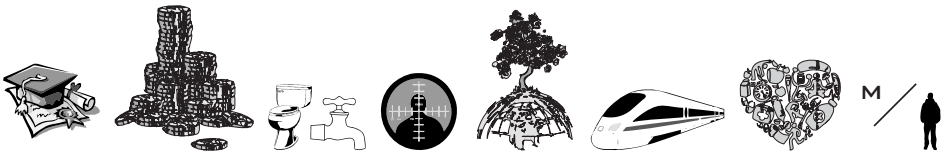
2.3 Current initiatives

The slum situation is already on the priority list of many governments in countries where slum presence is prevalent furthermore most developed countries give foreign aid. In addition, many western Non-Governmental Organizations (NGO's) are working with slum areas. Each participant engaging with the slum urgency does so differently. It is important to show what the current initiatives are, and even more importantly, what the effect is of each initiative. However it is impossible to test all possible individual initiatives. A few general ones are used to indicate what the effect is.

1. Demolish the slum
2. Charity
3. Upgrade the slum
4. Invest in the city
5. Invest in the slum



Each initiative is shown with an image and a graph. This diagram is a sketch on how the slum will develop after the imitative. The graphs indicate how in time the areas will develop. The different color lines are based on the legatum prosperity index criteria[31]. the index differentiates between education; economic performance; sanitation; safety; environment; transportation; health and living area per person. These graphs are not precise, but they indicate what would happen, through a rational analysis of the initiative.



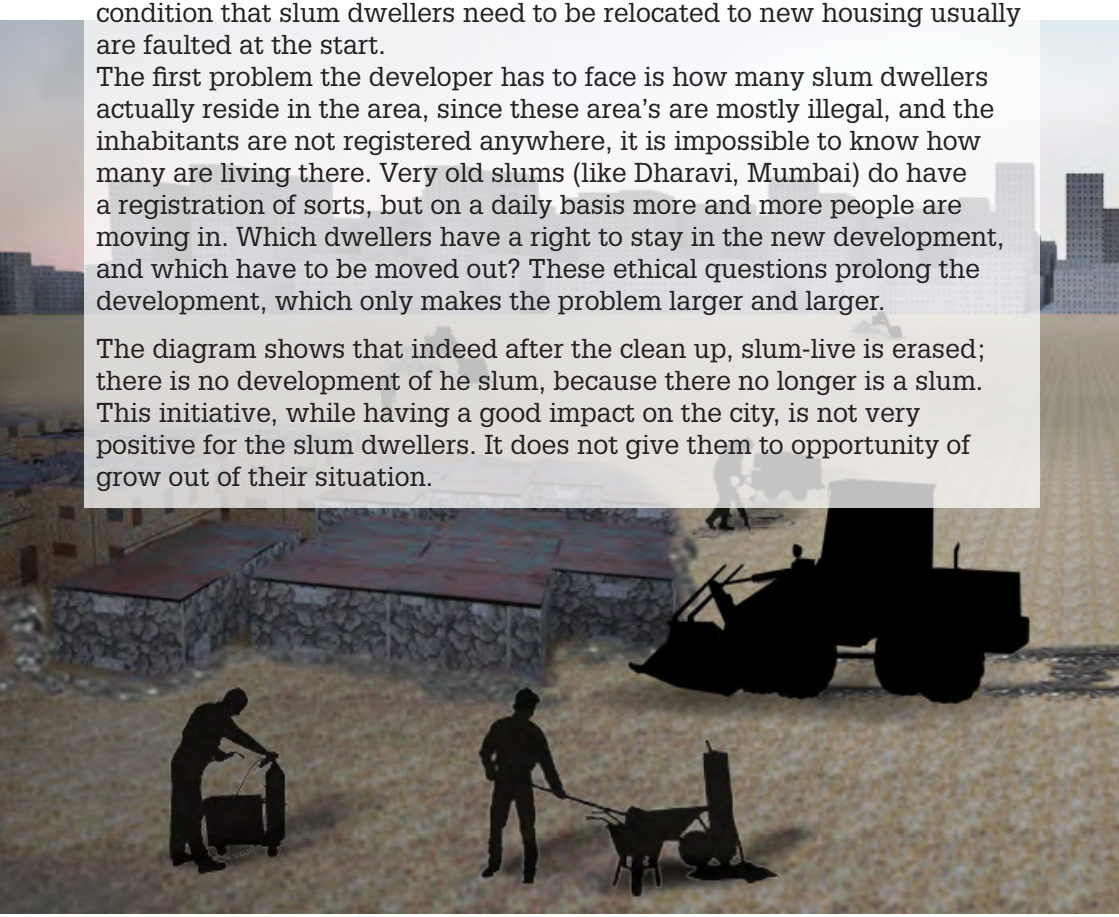
legatum properity index criteria

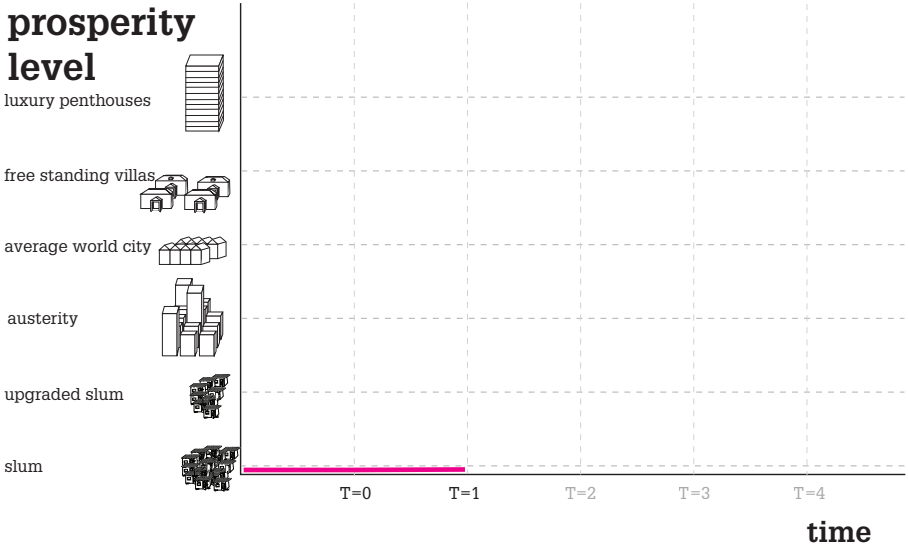
2.3.1 Demolish the slum[32]

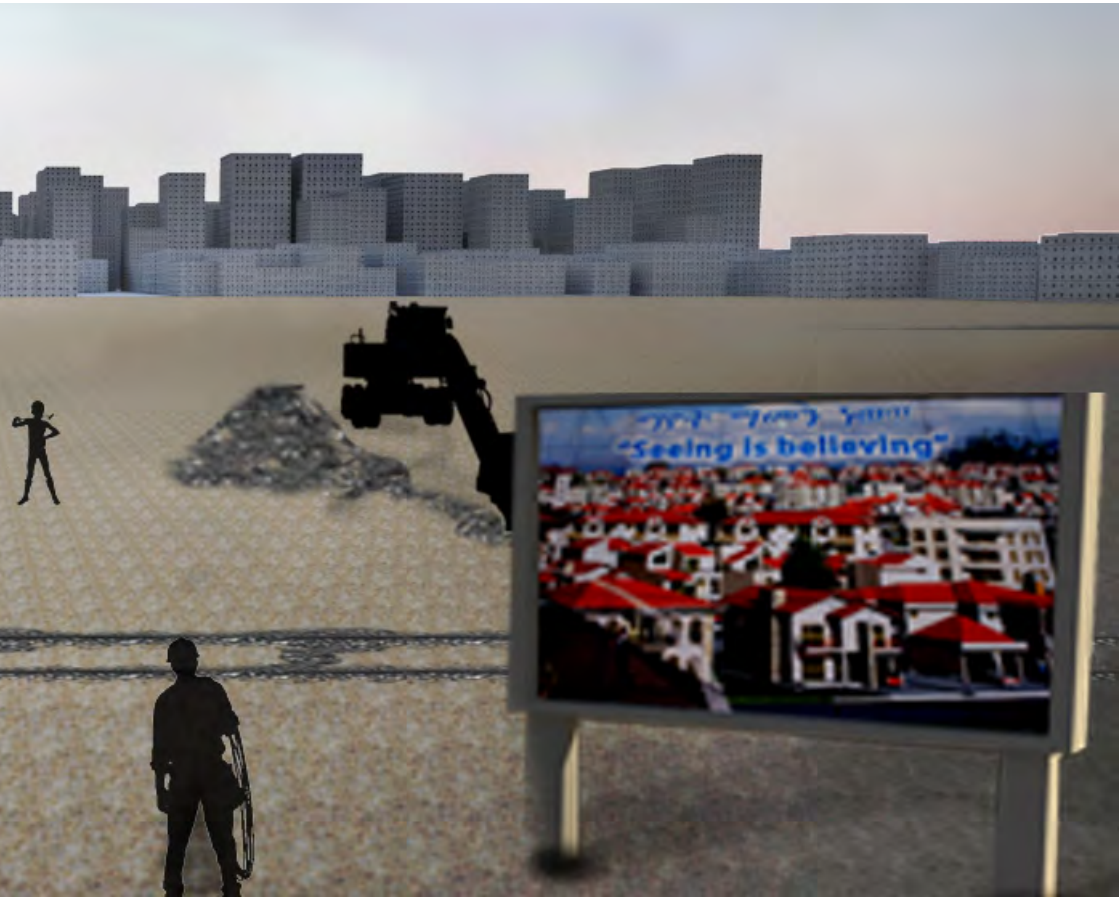
First the demolition of the slum area, here the slum is completely cleaned up/out. This provides room for new development on high potential building sites. Slums often are located on land that belongs to the city. Therefore, the city council holds the right the remove illegal structures and allow for large buildings companies and developers to roam free and build what the city council seems worthy. Often the leads to the option that makes the most profit, which is middle class and upper class housing and business districts. This leaves the slum dwellers without a place to sleep, thus moving to another sidewalk or other part of the city that is undeveloped. In short demolishing slums only fills the pockets of high-ranking city officials and developers, but simply shifts the problem to other parts on he city country or globe, which ever you prefer. There are examples where the slum clean-up is followed by a mixed development. A developer can utilize the area on the pre-condition the slum dwellers are also housed. This type of development is of course far better then leaving it completely up to the market to decide what to build. There are however a few loop holes. The projects led by the pre-condition that slum dwellers need to be relocated to new housing usually are faulted at the start.

The first problem the developer has to face is how many slum dwellers actually reside in the area, since these area's are mostly illegal, and the inhabitants are not registered anywhere, it is impossible to know how many are living there. Very old slums (like Dharavi, Mumbai) do have a registration of sorts, but on a daily basis more and more people are moving in. Which dwellers have a right to stay in the new development, and which have to be moved out? These ethical questions prolong the development, which only makes the problem larger and larger.

The diagram shows that indeed after the clean up, slum-live is erased; there is no development of he slum, because there no longer is a slum. This initiative, while having a good impact on the city, is not very positive for the slum dwellers. It does not give them to opportunity of grow out of their situation.



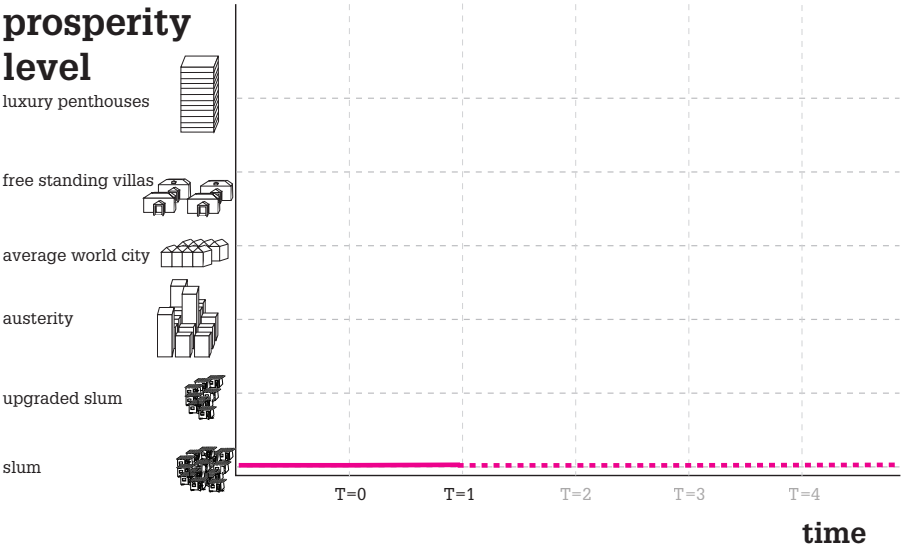

prosperity level
luxury penthouses
free standing villas
average world city
austerity
upgraded slum
slum
T=0
T=1
T=2
T=3
T=4
time


"Seeing is believing"

2.3.2 Charity

A charity project is perhaps to broad a term. Charity projects are successful all over the globe, be it to educate the children, or by small building practices. All charity projects are vernacular, small scale, and they do not have massive funds, since there are so many organizations all organized through small donations.

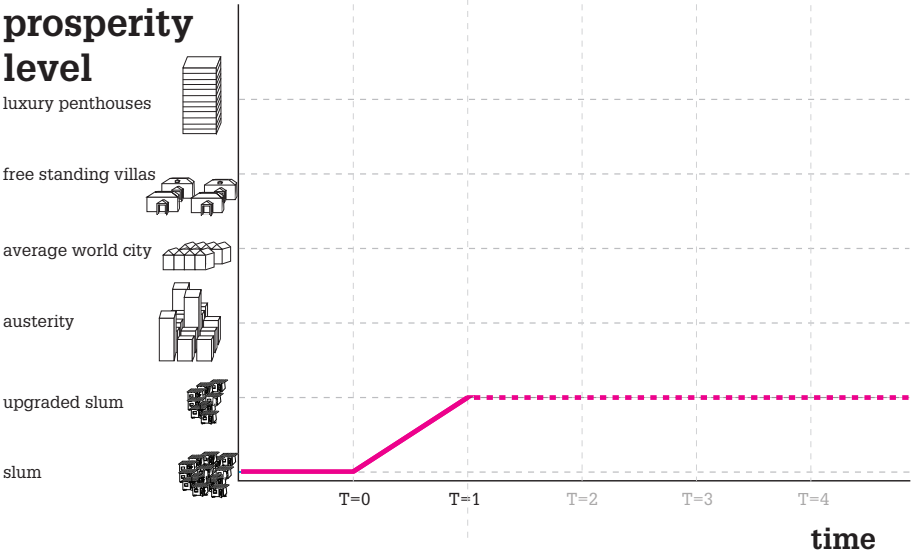
Featured here is the favela-painting project by jeroen koolhaas. In addition, Young Indonesian Architects[33] have done a similar project: colorful kampong. Both projects deserve respect, and are done with the best intensions. Indeed the happiness of the inhabitants in the areas might have had a short uplift by the projects. A however painted shack does not make it any less of shack, and it structurally does not help the slum dwellers in anyway. The slum is not more likely to redevelop itself in to a sustainable and durable city area; it remains a slum.


prosperity level
luxury penthouses
free standing villas
average world city
austerity
upgraded slum
slum
T=0
T=1
T=2
T=3
T=4
time

2.3.3 Upgrade slums

This is the new hype, and the way UN-habitat proposes to relieve 100 million slum dwellers from their slum existence. By simply giving the slum dwellers, a new house that erases them as slum dwellers according to the UN definition.

The project they currently have running in Kenya will cost around 1.2 billion US and will create housing for two millions slum dwellers. This adds up to about 6000 per household[34]. Further study shows that generically speaking around $4598 US[35 and 36] is needed per household to create a new type of slum, one where the UN-habitat definition no longer applies. Factually, it would not be called a slum any more, but there is no outlook on durable development within these new areas. While the living conditions are greatly improved, economically the slum dwellers remain in the arrears of the city and global community.

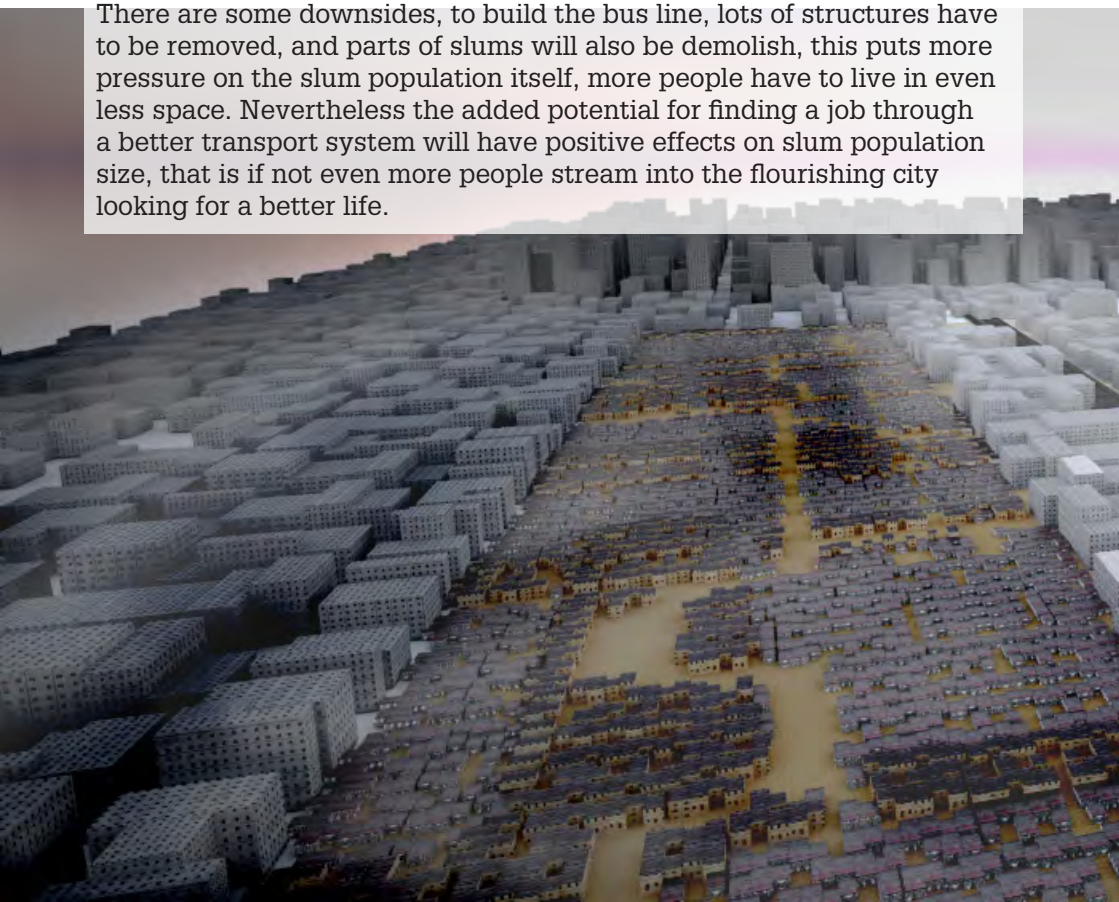

prosperity level
luxury penthouses
free standing villas
average world city
austerity
upgraded slum
slum
T=0
T=1
T=2
T=3
T=4
time

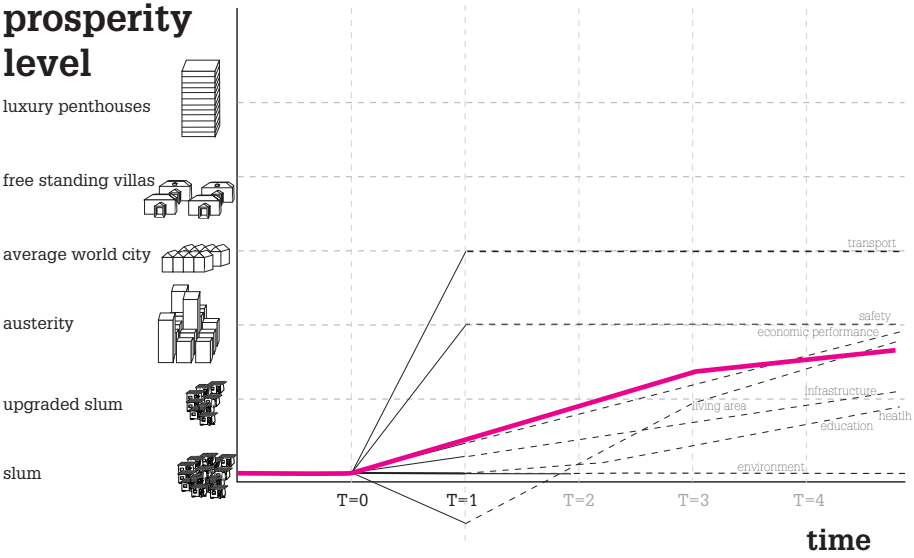
2.3.4 Invest in the city

The best project now known is perhaps Haussmann in Paris. Haussmann dissected middle age crowded Paris with large boulevards, which allow for a quick response to emergencies with in the city and most importantly greatly increase the hygiene of the city. [37]
For the sake of the present time here another project will be featured: the transmellenia[38] bus line of Bogotá. This 8.5 billion dollar project has had a great in impact on the city. New businesses came to the city and through the bus line; low-cost workers out of the slums are able to actually come to work.

This is what happens if a city decides to invest in the city itself thereby lifting the entire potential up. However the impact for the slum is somewhat absorbed by the rest of the city. Changes are slow, but chances are that in the end also the dwellers will benefit form this initiative. Former major Penalosa currently holds a professorship at Columbia University, in the urbanism department. His project is exemplary for one that effects the city population in its totality.

There are some downsides, to build the bus line, lots of structures have to be removed, and parts of slums will also be demolish, this puts more pressure on the slum population itself, more people have to live in even less space. Nevertheless the added potential for finding a job through a better transport system will have positive effects on slum population size, that is if not even more people stream into the flourishing city looking for a better life.




prosperity level
luxury penthouses
free standing villas
average world city
austerity
upgraded slum
slum
transport
safety
economic performance
infrastructure
living area
health
education
environment
T=0
T=1
T=2
T=3
T=4
time

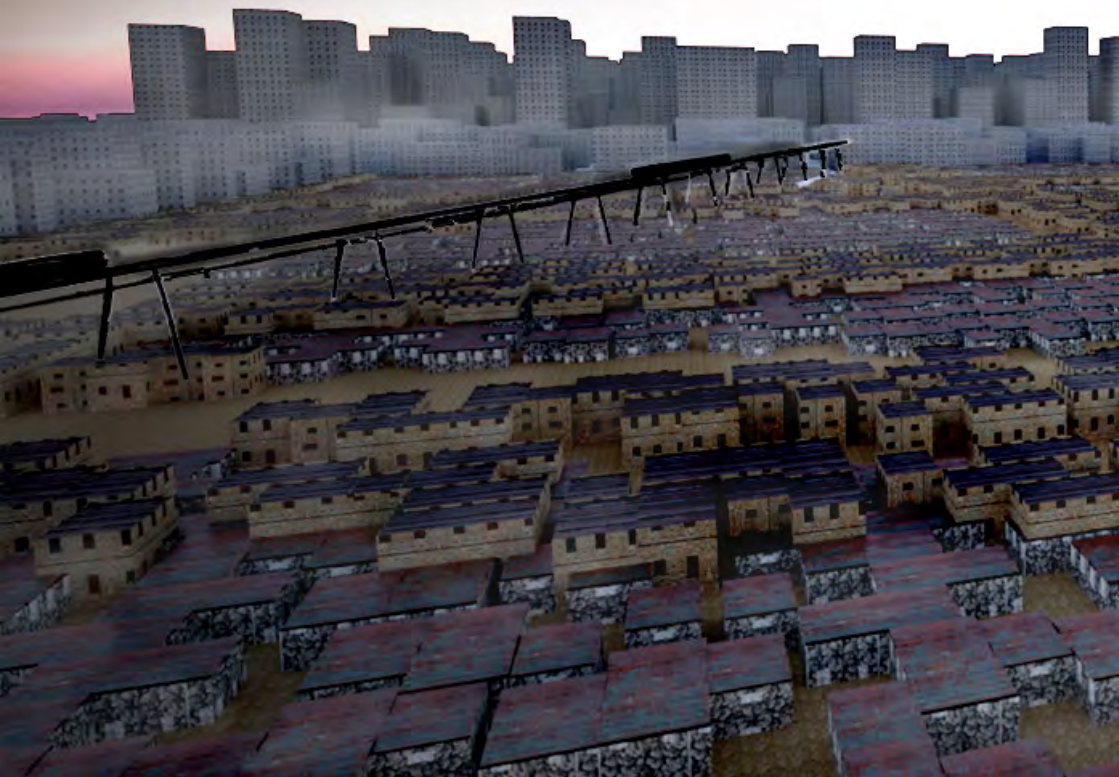
2.3.5 Invest in slum

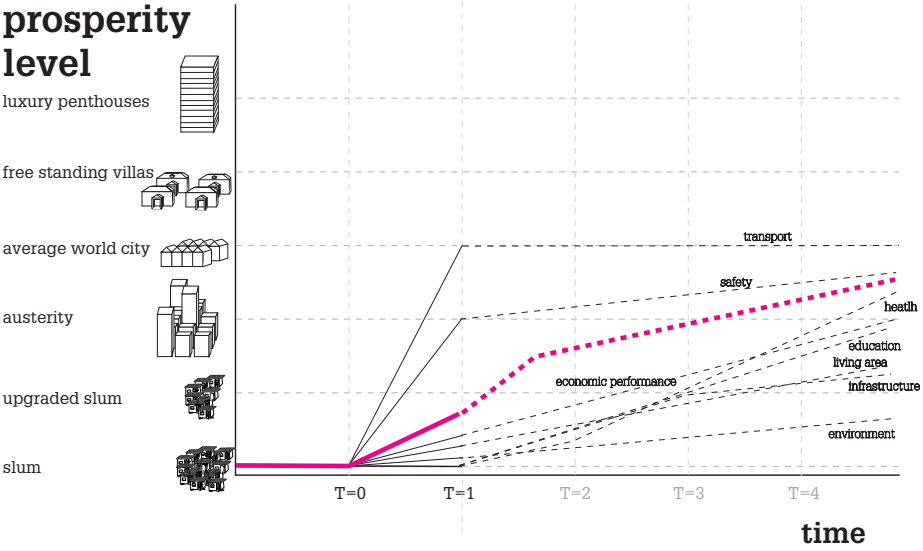
The final current initiative shown goes even one step further: Caracas Venezuela, here the slum is affected directly again by means of transportation. The cable train project currently under construction has no need for demolition of slum dwellings. Urban Think Tank[39] has done quite well to create a cable train station within the el liberator slum. This allows the slum dwellers to be directly linked to the city and the jobs it has to offer.

In essence, the project is extremely expensive, and has only little impact. Of the two-mile stretch the cable train is planned to serve only about 300 meters goes into the slum itself, the rest facilitates the central business district of Caracas. Change will come, but slowly. Some might just see it as publicity stunt of the major to help the slum dwellers, whilst creating an overestimated more of transportation for the higher class citizens.

Based on the initiatives we have just seen pass the revenue one can conclude that there are as of yet no solutions created to boost slums into an era of sustained growth, and a generic solution is even further on that horizon.

Instead of solving the issue at hand let us ask the question why are there slums?




prosperity level
luxury penthouses
free standing villas
average world city
austerity
upgraded slum
slum
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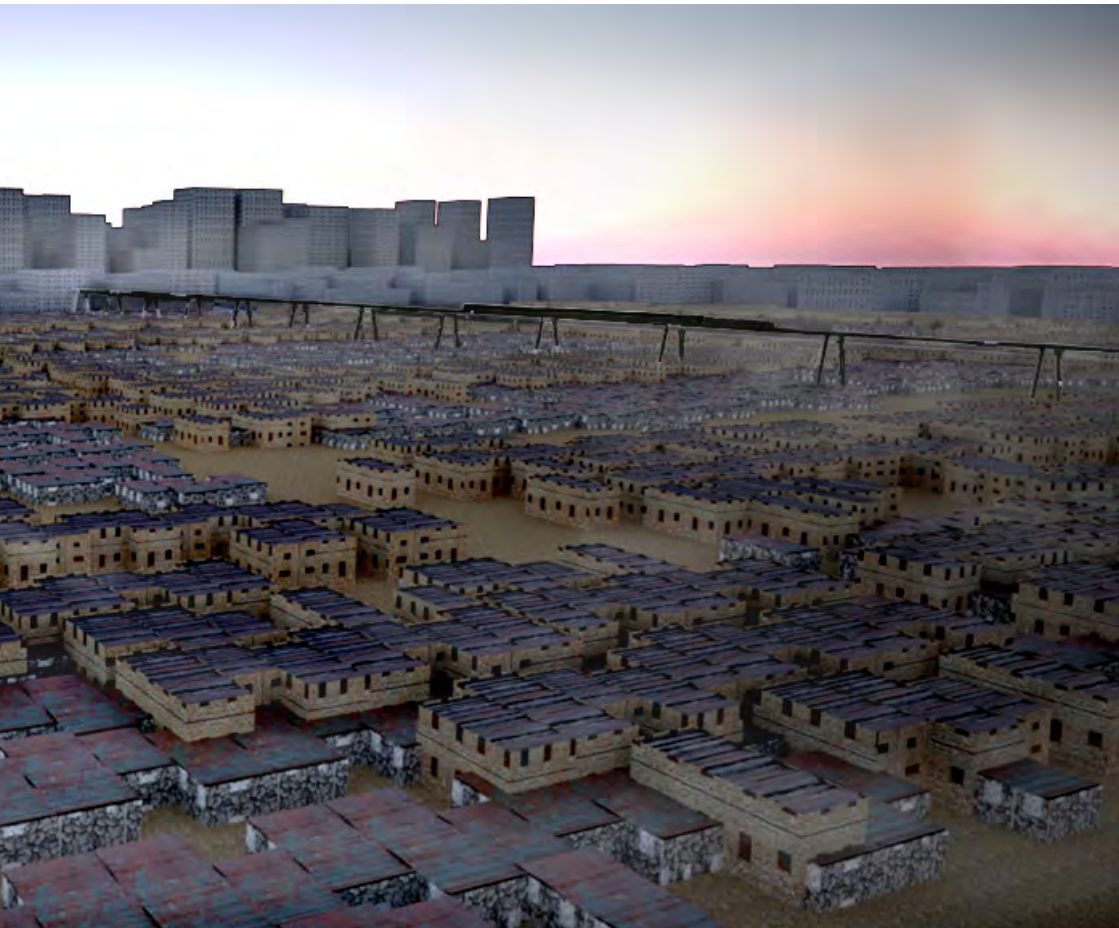
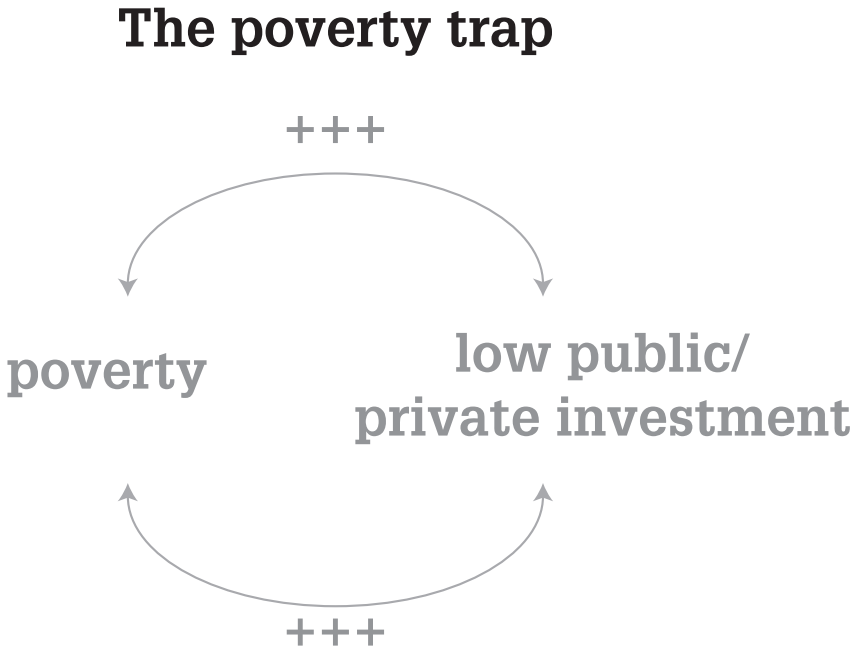


2.4 Why are there slums?

The estimation that the informal urban areas will absorb 90% of population growth across the globe is alarming. How is it that while humankind is able to travel in space we are not able to provide for adequate housing and facilities all humankind? Billions dollars given in aid yearly are not enough or not used effectively enough to solve the problem of the urban poor. Perhaps slum dwellers are simply lazy, but research has given an alarming counter argument.

Jefferey Sachs in his book common wealth refers to slum dwellers being trapped in poverty.[40]He argues that they cannot meet their immediate needs like food, water, health care, adequate housing; therefore they cannot not possibly develop further since their entire effort in life is to survive: there are no surpluses that could lead to further development of the community. The Berkeley faculty of economics backs up this definition of poverty trap. The faculty has done a research on the subject and concluded that the urban poor are locked in low return occupations.[41] Indeed the urban poor are trapped. Moreover, they are not lazy; slum dwellers are more then willing to change their lives. Primarily they want to have the opportunity to grow, to rise to new standards.

Precedents in Pakistan show us that the community tries to come



up with collective program[42]. All the pennies that can be spared are collected and put to use for the greater good of the communities. This way the Orangi Township has created sanitation for the entire slum.

Slum dwellers have the power but lack the means to engage in far going development of the area for which much larger funds are necessary.

The previous paragraph argued that without a sustainable/durable initiative the slum dwellers will remain. Simply giving them part of their basic needs will not suffice. True they may no longer be living the horrid conditions they are now living in, but for how long? Who will keep their housing intact? Moreover, who will make sure they have enough water when current initiatives have no more funds left to give?

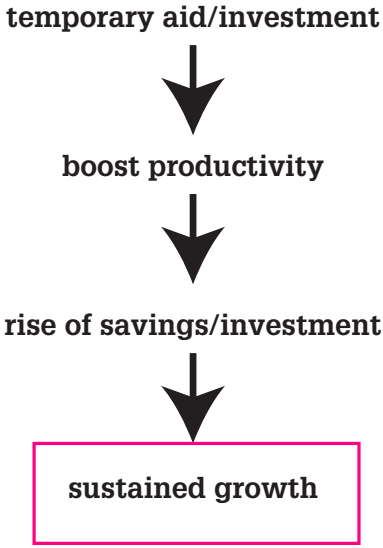
A more durable solution is to encourage and help the slum dwellers to solve their problems themselves, with a little incentive. When the critical mass is reached and the tipping point found slum dwellers are highly entrepreneurial and collective, they are in fact the motor of the city of the future in most parts of the world. According to Saskia Sassen the greater cities in the southern hemisphere would not thrive or be emerging market economies if it were not for the urban poor living in informal settlements[43]. A generic solution to lift the standards for all would suffice, and take the world to another playing field. Ready for humanity to keep evolving on the pace it has the last 100 years, or even faster with the advance technological breakthroughs bound to be waiting around the corner

A generic solution for the global problem of slums; it all starts with economic performance, if the economy grows, so does the power of the people who harvest the wealth created. We will go over the urban economic views of Saskia Sassen, and relate them with Jane Jacobs. The conclusion will show that it is possible to inject a booster into a slum, and have it multiply itself into and era of sustained growth. Through calculations on both products and economics we will construct a vision on the generic slum. A vision will be the future of our emerging markets economies, a vision that is scary and utopia at the same time.

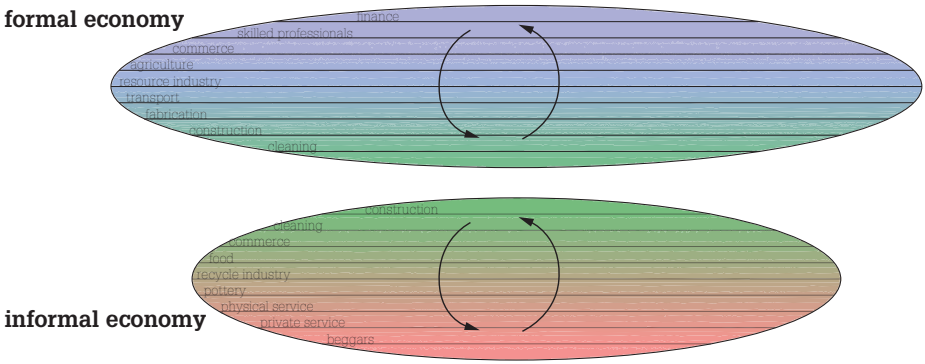
Chapter 3. Archonomics

To end the poverty trap[44] the slum will have to surpass it basic needs, Only then will it be able to develop itself. A strategic investment must allow the workforce to increase production, and income. Thus surpassing their basic needs, unlocking the potential to lift themselves out of the trap. Until now there is only one-way out of the trap. Some families make it big. The family moves out of the slum and start a life on the up. It is almost the American dream; come to the city where dreams come true. Of course, these are one of the lucky few that win the lottery of life.

But if in some way we can reach a critical mass of families making it, then given the collective nature of the community they will bundle their forces and develop their own informal living areas into a lower middle class and beyond. In fact, what we are trying to achieve is a shortcut through history. The rich and developed west once too was a slum like existence (according to present standards). Collectively we have all found our way into fully developed market economies with thriving populations. The key difference is the mass of population reached by the initiative. If wealth is accumulated simultaneously by a large number of inhabitants, these inhabitants will develop their own situation.



In order to do to unlock the trap the following chapter is very important: archonomics, architecture and economics, The chapter will show the essence of how an economy works. First a few basic economic lessons are described so we can understand how to intervene and what it will do to the local economy in the city. This is followed by what the slum has to offer. One needs to know where the biggest potential market is, thus the biggest potential for a thriving economic system that can give back to the community.



3.1 basic economic lessons

In respect to economic systems within the city, most people refer to two "different" systems, one being formal and one being informal. The distinction is true in a legal sense:

The financial dictionary defines informal economy as:
System of trade or economic exchange used outside state controlled or money based transactions.
Whereas formal economy is the system of trade or economic exchange used inside state control.[45]

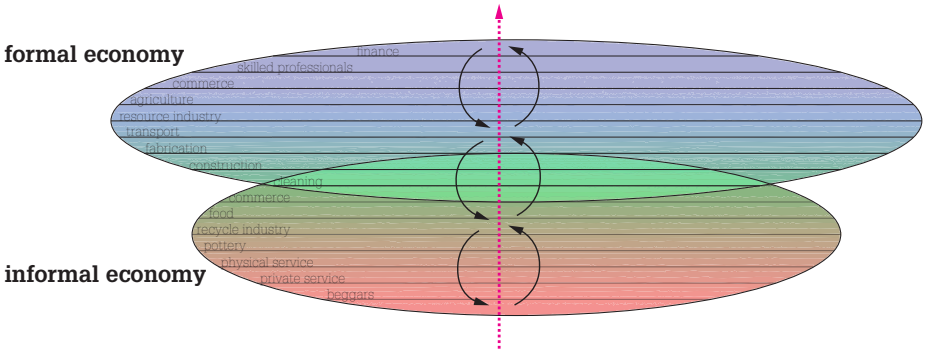
Informal economic activity is a form of exchange without regulations and laws. Practiced by most of the world's population, it includes barter of goods and services, mutual self-help, odd jobs, street trading, and other such direct sale activities. Income generated by the informal economy is usually not recorded for taxation purposes, and is often unavailable for inclusion in gross domestic product (GDP) computations.

However, in reality it is a single system according to Saskia Sassen[46]:

A detailed analysis of advanced service based urban economy shows that there is a need for firms, sectors and workers that may appear as though they have little connection to an urban economy dominated by finance and specialized services. In fact, they fulfill a series of functions that are integral to that economy, but they do so under conditions of social, income related and often racial/ethnic segmentation.

The last part of Saskia Sassen quote is one of the things many governments try to solve, but one does not do so with more regulations and laws. To outlaw the informal economy does not help at all, for the economic activities already fall outside the state controlled economy. The slum booster will have to step over the definition and use the economy as a hole.

Aside form the legal status, for the economy of the city to growth, collaboration should dominate exploitation. Collaboration leads to new work, as Jane Jacobs will tell us further on. It is only possible to collaborate if the parties involved are willing to work together and have something to offer. This is where the economic evolution of cities becomes important.



Now we have established the economy is in fact one. We can dissect the economy into four sectors. The primary sector is comprised out of all activities that lead to resources. The sector is followed by a secondary sector, where resources are processed into products that can be bought by consumers. Thirdly, the commercial sector is comprised out of services and other non-tangible consumer goods, like entertainment. The fourth sector is service based in which research and development and services are the primary sub-sectors. In the fourth sector money is invest to create more efficient of productive sector in the beginning of the chain.

This system is reciprocating. Each sector demands the other sectors to develop and this development leads to more demands. The circle drives humanity to evolve. The evolution has taken us through the industrial revolution, to the computer and digital revolution, and at present, we are benefitting form the virtual revolution.

In order to better understand how reciprocating economic system work we will look at two lessons learned form Jane Jacobs.

3.2 Jane Jacobs

Jane Jacobs in her book the economy of cities[47] has inspired many urbanists, architects and architectural theorists and thinkers. The follow two paragraphs describe two important lessons on the economy of cities. The are of crucial importance of the project.

3.2.1. Lesson one: diversity

Economic diversity is important for the economy of a city[48]

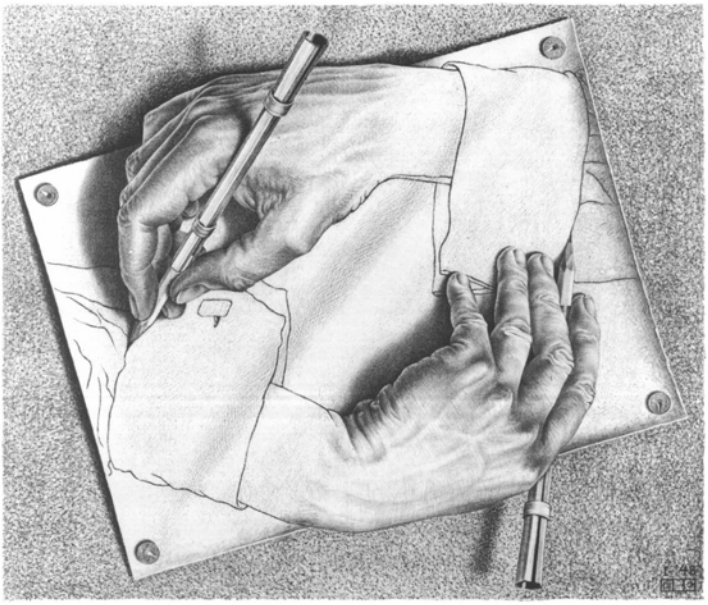
The economy of the city is much like the harvest of crops. In the early middle ages farmer realized that focusing on one particular species of crop made them vulnerable for pests and other diseases. One single blow and the entire harvest for the year would be gone. By diversifying their crops, they split their bets thereby decreasing the chance something would wipe them out. The same is found the Darwin and it is also the reason incest does not lead to a superior race. For a city to be completely invested in one particular sector of the economy, or even worse a specific part of the economy, opens the chances the city will not survive a pest, or an economic blow in that part. This has historically happened many times, perhaps even Babylon suffered from this fate. A more recent example is the city of Detroit. Detroit has known tremendous growth and prosperity. It has been known as the pinnacle of the American dream. After flour mills, needed ships Detroit turned motor city. In the early 1900, shipyards carried the city, producing ships that ruled the oceans of the world of mass transportation. This expertise leads to the creation of cars half way through the last century. GMC and ford started the evolution with the creation of the Mustang, a fully adaptable car available for all households. Detroit was standing on the shoulders of giants and looked unbreakable. The financial crisis of 2008 killed the motor industry in Detroit and within went the city, which has suffered the most foreclosures of the continent. A thriving American picture perfect dream city of endless opportunity suddenly is turning into a ghost town. The city has had the reset button pushed. Presently, Detroit is turning back to its local population to recreate the city. Back to the creative industries, alternative businesses are taking of, and it promises to be a bright future.[49]

It hasn't always been like this, and Detroit is of course a multimillion-inhabitant city. Small towns of the gold trail from east to west America have completely been abandoned when the gold rush ended. These town where 100% focused on the miners passing through, when the flow ended so did the towns.

There are many examples and metaphors to describe how important diversity is for a cities economic survival. All who read this book will have the intellect to see so, I presume

3.2.2. Lesson two: Reciprocation

The second lesson Jane Jacobs has described is how a reciprocating system works. Reciprocating systems are all around us. Perhaps every self-sustaining system is reciprocating, but in a reciprocating system if one parts stops, the whole system fails. A simple example is an animal. An animal eats, hence it has the strength to find food, which allows him to eat, which allows him to find more food etc. similarly our harts pump blood through our lungs which allows for oxygen to by transported through the body, which allows the hart to pump blood through the lungs and the circle continues. Economies show the same concept. People work, and earn money, which they spend, on things other people make during their labor. Without a cash flow economy will falter much like the hart of a human being will stop if it has no oxygen to consume. There is however one important thing to mention: some types of work will lead to new types of work[50], much like the oxygen absorbed through the lungs in the blood pumped there by the hart is also used to power our the rest of our bodies. If say we start jogging every day this will lead to more muscle tissue, and hence will demand more blood to be pumped through the body; people who train a lot will have a stronger bigger hart muscle and larger lungs to ensure enough oxygen can be given to the blood transported through them.



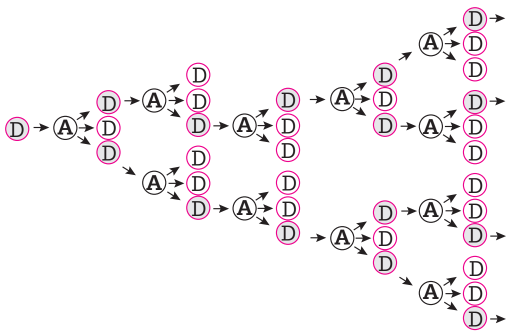
In this drawing by Escher reciprocation is visualized to perfection. The one hand draws the other and vice versa, without the action A action B cannot exist, however action B is just as vital to the process. The only way it can start is by miracle, or outside help, in this case the artist.

The economy of a city is much the same, when a process starts, like the fabrication of steel, it starts for a reason. This can be any number of things, but lets say it is because the population of the city has grown, and hence the city council start the build of a large community building, big enough to hold the entire population, some big ordinary bricks are not longer good enough to span the massive area needed inside. With the ability to create steel beams and columns suddenly there is a rise of a new architecture, since the town hall is built of steel beams and columns why not a new apartment building, or bridges etc.. Creating a steel construction for the town hall has lead the economy of the city to create a whole new work sector. More and more demand rises for the steel, and construction companies start to focus on steel only, which creates room for new construction companies in brick construction. The reader can surely follow how the process works it is indeed elementary economics. But it is essential to understand how new work is added to the economy of a city, since the global slum situation needs an economic boost, a structural durable and sustainable boost. In short, the slum needs to add new work to the city, and this addition should lead to new work, which should lead to new work,.. etc. Jane Jacobs describes two fundamental processes that allow for new work to be added:

1. Export-multiplier effect
2. Import replacing multiplier effect

3.2.2.1. Export multiplier effect

If a local worker starts to export his products, the local economy benefits, there is more space, since part of the products he usually sold in the local market is now taken away, but the city still demands his products. The local worker could start to produce more, for which he would new more workers, thus more jobs and the cities economy expands. But it does not stop there. If more workers are needed, they will have a bigger secondary spin-off. All these workers will need groceries, so the shops will sell more to the workers of the producer. And since they sell more products, they need to buy more, or grow more, which leads to yet another influx.

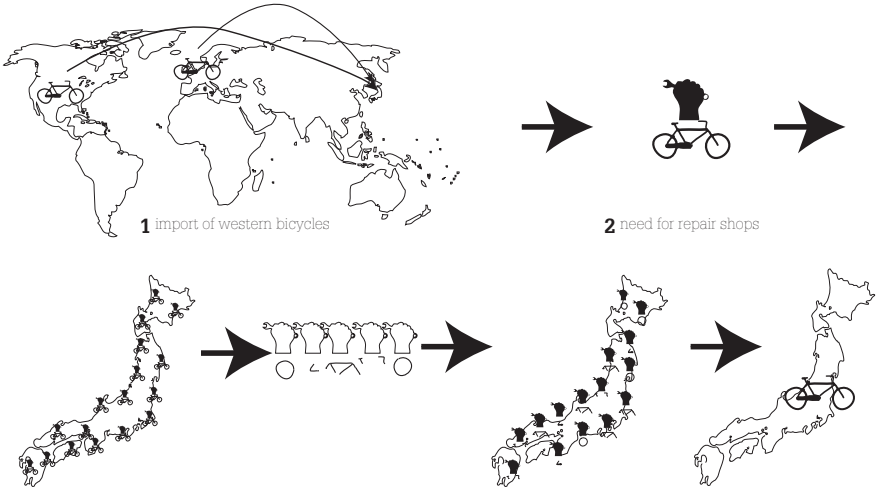


This effect multiplies the cities economy, for every new export has multiple secondary works for the local economy.[51]

3.2.2.2. Import replacing multiplier effect

Within a cities economy there is export and import. The import replacing multiplier effect constitutes the reaction of a cities economy to import. First the city demands a certain product or service, which is can import form any other place. The inhabitants of the city will quickly see the chances in the economic market, leading to a decrease of import and an increase the vernacular economy. The following story about Japan and bicycles will illustrate how the process works, indeed replacing import will increase the vernacular economy, and in most cases even goes on to multiply further through new export options.

Around 1800 Japan imported bicycles from Europe and the US. After a while the bicycles would need some repairs, so a few Japanese repair shops opened for business. As the amount of imported bikes increased, so did the business for the repair shops. These shops got so good in repairing bikes that they started producing their own spare parts. Within cities repair shops started specializing in certain specific parts of the bikes imported. These parts became better then the parts the bikes where originally fit with. This lead to the creation of a Japanese bike, like Koga Miata. The Japanese no longer had to import bicycles from all over the globe, they could produce the bicycles themselves, creating many jobs in the economic market. The bikes became so good that at some point the Japanese started exporting bikes to Europe and the US. Currently most bikes come with a Shinamo brake system, which is Japanese made.[52]



3.3 Collaboration

Jane Jacobs may have described beautifully how the reciprocating economic systems within a city work. However to actively create this system one fundamental block must be taken. As has been shown in the bicycle example the different bike shops had to work together. Each specialized shop contributed to the creation of the Japanese bike. In order for the economy of a city to grow collaboration is indispensable. One needs to understand how collaboration between parties works in order to actively engage with the reciprocating system.

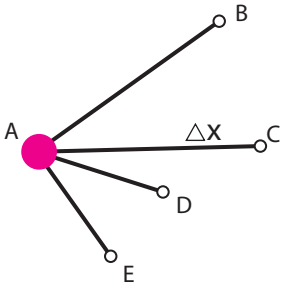
Collaboration is when two or more parties work together to produce something, anything. In writing this book the I have consulted dozens of intellectuals, each one of them has collaborated with me for the creation of this book. further details see the credit chapter; the point is clear.

Collaboration is based on proximity. A closer investigation of the term proximity allows for the identification of the potential for people collaborating. A study done by the University of Utrecht identifies 5 different types of proximity. Each has it own value in the process of determining how likely collaboration between parties is. Utrecht University studied more then merely geographical proximity, although it is one of the items on the list. In the slum booster project in which a strategic business venture is created to boost the urban informal areas it is highly important to take into account the likely hood of collaboration.[53]

3.3.1 Proximity 5 types:

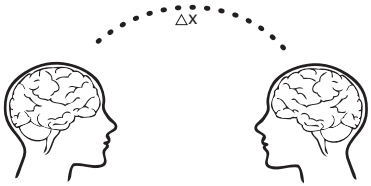
1. Geographical proximity[54] refers to the spatial separations between actors, and is supposed to provide easier and less expensive face-to-face interactions.

Depending on the level of development spatial distance is can become less important. For instance multi national franchise firms collaborate on a global level. They all work to reach the same goal: to sell or service as much as possible. If the director of Holland McDonalds wants to collaborate with the director of Germany on a new commercial plan to win the rest of the fast food market in the German-Dutch border area they will simply take a plane and fly back and forth for meetings. A farmer in the north of Pakistan with the best beef on the globe will probably not as easily fly back and forth between Europe. Even worse, perhaps he does not even have the means to travel across his own country in order to sell the beef in Karachi. The geographical proximity to other parties restricts his potential for collaboration.



2. Cognitive proximity[55] refers to the degree of similitude of knowledge bases of organizations, and is necessary to communicate and transfer knowledge between partners. The collaboration choice results of a situation where the organization needs external knowledge in order to innovate.

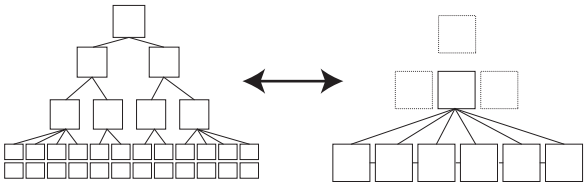
Here the intellectual level plays a role, an illiterate Eskimo will not be likely to collaborate with a graduation student in Holland, or in Greenland for that matter, perhaps only if the student is researching migrating patterns of that Eskimo group, in which case the cognitive proximity is very high as they probably both know a lot of migrating patterns of that Eskimo group.



3. Organizational proximity[56] is defined as the degree of hierarchical interconnections between two organizations and reduces the uncertainty about the behavior of the future partner.

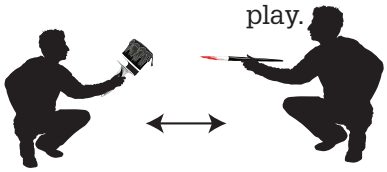
Here it is about companies working together. Again a simple example will show the working of this type of proximity. A large architectural office has a problem with a structure design. The office is working on the biggest skyscraper of the world, twice as high as the Burj Kalifa

1600 meters. The architecture office will most likely not work with a one-man construction company. The freelance agent might have the intellectual capability to create such a tower, but if he gets a bad case of the flu the project design would come to a stand still. The big office would be more likely to work with a large construction constancy company. There is much less uncertainty in that collaboration.



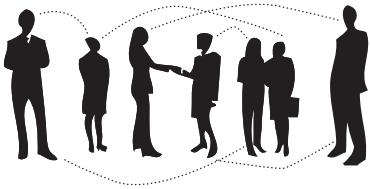
4. Institutional proximity[57] is defined by the similarity of informal constraints and formal rules sharing by actors, where common representations and routines of working allow organizations to realize an efficient transfer of knowledge.

There the code of conduct comes into play. Offices that work in a similar way are more likely to collaborate. An artist who creates photographic images in paint is not likely to collaborate with a painter who only uses a roller to paint 100+ square meters in a certain colors. Even though the two work in the same field they works with an entirely different set of tools and ethics and will rarely collaborate.



5. Social proximity[58] refers directly to a kind of proximity between individuals where friendship and trust are central, and is supposed to diffuse informal knowledge, which facilitates collaborations.

In the great world of business it's all about whom you know. A friendly word or a letter of reference can take one a long way up the ladder of a company. The acquisition of new work for a company largely depends on the capability of managers and professionals who work in a social network. Getting the foot in the door takes you half way into any conversation. Informal networks are very important in the potential for collaboration in small micro economic systems. The bigger and more professional companies get, the harder it is to utilize social networks for advantages, but for the sake of the slum booster project which is based primarily inside the slums which is dominated by a grey markets social proximity enhances the potential for collaboration greatly.



3.3.2 How to use proximity as a tool

The 5 different types of proximity can be used as a tool for urban planning, or planning of an economic entity within the generic slum. By strategically positioning the economic performance booster, and carefully selecting it, one can maximize the potential for collaboration, and in doing so, also maximize the possibility for new work to be added to the economic system, thereby maximizing the reciprocity of the system for the area, ultimately this maximizes the capability of the slum to develop itself. When one tries to work with planning schemes of company structures within an urban fabric it is important to cover the city as a hole, with its economy, and the vernacular situation. In this research the slum versus the city. The author would like to note that indeed there is only one economic system within the city, but for collaboration purposes it is important to make a distinction between the informal areas and the developed city itself.

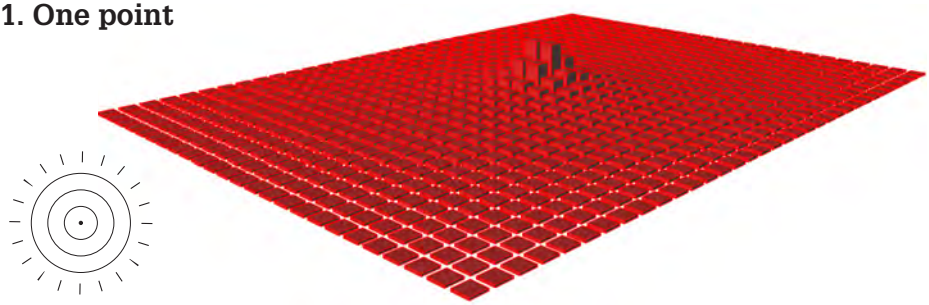
The goal should be to maximize the potential for collaboration within the slum, but also between the slum and the city. The companies in the city would presumably have more means to invest (and should have reason to want to) but for the multiplier effects to work the potential for new work to be added within the slum is more important.

Geographic proximity is the easiest to map out. Cognitive proximity can be fairly easily be seen, to take a shortcut odds are that the slum dwellers have a lower literacy rate than then city inhabitants, let alone academic education. However the low-income jobs can still provide a better situation for the slum dwellers then they have now as we will see further on. Institutional and organizational proximity can be worked on. In the beginning it is important for the two to primarily connect within the slum activities, as the slum develops it will get closer to the way city itself works. Finally it is important to note that the social proximity within the slum is perhaps far greater then the social proximity within the city. There is however a large gap between them at present. Still within a slum villages and families remain a pact, as we have shown, there is a strong collectiveness in the communities.

The geographic proximity in the generic slum is illustrated by data-scapes. This is a form of parametric modeling that creates 3D graphs to show how a certain implementation of an economic performance booster affects the area. The closer the inhabitants are to the booster the more likely they are to collaborate with it. Data-scapes allow for a visual representation of this relationship.

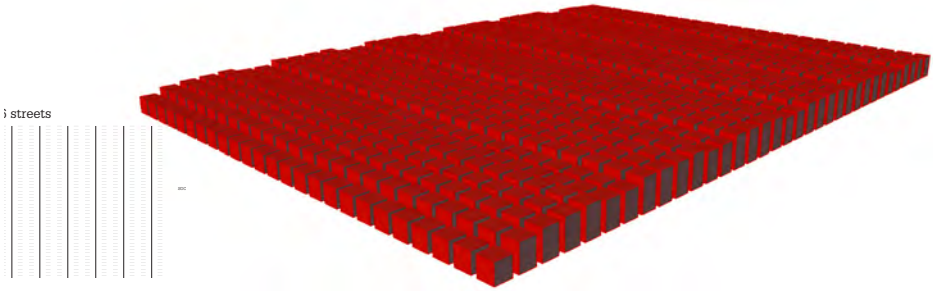
3 different types of implementation of a fictional company will be introduced in the model and the data-scapes will show the effect of each implementation on the surrounding area.

1. One point



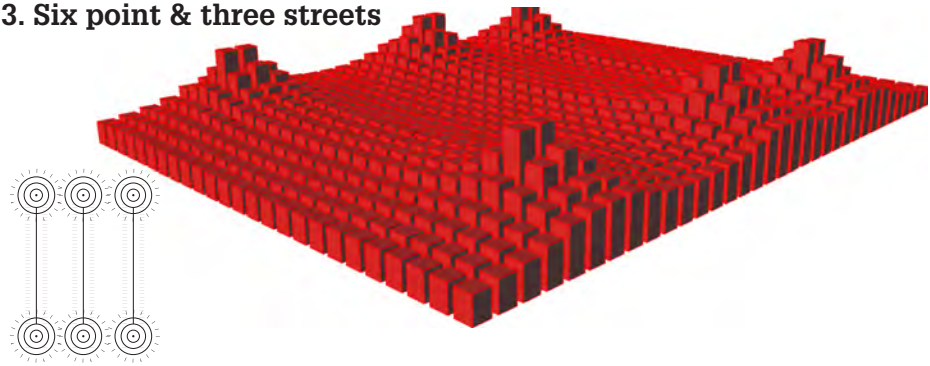
216 structures erased, equiv: 1400 units/households
268 structures effected by (within 50 meters)
1526 structures effected by (within 100 meters)
3048 structures effected by (within 150 meters)

2. Six streets



160 structures erased, equiv: 1037 units/households
2611 structures effected by (within 50 meters)
3816 structures effected by (within 100 meters)
5330 structures effected by (within 150 meters)

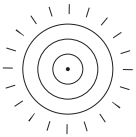
3. Six point & three streets

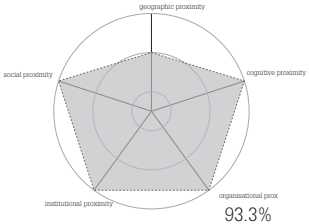


200 structures erased, equiv: 1296 units/households
7830 structures effected by (within 50 meters)
13169 structures effected by (within 100 meters)
100% of all structures effected within 150 meters

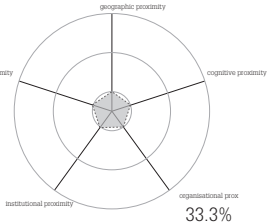
implant ◄——► city impant ◄——► slum

1 1 point





93.3%



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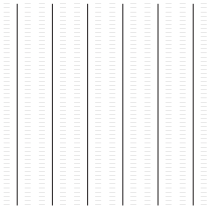

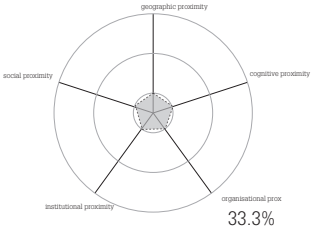

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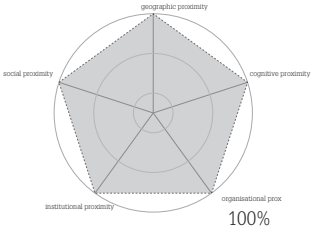
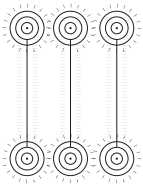
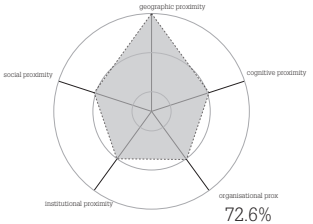


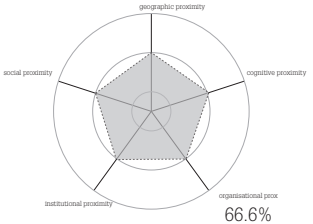
100%

3 6 points, streets





72.6%



66.6%

Next the data-scapes will be used to create two rose-diagrams per option:

1. Indication of the total proximity towards the city
2. Indication of the total proximity towards the slum.

The separation is made, because the relative proximities will vary depending on how the implementation is viewed upon.

The economic activity structure within the slum area differs from those in the formal city areas.
For our booster to start we need collaboration within the slum. At a certain point in time when the slums has developed to just under the city standard a critical point will be reached when collaboration with the city becomes important. At this point the development of the area becomes more and more city like.

The three Different data-scapes give us an indication of how the implementation will affect the area. The rose diagrams will zoom in on all 5 aspects of proximity related to the potential for collaboration. The concepts give us the possibility to see what type of intervention of economic performance on and urban scale has what type of influence.

The diagram are setup as three circles with five points surrounding. These rose diagrams are relative to each other. As we have three concepts tested there are three different levels of proximity. The outer circle represents the maximum proximity, and the inner circle represents the least proximity.

Following the data scapes and the rose diagrams one can conclude that the best option of implementation of an economic structure is a combined point/scattered implementation. This maximizes the affected area; therefore the likelihood for collaboration within the slum is the highest. The point insertions allow for a more "city-like" concept of company structure, which brings the entire implementation of an economic entity closer the structure of the city.

3.4 Selecting work sector

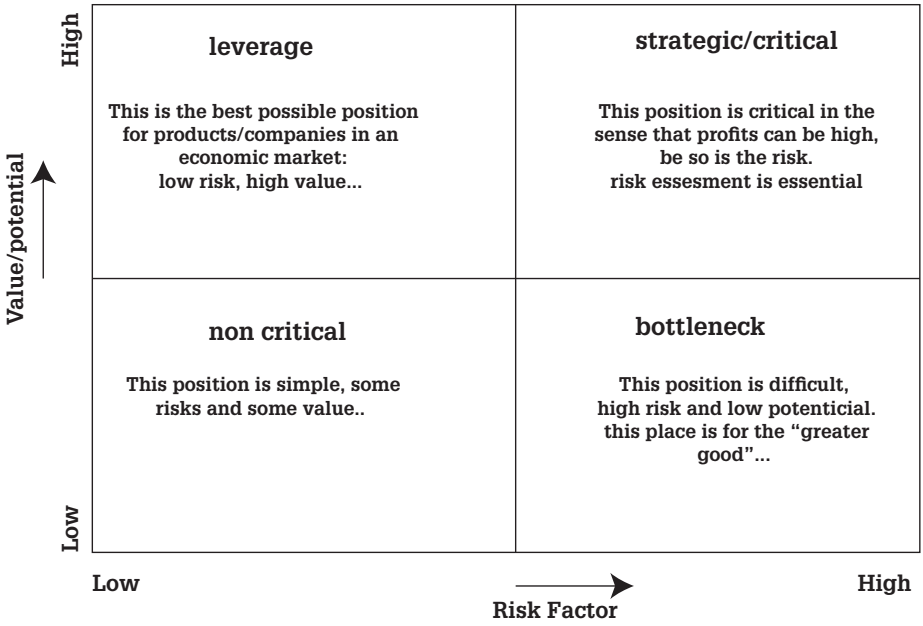
It is clear how the economy of a city works. It is also clear how collaboration and proximities work. Next on the list: How to find a suitable economic sector/business to boost?

Slum dwellers hold a variety of jobs:

Housekeepers; cleaning service, security guards and watchmen; small merchants and shopkeepers sellers, working in commerce and similar activities; street vendors; mechanics, blacksmiths, locksmiths and plumbers
tailors, seamstresses, designers, furriers; leather craftsmen and workers; weavers, textile workers and assistants
wood and paper craftsmen, carpenters and workers; goldsmiths, silversmiths, potters and jewelers; prepared food workers; barbers, salon stylists and related workers; shoe shiners, delivery men; dry cleaning laundry personal; workers in unclassified services; collecting and recycling waste[59]

How can this economy be boosted? Seemingly slum dwellers already hold a lot of different jobs, which is important for their economy to remain durable. Slum dwellers already collaborate within the slum with each other. And new types of work are added daily. Yet they remain trapped. Slum booster needs to find a work sector that can be done more efficiently and that will lead to the creation of new products. The Kilrijc model will tell us what type of company has the least risk and the highest potential.

In the Kilrijc model products or companies values/potential are set of against their risk factor. Through the model one make an assumption



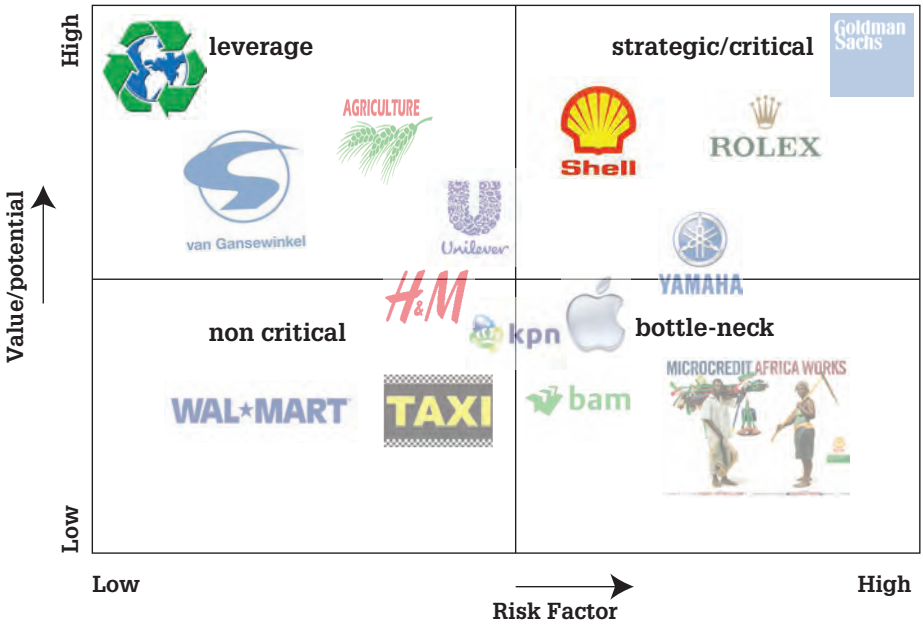
about high likely a certain product/company will have success ion the capitalistic market economy. The 4 quarters of the diagram are indicated as leverage, strategic, non-critical and bottleneck companies. The slum booster has to have little risk, and a high profit potential.[60]

Below the model is filled in with potential company types. Note: these are not the companies proposed to be used as booster, but company types.

As we can see big investment companies like shell and mobile have a large risk and a large potential profit. These are strategical boosters. However if the slum is not conveniently located on top of an oil reserve the project would fail and cost a tremendous amount of money. Non-

critical companies like wall-mart or taxicabs; even cleaning services and street vendors will have success, but will yield a low profit. This is not what we are looking for as a booster. Bottleneck companies need are those of the lottery-winners, there is potential for a profit but it's hard, micro-credit plans primarily focus on these companies.

If one takes the generic scheme of economy[61] one can use it for the next part of the booster selection. A nation's economy can be divided into various sectors to define the proportion of the population engaged in the



activity sector. This categorization is seen as a continuum of distance from the natural environment. The continuum starts with the primary sector, which concerns itself with the utilization of raw materials from the earth such as agriculture and mining. From there, the distance from the raw materials of the earth increases.

Primary Sector

The primary sector of the economy extracts or harvests products from the earth. The primary sector includes the production of raw material and basic foods. Activities associated with the primary sector include agriculture (both subsistence and commercial), mining, forestry, farming, grazing, hunting and gathering, fishing, and quarrying. The packaging and processing of the raw material associated with this sector is also

considered to be part of this sector.

In developed and developing countries, a decreasing proportion of workers are involved in the primary sector. About 3% of the U.S. labor force is engaged in primary sector activity today, while more than two-thirds of the labor force were primary sector workers in the mid-nineteenth century.

Secondary Sector

The secondary sector of the economy manufactures finished goods. All of manufacturing, processing, and construction lies within the secondary sector. Activities associated with the secondary sector include metal working and smelting, automobile production, textile production, chemical and engineering industries, aerospace manufacturing, energy utilities, engineering, breweries and bottlers, construction, and shipbuilding.

Tertiary Sector

The tertiary sector of the economy is the service industry. This sector provides services to the general population and to businesses. Activities associated with this sector include retail and wholesale sales, transportation and distribution, entertainment (movies, television, radio, music, theater, etc.), restaurants, clerical services, media, tourism, insurance, banking, health care, and law.

In most developed and developing countries, a growing proportion of workers are devoted to the tertiary sector. In the U.S., more than 80% of the labor force are tertiary workers.

Quaternary Sector

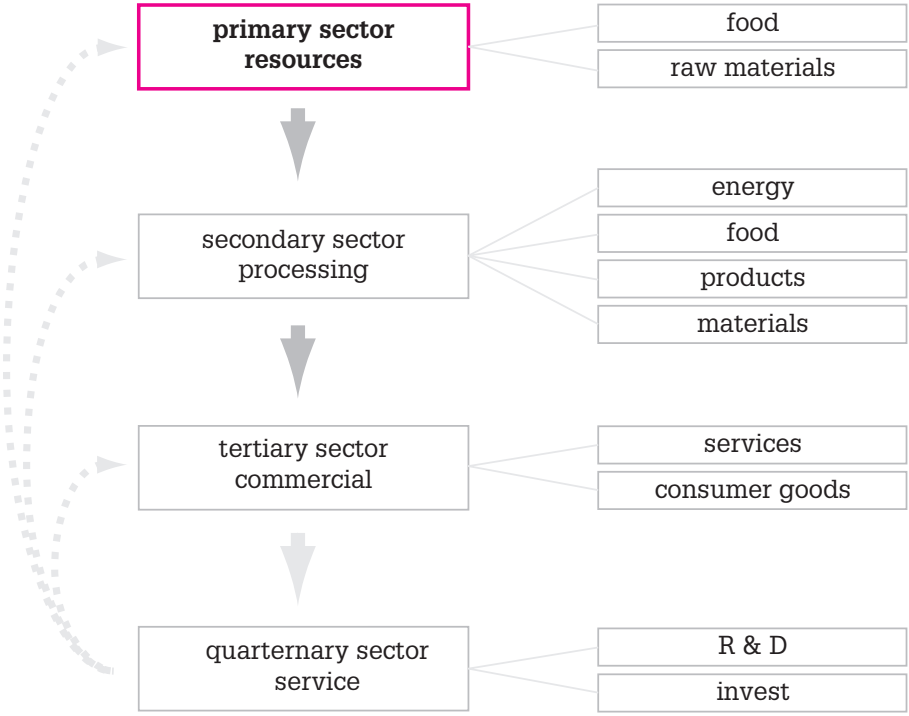
The quaternary sector of the economy consists of intellectual activities. The quaternary sector includes the highest levels of decision making in a society or economy. Activities associated with this sector include government, culture, libraries, scientific research, education, and information technology nonprofit, health care, culture, and the media.

For the booster to have the most potential for development it is essential for it to be a primary sector endeavor.

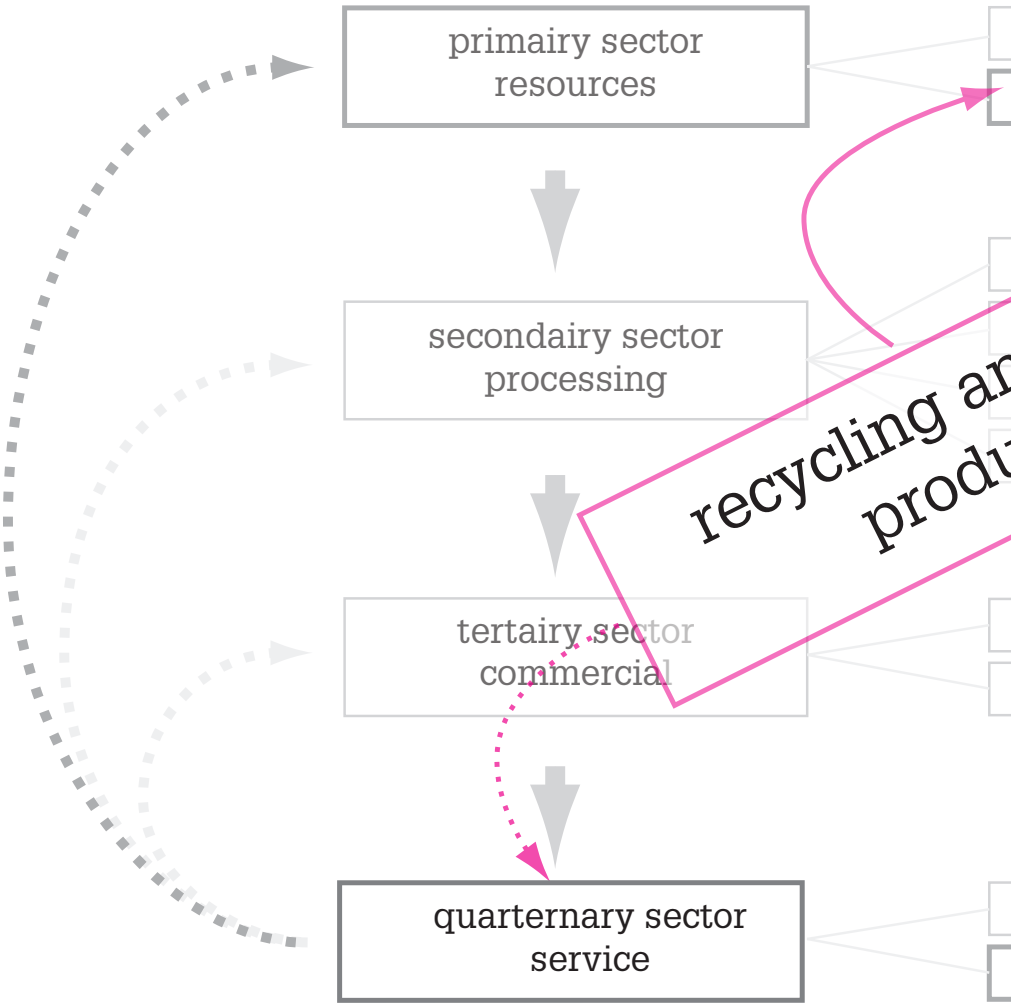
From the primary sector the potential for spin-off of newly added work is the greatest: Everything starts with resources. If the booster creates resources it is possible to become partly self-sustainable, it would create a strong position in the economy of the city, and beyond that going national and global even.

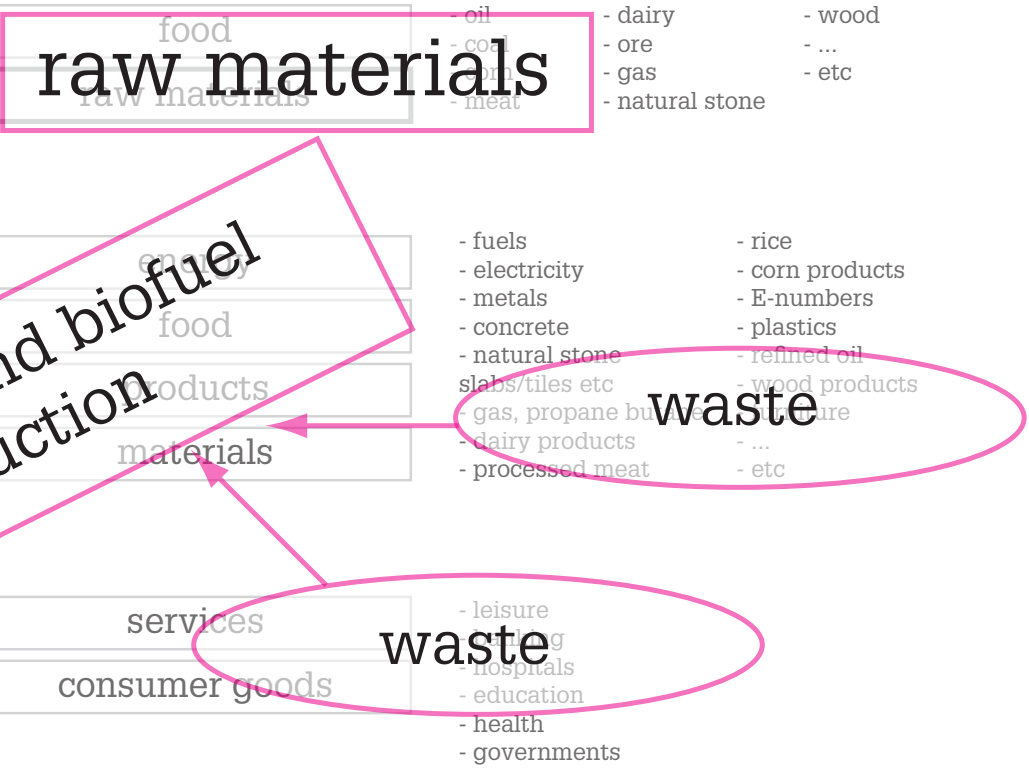
These selection criteria combined lead to a waste management facility.

Slum dwellers already work with waste. They recycle and utilize the potential resources thrown away by the city. Recycling in the western world is a hot issue. To find potential investors this has an advantage. Plus by taking municipal solid waste we can reconstruct en great number of resources, which leads to the maximum of spin off. We can boost this work sector by investing in certain types of automated plants, and restructuring the slum to fit the recycle process.



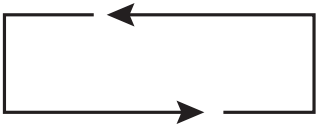
To do so we will have to view the slum as a business consultant: firstly the vernacular, the generic slum, and then the process to be fitted in the slum. The project will at this point need a feasibility check. And that's where the project becomes tricky, for the purpose of creating vision social and economic feasibility is looked at.


primairy sector
resources
secondairy sector
processing
tertairy sector
commercial
quarternary sector
service
recycling


raw materials
- oil
- coal
- gas
- natural stone
- dairy
- ore
- wood
- ...
- etc
waste
- fuels
- electricity
- metals
- concrete
- natural stone
- rice
- corn products
- E-numbers
- plastics
- refined oil
- wood products
- dairy products
- processed meat
- ...
- etc
waste
- leisure
- education
- health
- governments
- investments and research in order to ensure futher expansion
i.e. Universities

recycle

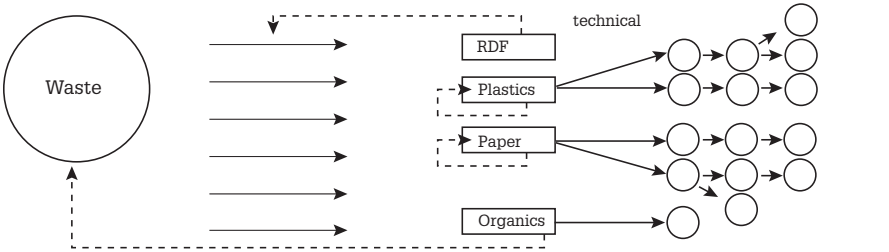
downgrading, closed system



re-allocate

upgrading, open system

labour + knownledge = re-allocation, innovation, new products, new markets



Chapter 4 waste management

4.1 Reallocate!

First of all the innovative nature of the projects embodied in the booster will be more clear if we no longer talk about recycling, when dealing with waste in a manner of creating new resources it should be called re-allocation.

The definition of recycling is correct: re-cycle, to put product through another life cycle is what the essence of the reallocation plant is. But in common tongue recycling is a closed downgrading system, book becomes newspaper and newspapers become toilet paper, which becomes organic waste through sewer systems,

NO MORE! Books become paper pulp, which can be used for anything, artists can recreate handmade paper, of even insulation for housing! The re-allocation booster will redistribute elements used in products to recreate A-class resources. Plastic is re-allocated back to plastic pellets, which can be used to create crates for shipping yards, but also to mold a new dashboard to the new E-class series of Mercedes, not to mention pipes for sanitation. Waste will be directed through the slum to create new resources and products.

Because the re-allocated resources can be used for any type of production it will lead the advance of new products, the export multiplier effects goes to work, and with it also comes the import replacing multiplier effect. The economic performance will increase and so will the in performance of the slum.

The slum will rise to it's full potential, labor combined with knowledge leads to innovation and new products for a new market, found in the slum and far beyond.

4.2 Re-allocation math

To further investigate if the proposition would work a thorough investigation of a re-allocation process is needed. The following questions are essential for determining if the concept could work, and what the consequences are.

- How much waste is produced
- What is the composition of the waste produced in cities
- How does the re-allocation process work?
- How much can people do?
- How many people are needed to reach the critical mass?
- How much space is required for the process to be properly imbedded in the slum?

4.2.1 How much waste is produced?

The start of the investigation begins with an account of how much waste is generically produced in the cities that we are working with. The generic city has 1 million inhabitants. 500.000 of which are slum dwellers. The following data is used to asses how much waste the generic city produces.

The waste production of 1 million persons in Nairobi, Kenya is 500 ton/day
The waste production of 1 million persons in Mumbai, India is 400 ton/day

For the generic city and slum we will use 450 ton/day waste produced. This gives us the start of future calculations. Next the composition of waste is important to know what priduction we can achieve.

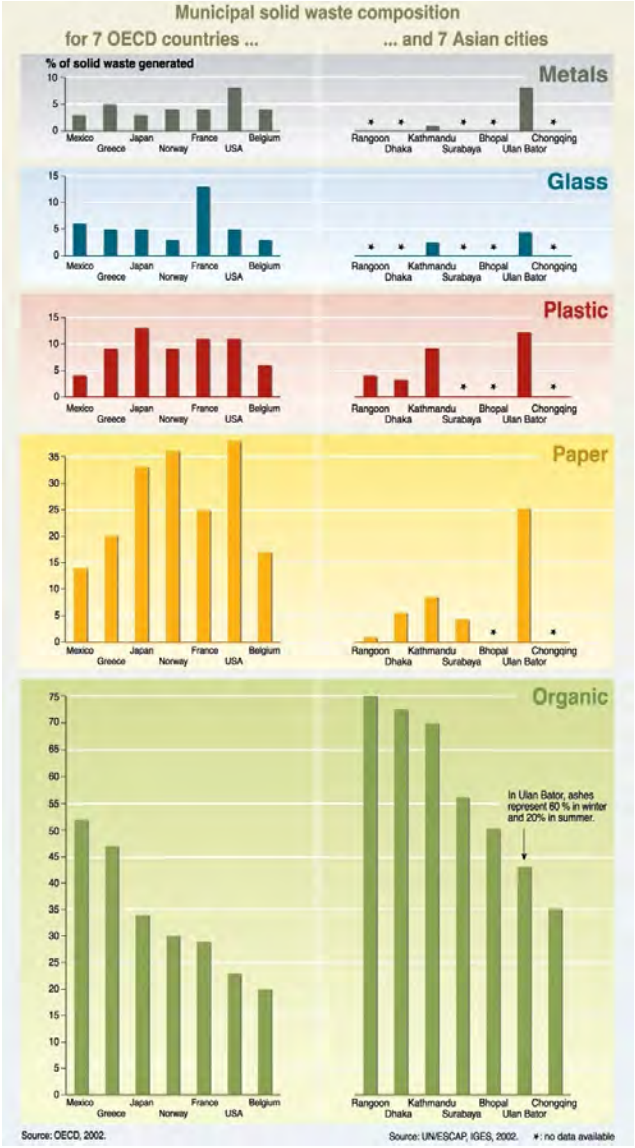
Based on a research the composition of waste is as the diagram[62] shows on the right.
The diagram leads to the following:

	OECD	Asian cities	generic	Production per day
Metals	6%	5%	5.5%	24.75 ton
Glass	6%	4%	5%	22.50 ton
Plastic	8%	7%	7.5%	33.75 ton
Paper	25%	10%	17.5%	78.75 ton
organic	37%	55%	46%	207,00 ton
other	18%	19%	18.5%	83.25 ton

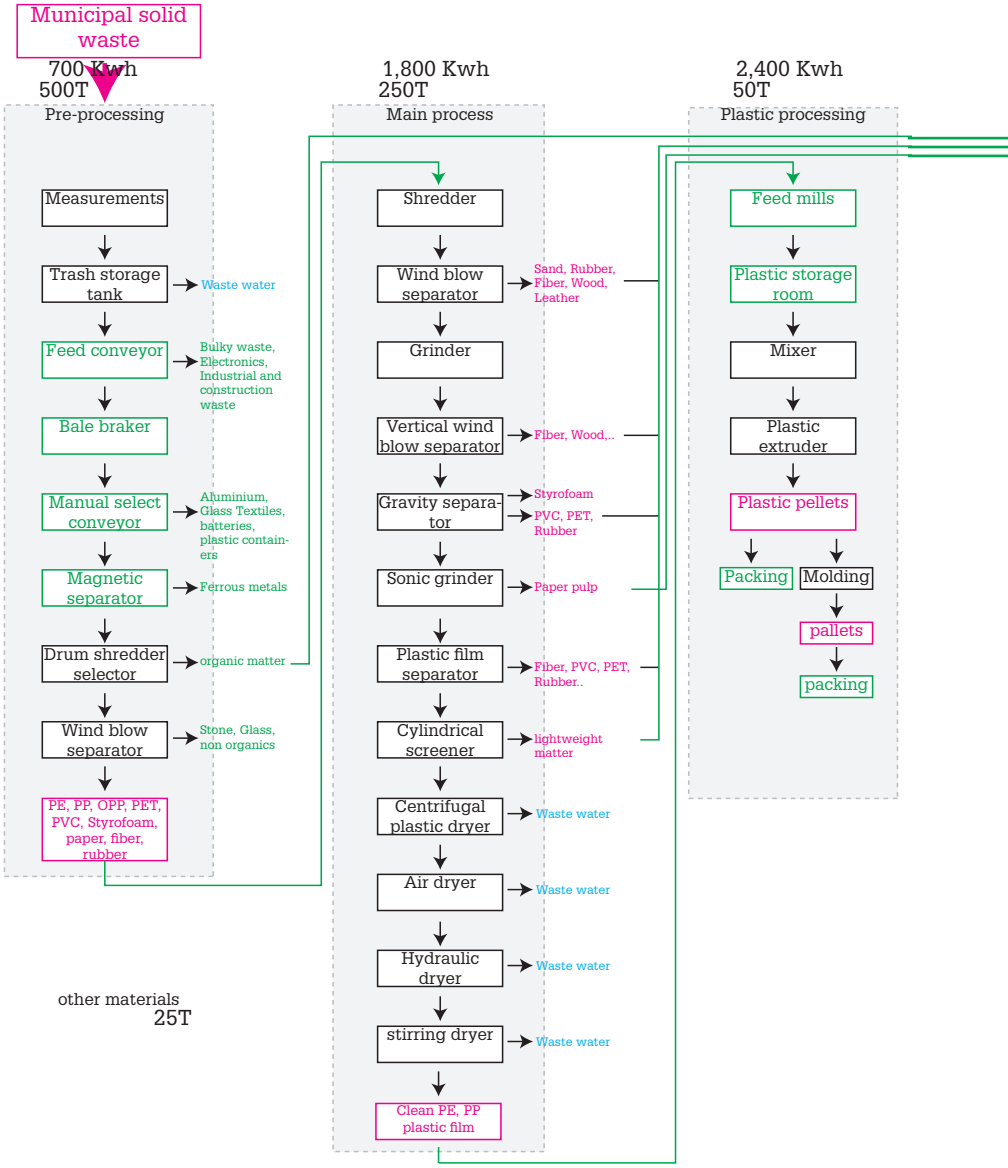
At this point it is clear how many tons of waste are available for the

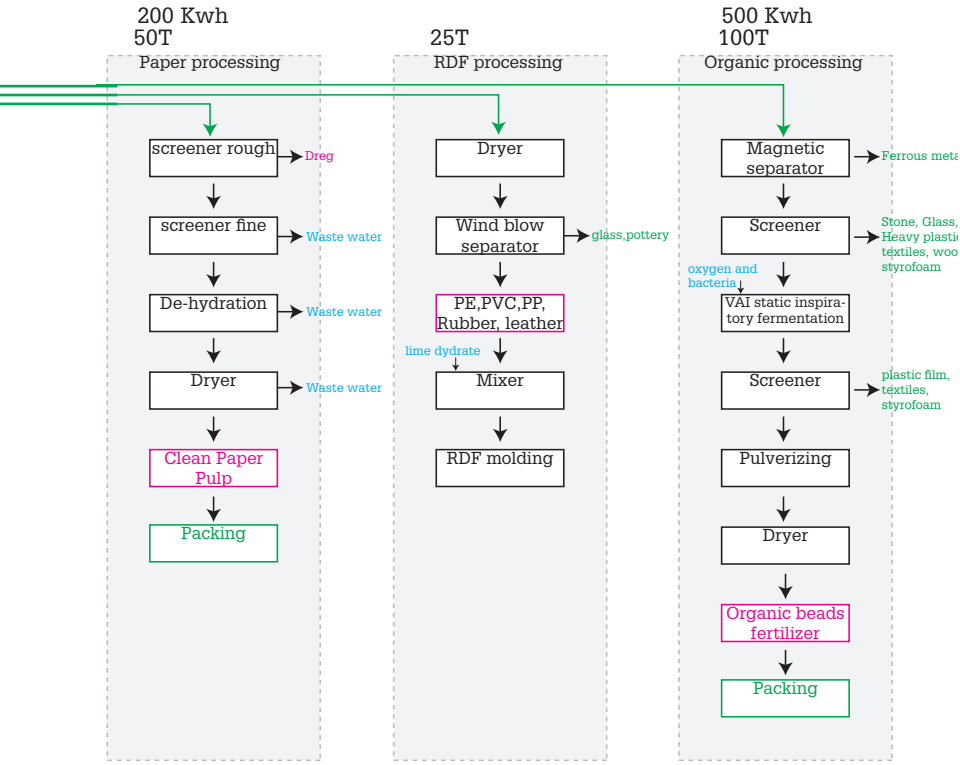
reallocation process. On the following page a diagram informs us how the process itself works. This diagram is taken form a fully automated waste management plant.[63] It gives a good indication how the process works.

Form the diagram we can reconstruct parts of the process that can be done manually. The green boxes indicate these steps.



The green boxes indicate parts of the total process that can be done manually





manually:
-garbage collection
- internal/external export
- pre process
- packing
- organics
- sorting of plastics

The result is that around 30-50% of the process can be done manually. Next we need to calculate ho many people are needed to actually do the work.

4.2.2 How many people are needed to perform the process:

the calculation can be done in a variety of ways. The author will show two separate calculations. The results vary greatly. However for the purpose of the project the second method seems more likely then the first as we shall see.

4.2.2.1 Method one based on energy

A fully automated plant for 500T per day uses[64]:

	Energy usage (Kwh)	Crew	Weight per day (Ton)
Pre-process	700	40	500
Main process	1800	24	150
Platics	2400	75	50
Paperpulp	200	18	50
Organics	500	15	250
RDF			
total	5.600	172	

This method of calculation is based on the energy needed by machines. How many people to we need to add up to the same amount om energy? a very active person 1.70m 25 years old and 70 kg need about 2941 calories per day.

just to stay alive he uses 1705 calories[65]

for activities he has 1236 calories to spend = 5,17KJ in 10 hours.

1W = 1J/s
1Kw = 1Kj/s

an average person is worth about 0.0014 Kwh per day!

5,600 / 0.0014 = 4,000,000 people needed to produce the amount of energy needed for a fully automated plant uses to process the garbage of a city with one million in habitants. just the preprocessing (700Kwh) takes 500,000 persons, (all slum in habitants)

but if 4,000,000 persons process 500T per day, this is 125 gram per person per day.... which is almost nothing. This is not the right method of

calculation.

4.2.2.2 Method two based on weight

a generic garbage bag is tested to withstand 10Kg. If a bag averages 5 Kg of garbage and every person does one bag a day.[66]

500,000Kg/5Kg per person = 100,000 persons needed
500,000Kg/ 10Kg per person = 50,000 persons needed
500,000Kg/20 Kg per person = 25,000 persons needed

Previously we have seen that 30 to 50% of the process can be done manually: This means that for initial employment between 25.000 and 32.500 persons are needed.

Is the critical mass reached by is amount? The critical mass indicates the tipping point. When the tipping point is reached chances are the new development will spawn throughout the slum area.

To answer this question it is necessary to know how many people in the work, this is a rough estimation based on the demography and research done by the ETH in kibera.[67]

Around 70% of the 500.00 slum dwellers in the generic slum will work. Which result in the workforce being 350,000 persons. 25,000 to 32,500 persons are needed for re-allocation process:

7-9% of the available workforce and 5-6.5% of the total population in the generic slum will find a job in the reallocation process. Is it enough for a critical mass to be reached?

If the work is evenly distributed over all the slum households in the generic slum the mass reached is the following:

on average 8 people live in one unit.
500,000/8= 62,500 unit in the slum
one person every 2-3 households could work in re-allocation.
this means that 30 to 50% of the house holds could have a connection with the economic boost. From this point of view one can state that the critical mass is reached. It is inevitable that the slum will use the new economic boost to develop itself. With the influx of economic performance the slum will start to develop, but this will be shown in the chapter 6

4.2.3 How much space is needed?

The process is clear, the amount of initial workers is calculated and the critical mass reached. 30-50% is done manually, but what about the other 70-50%? How much space is needed for the automated parts of the

process? The following calculation will attempt to show how much space is needed in the slum.

4.2.3.1 The automated

The rec-ylce plant needs 20,000 sqm of space
pre processing: 3,000m^2
main process: 10,300m^2
plastic: 2500m^2
paper pulp: 600m^2
organics: 1,000m^2
RDF: 600sm^2
feed waste storage: 2,000m^2

It is estimated that with 30-50% manual labor the area needed is decreased by approx 20%. The larger part of the process is still done automatically, and the space needed for the automation will not decrease in a one to one ratio.
80% of 20,000m^2 results in 16,000m^2 still to be added/integrated into the slum[68]

4.3.3.1 Space required for manual labor

The manual labor part of the process will be situated inside the houses of the slum dwellers. In the generic slum the total number of inhabitants is 500,000. They live on a site with an area of 1.38 km^2. This area has an built density index of 0.69.

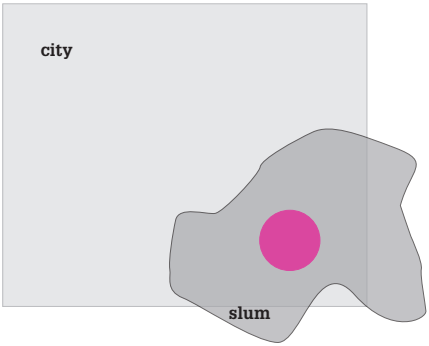
Per person the slum dwellers have approximately:
1,380,000 sqm*0.69 built/m = 952,200m^2 built area
Far=2.28
2,132,928 sqm/500,000 inhabitants = 4.26m^2 per person living/working space.[69]

The manual labor force is 25,000 to 32,500 people Each living on 4.26m^2 this results in an affected area between: 106,646 -138,640 sqm for the manual labor.

Taking the Floor ratio index into account the net affected area is: 61,892m^2, this is 4.5% of the total slum area and 6.5% of the total built area of the slum.

Total space of re-allocation then becomes: 61,892m^2 + 16,000m^2= 77,892m^2
this is: 5.6% of the total slum area and 8% of the total built area of the slum. This leaves 92% of the slum untouched by the new process,

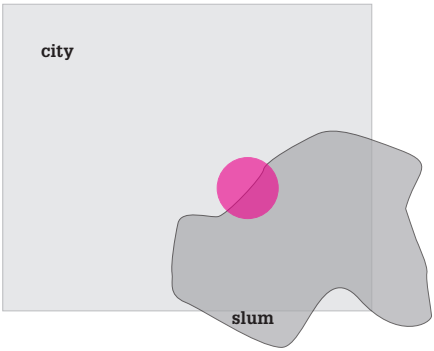
which is positive since we do not want to rupture the slum much. The innovative nature of the people living in the slum should be sought in new production methods and products the processes should new launch a complete new development.[70]



A: Intervene in slum

- illegal
- relocation issues
- undesired environment

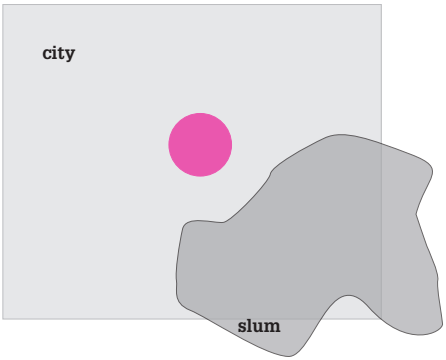
+ “in” the people
+ run by slumdwellers



B: Intervene border of slum and city

- hard location
- relocation issues

+ best of both worlds
+ best economic impact
+ best for devellopements



C: Intervene in city

- city upgrade, not slum
- no active empowerment
- not innovative

+no relocation

Chapter 5 implementation

5.1 Generic city and slum

In this chapter we take the final step towards the implementation. Here all previous data comes together and is tested against the generic slum and city. At the end of the chapter we will have chosen an implementation strategy.

The first question is where to place the booster. As we have seen in chapter three most obvious is to place the booster inside the slum. There are two other options.

1. on the border of slum and city

2. To intervene in the city itself.

The border strategy could be very useful indeed. The goals is to effect both economies within the slum and that of the formal city.

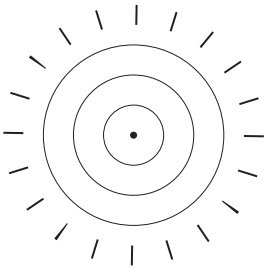
The city intervention seems less usefull, as we have seen in chapter 2 initiatives for city boosting are used throughout the world, with bogota as the example given.

This research will focus on the changes within the slum, and just outside the border of the slum.

it will be a composition of intervention A and B. The choice for option A is simple: to have as much effect as possible the slum needs to physically change somewhat. this intervention will trigger the inner working of the slum as an organism. which in turn will turn the intervention into a true booster.

The results of the booster will be shown in graphs, calculations and images in chapter 6 and 7.

1 1 point



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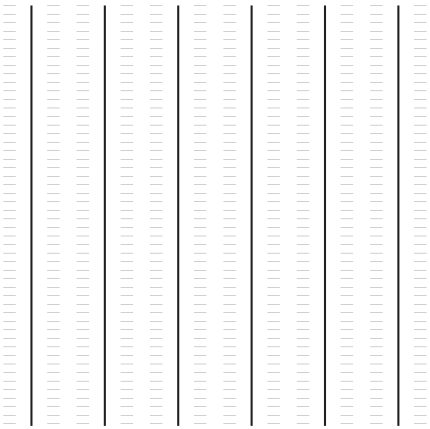
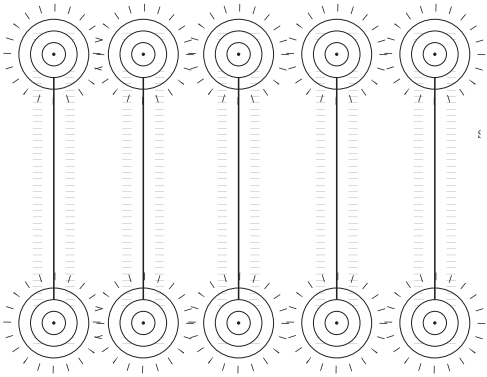


3 6 points, streets



5.2 Three implementation concepts

As the process can be imbedded it is now important to utilize the lessons learn in the archonomics chapter. The datascapes shown will now be used to create 3 implementation concepts. These concepts will be examined on a number of aspects. The types of proximity are shown in rose diagrams indicating how close the concept is to the city and to the slum. Also a brief examination of the costs is used to choose the best possible scenario. The following three concepts are used:

1. the central plant (100% automated)

2. the scattered version (100% manual)

3. the combination (30-50% manual 50-70% automated)

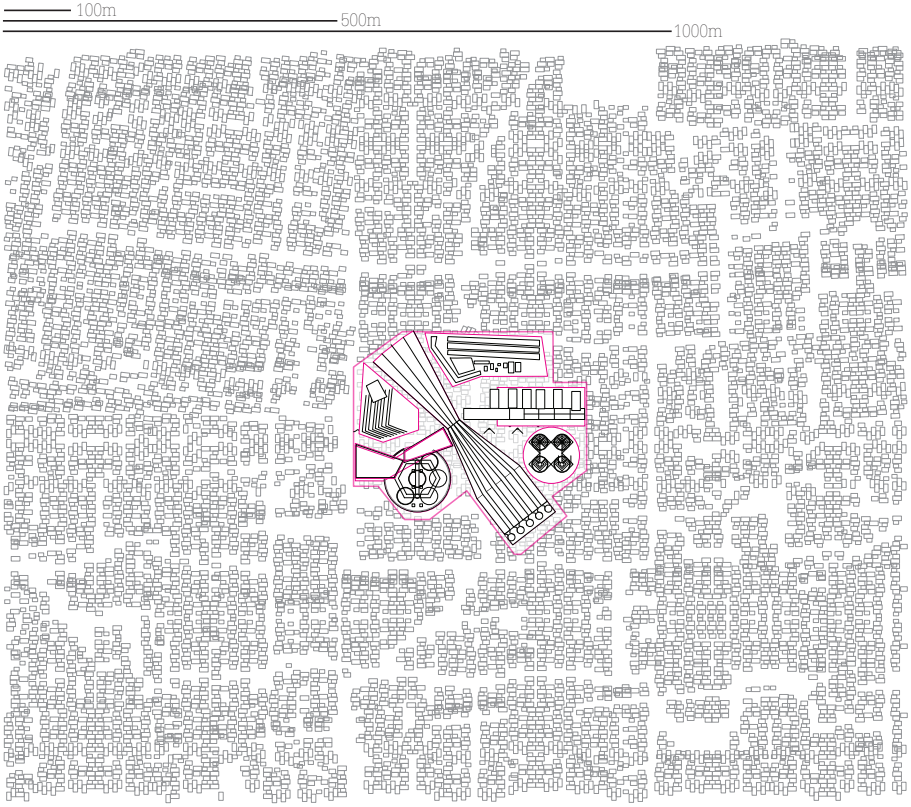
The implementation strategies have changed slightly. instead of the hypothesis using 6 points and 3 streets in the third implementation option, this chapter will use 10 points and 5 streets. This is done to facilitate the different processes in the streets as we shall see further on.

5.2.1 The centered plant

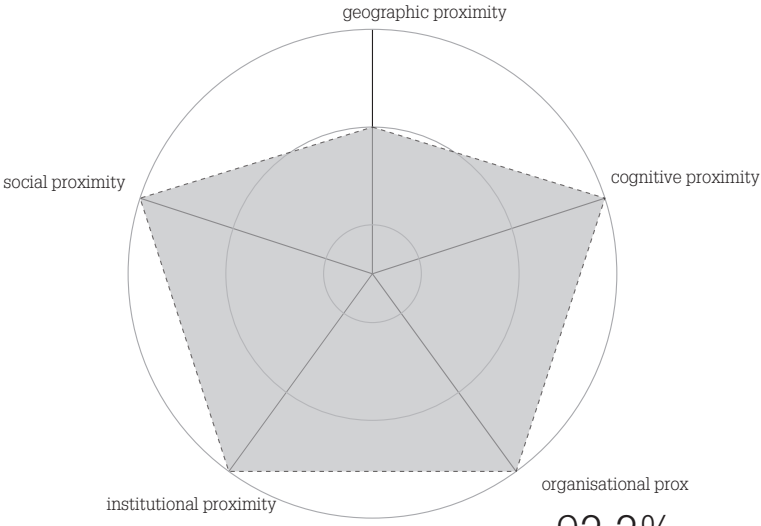
The concept has a few advantages. It is very much like the way the formal based companies work: as much automation as possible. The plant would fairly easily collaborate with the cities companies.

Investment: 72 million
Capacity: 500 Ton/day
Revenue:65 million/year
Costs: 30 million/year
Profit: 35 million/year[73]

However the central plant will not affect the slum dwellers. The critical mass will not be reached and the economic performance boost will not unlock the potential the slum has to offer. There is little room for spin-off companies, and related newly added work. All products will be sold to other companies outside the slum. In the end only the owner/investors will see a profit, al be it a big one.

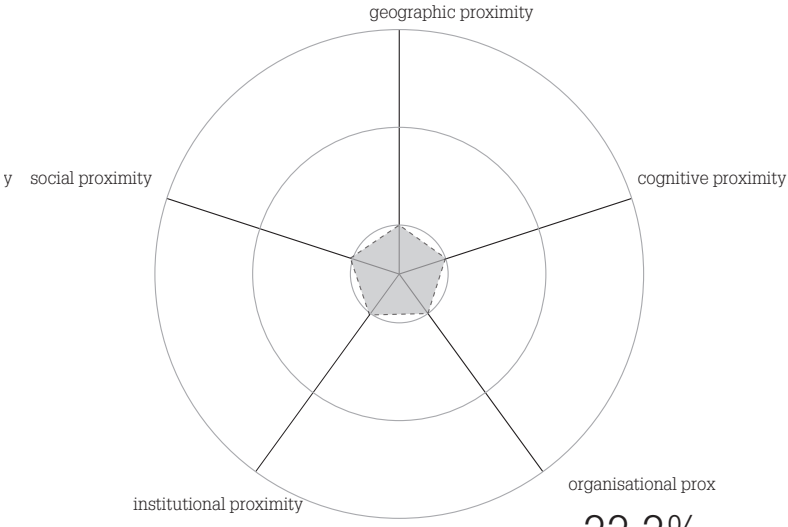


proximity score city



93.3%

proximity score slum



33.3%

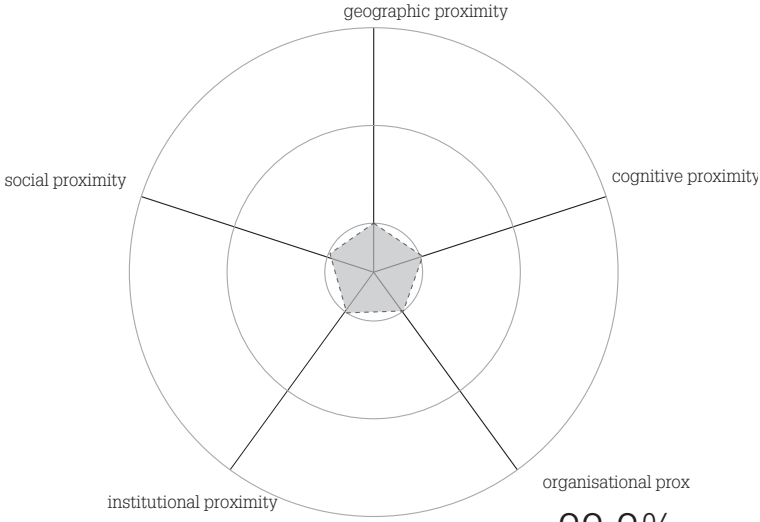
5.2.2. The scattered version

The scattered concept comes very close to the way the slum functions now. Restructuration of the process so the slum can boost their economy a little seems a good solution. It certainly is the cheapest.

Investment: $0
Capacity: 500 Ton/day
Revenue: 10 million
Profit: $0.5 million

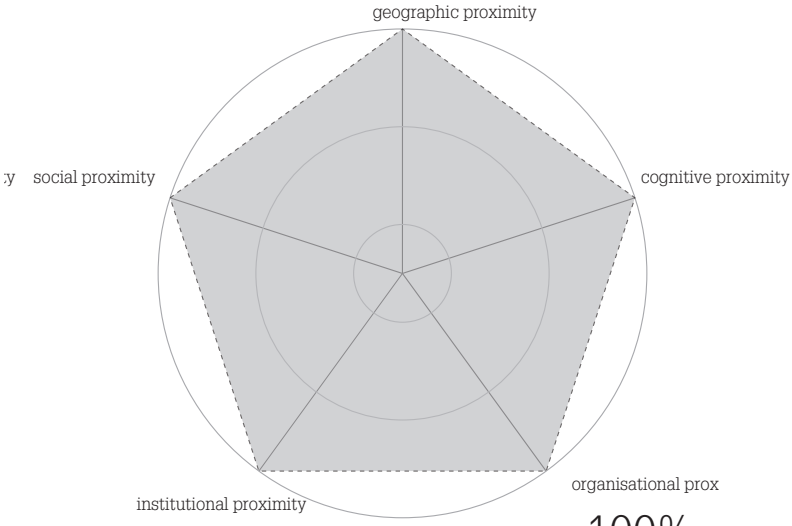
This would be the equivalent of a production process slummified. In this concept every part of the process is done by hand. This however does not lead to a boost in productivity and a rise of savings. The Dwellers need to boost their production in order to surpass their basic needs. The potential for collaboration with the city is very small. This concept would not end the trap.

proximity score city



33.3%

proximity score slum

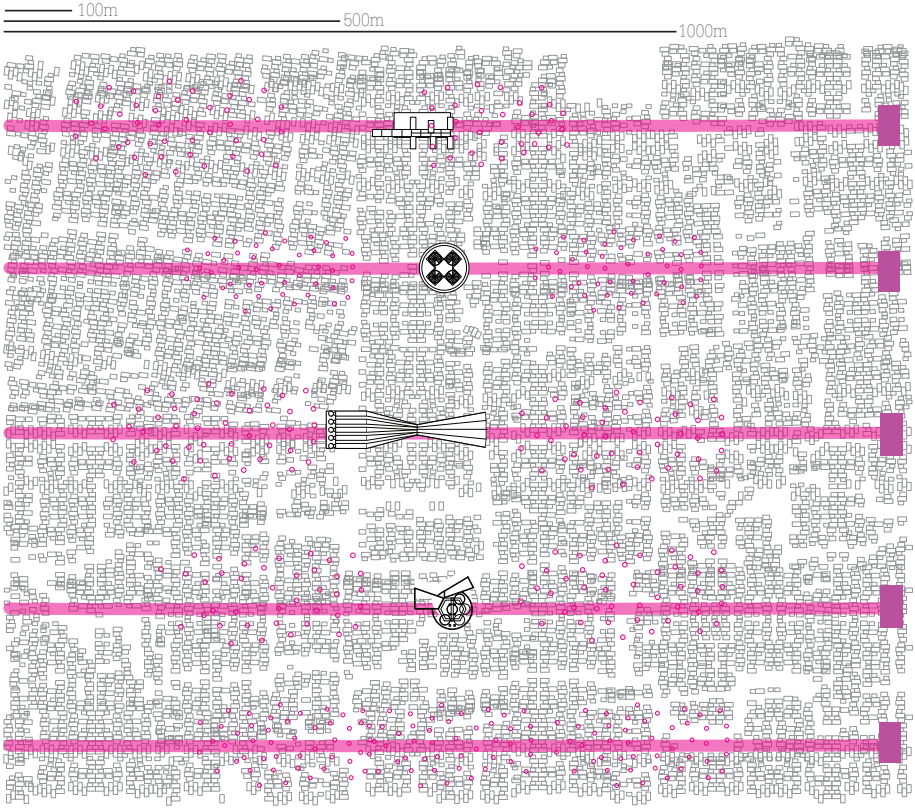


100%

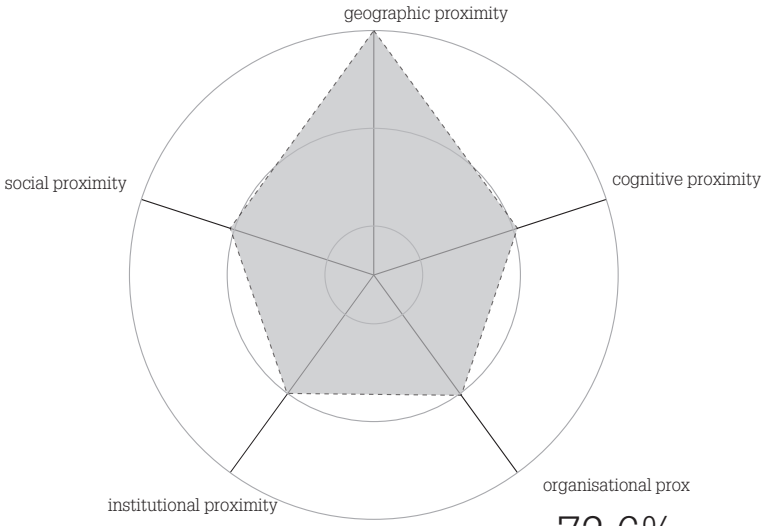
5.2.3 The combination

This concept takes the best parts of both former concepts. It has automated parts, though not centrally located they are clear places where the production process is boosted, which leads to a surplus of products giving the slum and economic boost. It also works very much like the slum is currently. Around 30-50% is done manually and slum dwellers are already doing these types of things within the slum. A minor investment would be paid back within 3 years giving the 32500 slum dwellers the opportunity to work and start to break the poverty trap.

Investment: 30 mln
Capacity: 500 Ton/day
Revenue: 65 mln/year
Costs: 50 mln/year
Profit:15 mln/year

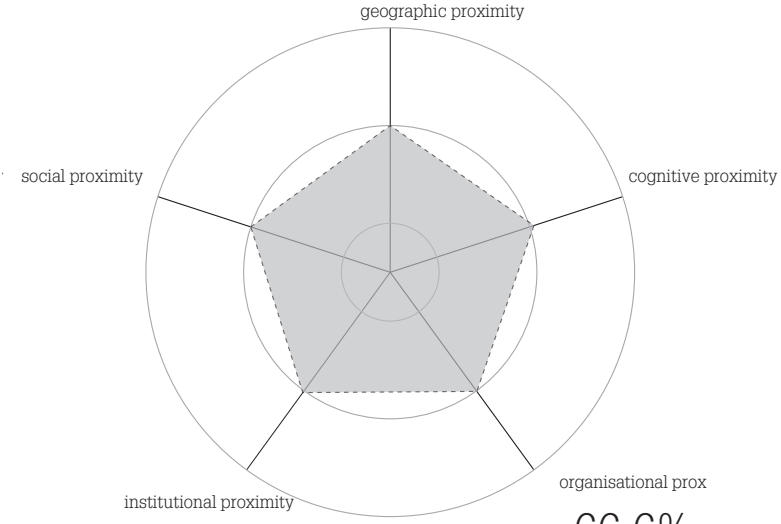


proximity score city

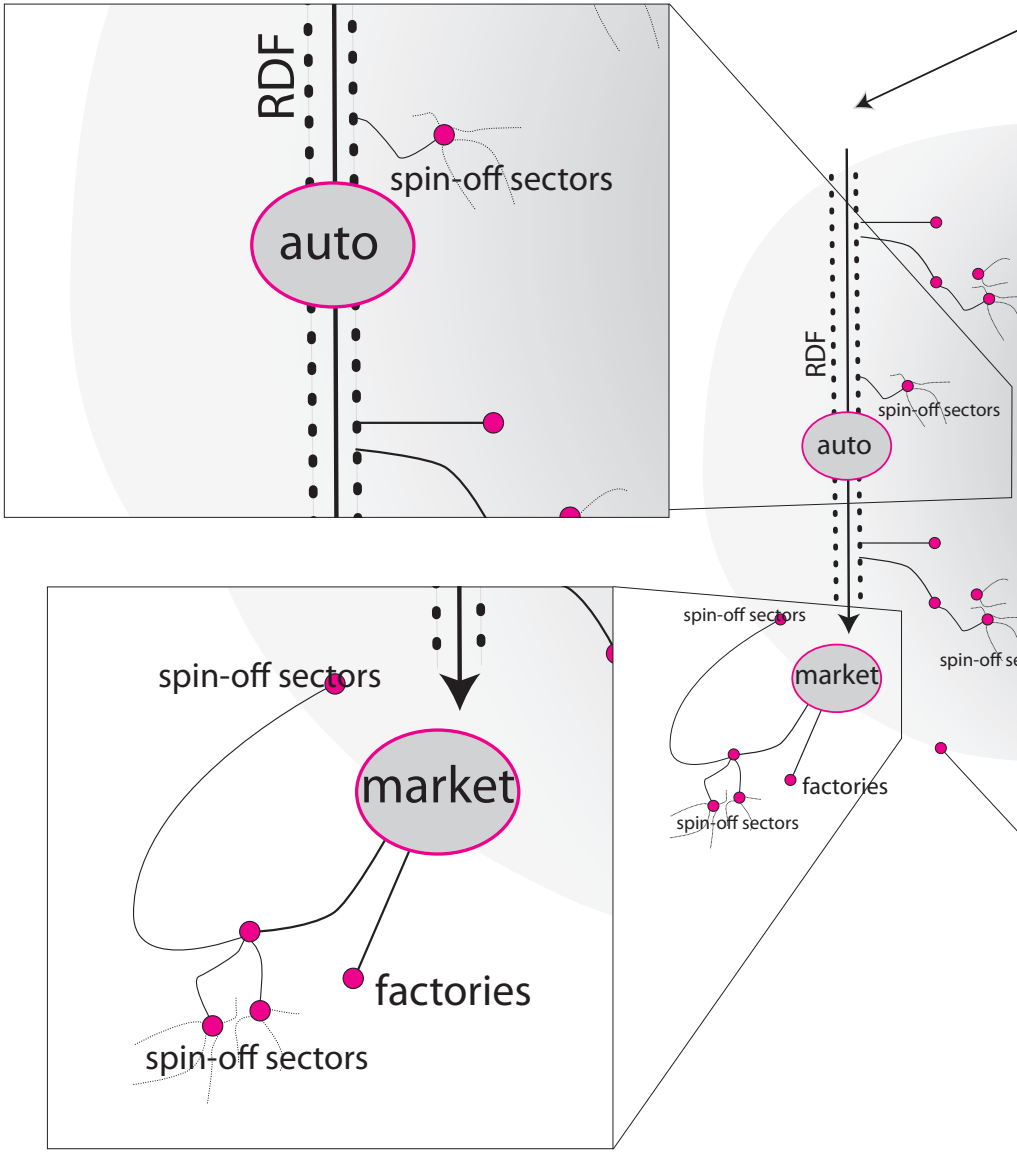


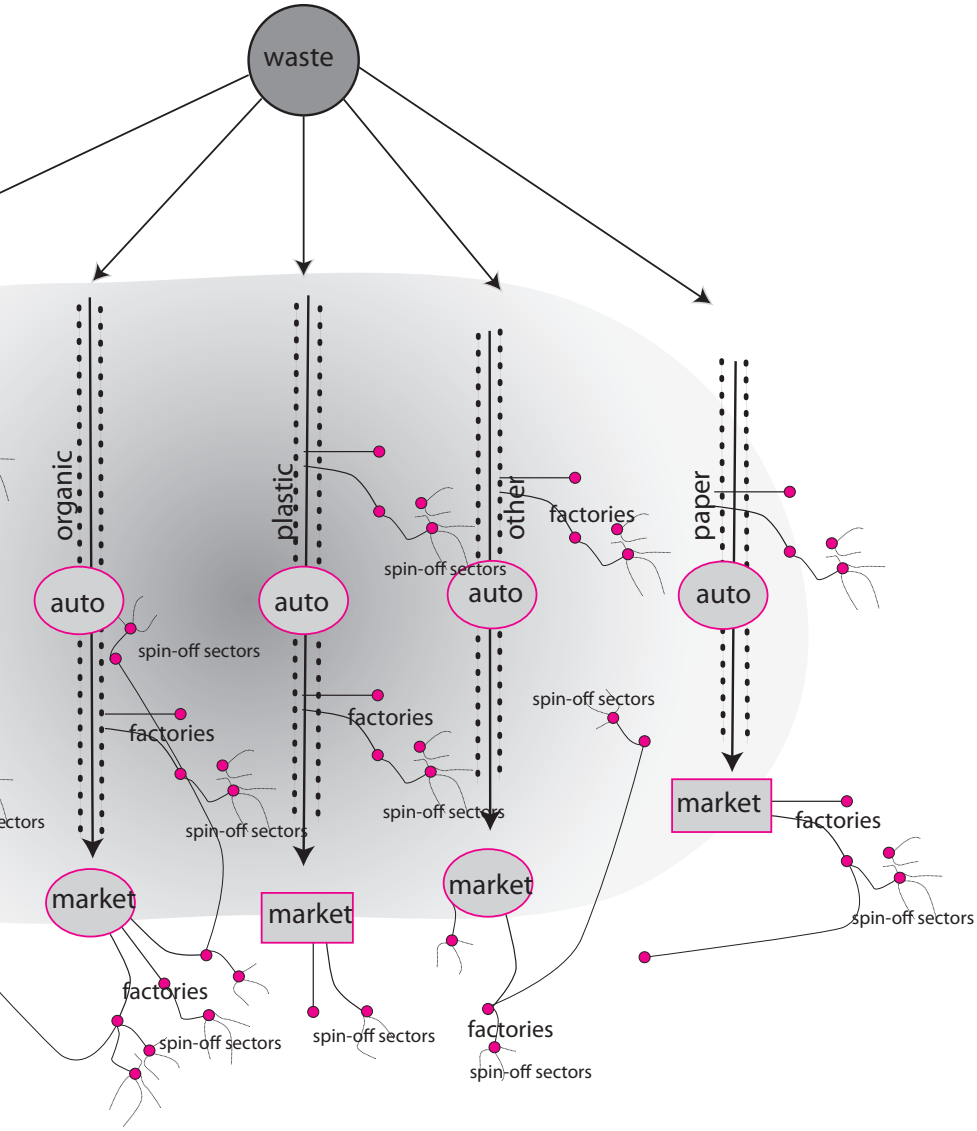
72.6%

proximity score slum



66.6%


RDF
spin-off sectors
auto
RDF
spin-off sectors
auto
spin-off sectors
market
factories
spin-off sectors
spin-off sectors
market
factories
spin-off sectors


waste
organic
plastic
other
paper
auto
auto
auto
auto
spin-off sectors
factories
spin-off sectors
factories
spin-off sectors
spin-off sectors
factories
spin-off sectors
spin-off sectors
market
market
market
market
factories
spin-off sectors
factories
spin-off sectors
factories
spin-off sectors
spin-off sectors

5.3 Economic feasibility

A simple calculation will indicate if the proposed plan is economically feasible. For the plan to work the GDP of the slum area needs to increase. The income of the manual labourers should increase a little to give them the incentive to actually do the job, finally there should be profit to use for further investments and development inside the slum.

Before implant[74]
average income generic slum: $ 93.35/month

After implant:
$45mln/30 000 = $1500/year = $125/month = 34% increase

34%raise income workers

GDP Before implant
average income generic slum: $ 93.35/month

500 000*93.35 = $46 675 000

average income After implant:
470 000*93.35 = 43 874 500

30 000*125 = 3 750 000

3 750 000 + 43 874 500 = 47 624 500

2% average raise income generic slum + 15mln profit

GDP After implant:
47 624 500 + 15 000 000 = 62 624 500

62 624 500 / 46 675 000 = 1,34

34 %GDP slum

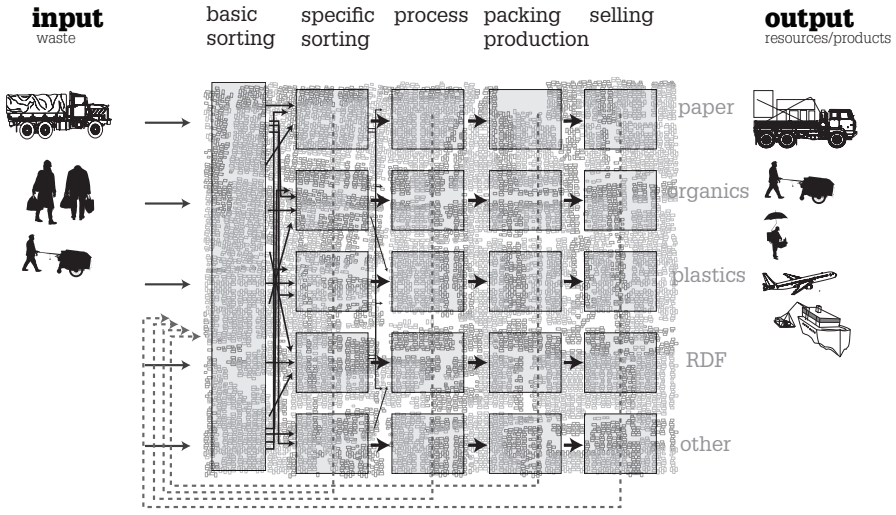
5.4 How will the implementation work?

How will the process flow through the slum? Based on the implementation concept selection we have chosen for 5 streets with automated centres along them. The five streets are evenly distributed though out the slum. Each street has a certain productivity chain. Respectively; paper, organic, plastics, refuse derived fuel, and other materials (predominantly rubble). In the diagram the process is schematically shown.

A zoom in of the process will clearly the production process further. Waste comes into the slum; it is collected in the city and goes through the first selection process. Different materials go to the different streets where a second selection process follows.

The materials go into the automated centres in each individual street and out come the resources. Some of the resources are immediately processed to product, which can be used inside the slum. The rest of the resources are packed and sold on the markets at the end of the line.

During the process cross-fertilization will occur. Slum dwellers will learn form each other to become more efficient in their selection and production methods. Materials, which can be used inside the production process of other street, will swiftly find their way thereby increasing productivity. Knowledge of the products grows and new innovation leads to new products and process chains. This also enhances productivity, soon the entire process is reciprocating and the boost has started.

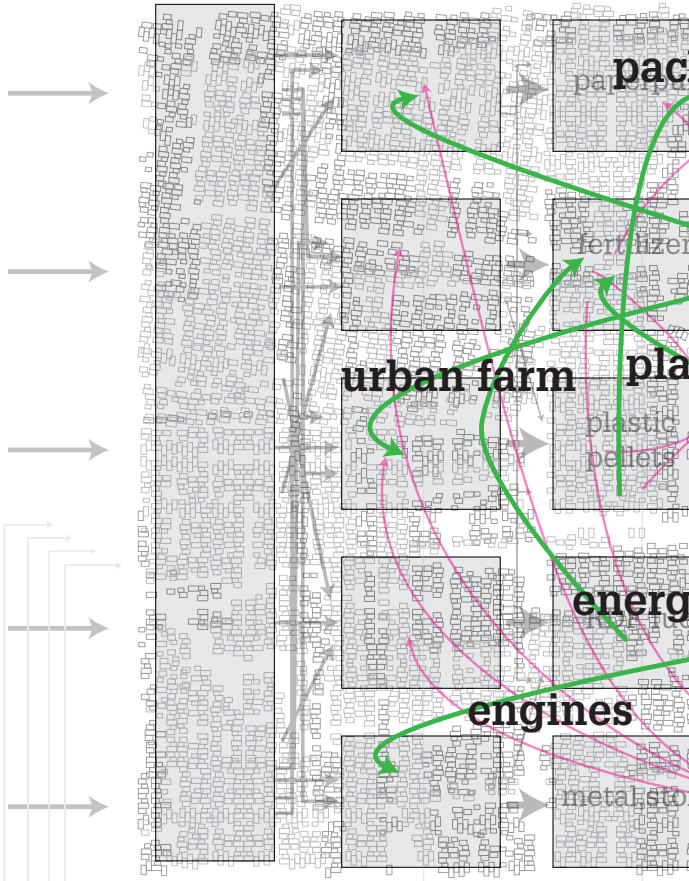


input
waste

basic sorting

specific sorting

proces



ss packing selling
production

output
resources/products

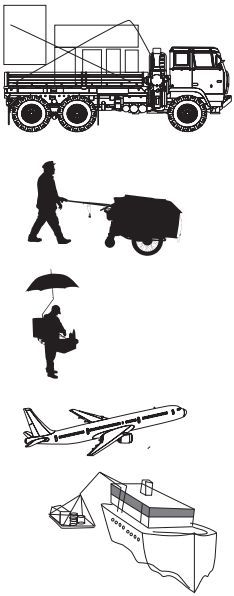
paper

organics

plastics

RDF

other

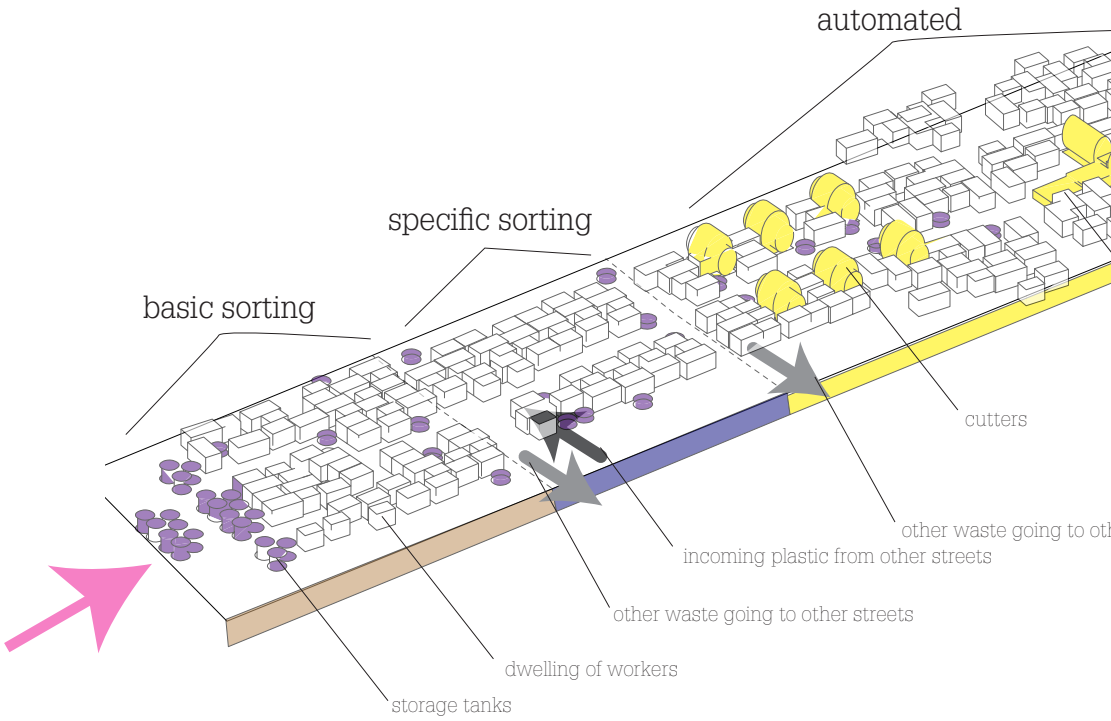


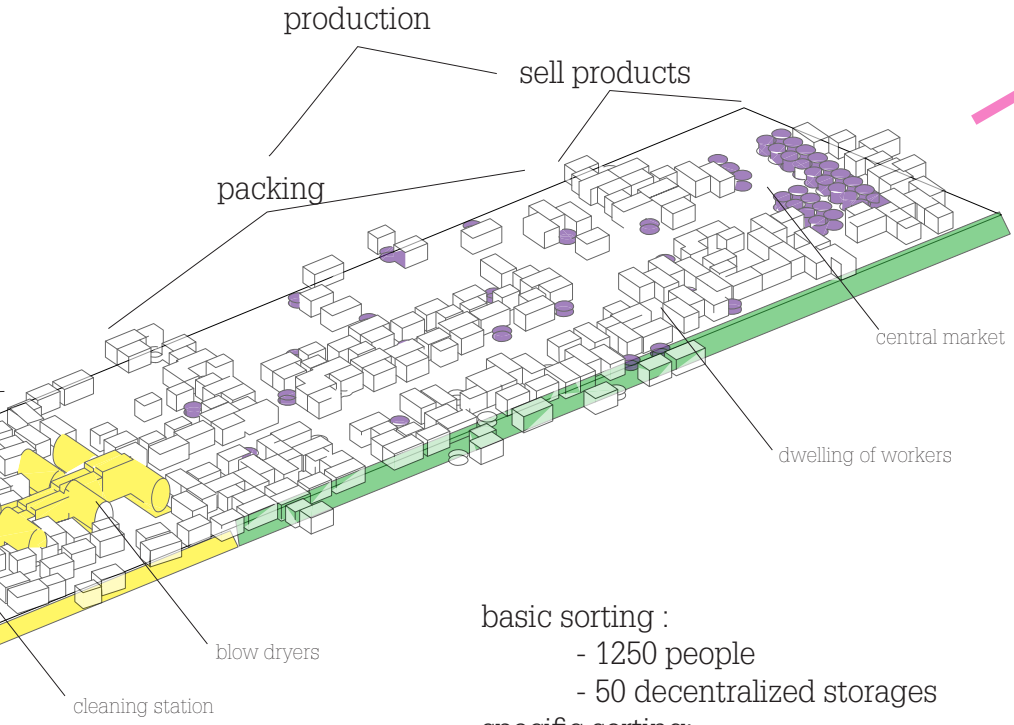
5.4.1 schematics of waste processing streets

Zooming in further on the street level implementation clearly has impact. On the following pages streets schemes show how the implementation works.[75]

Paper street

Each street begins with a basic sorting section. The automated part of the paper street focusses on the pulverization of paper. The small pieces of paper are soaked in water and cleaned. Next a centrifuge removes the biggest part of the water added. After this the damp pulp is blow dried to be come new clean paper pulp. This can be used to make new paper and even as isolation in the future houses of the slum.





her streets

basic sorting :
- 1250 people
- 50 decentralized storages

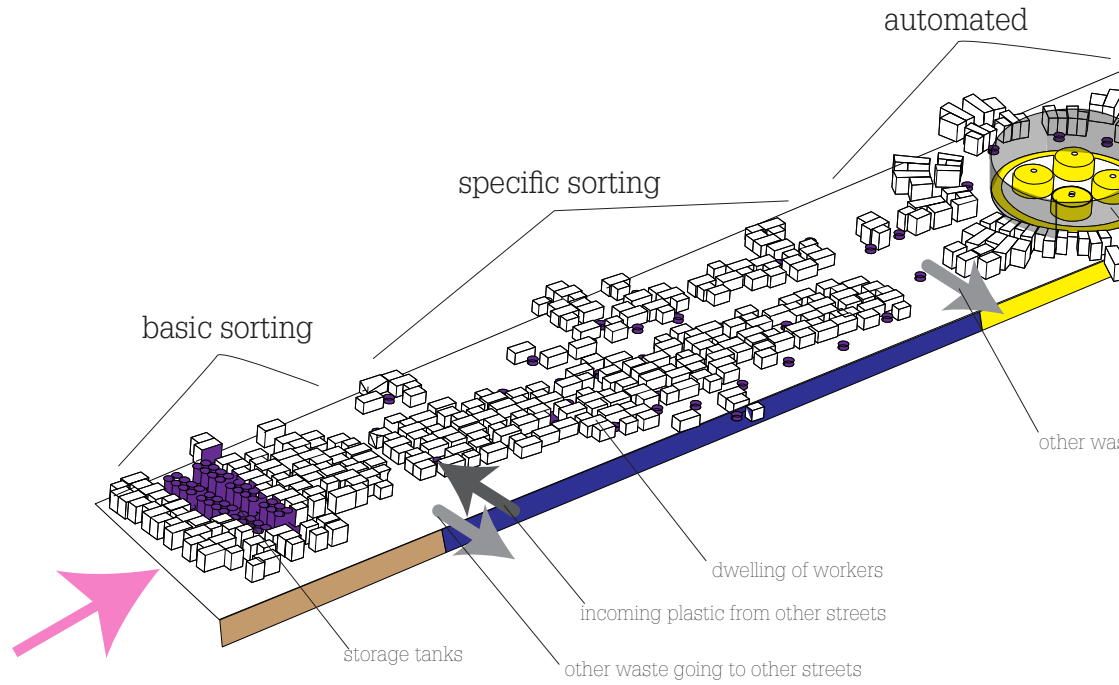
specific sorting:
- 1250 people
- 23 decentralized storages

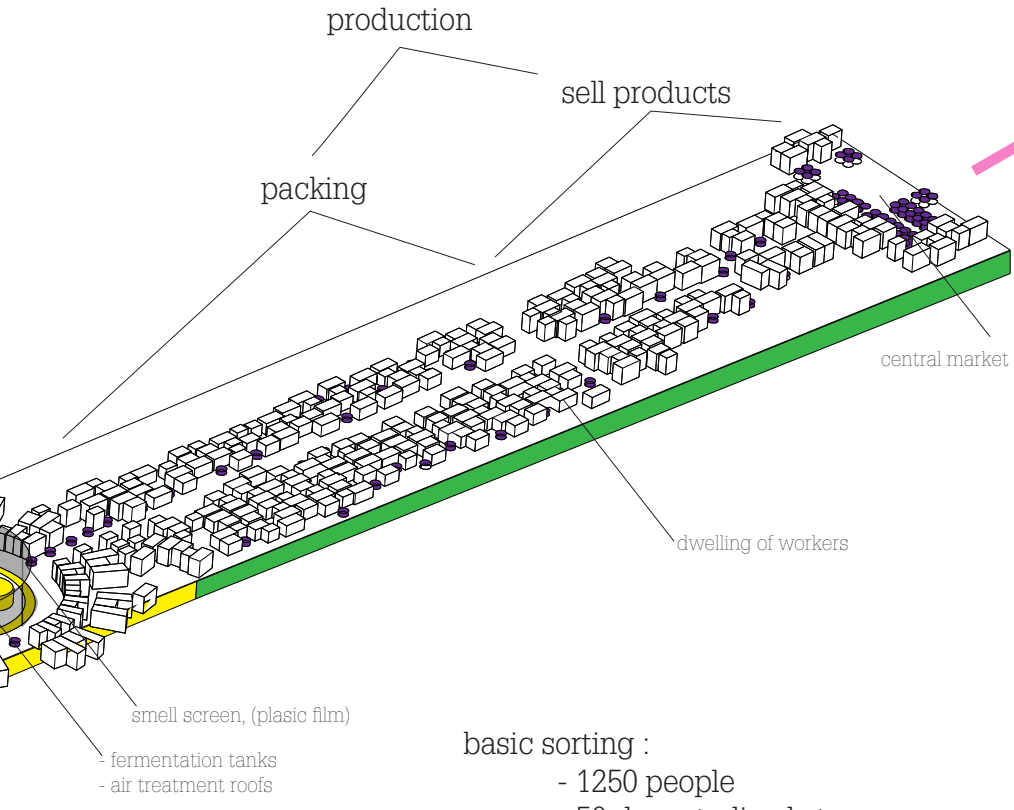
automated plant:
- paper and carton cutters;
- cleaning water station
- blow dryers

production:
- 2500 people
- 48 decentralized storages

Organic street

Organic waste is of high value if the processing method is right. Again a pre-screeening section separates the primary types of waste and distributes the waste to the street it will be processed further. the organically degradable waste is stored in four large tanks in which batches are created and gasses are won. After 4 days in the sun the waste has degraded and is dried into fertilizer.





basic sorting :
- 1250 people
- 50 decentralized storages

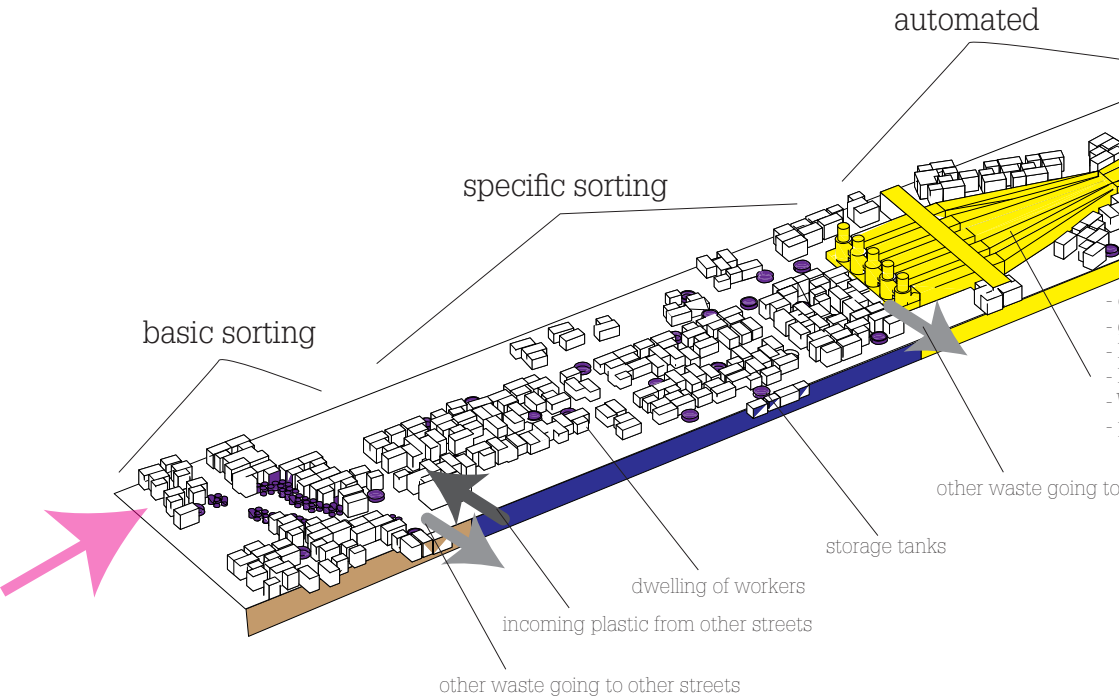
specific sorting:
- 2500 people
- 30 decentralized storages

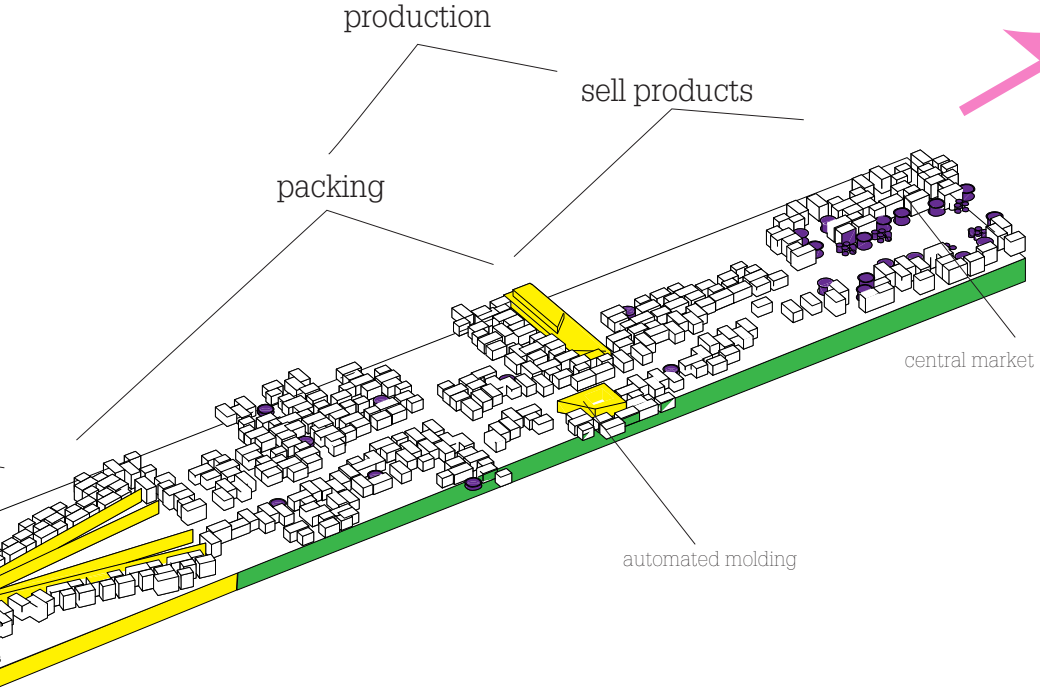
automated plant:
- fermentation tanks;
- air treatment plant

production:
- 2500 people
- 80 decentralized storages

Plastic street

This is diagram of the plastic street. A larger automated facility is needed to create the plastic pellets that can be used for any application. Further on there we be molding facilities to directly mold plastic into the desired forms. Most of the plastic will be sold to on the market.





cutters
gravity tank,
blow separator
PE,PP,PVE separator
Water basin
plastic film screen

other streets

basic sorting :
- 1250 people
- 36 decentralized storages

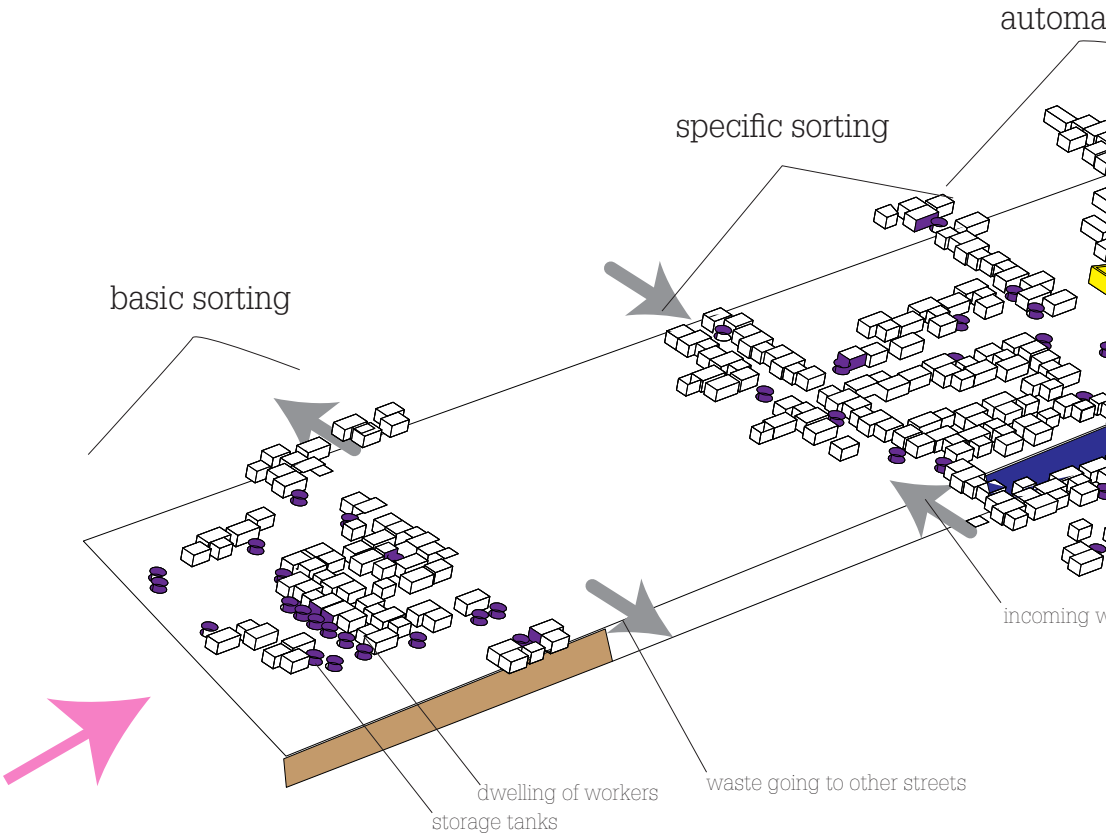
specific sorting:
- 2500 people
- 20 decentralized storages

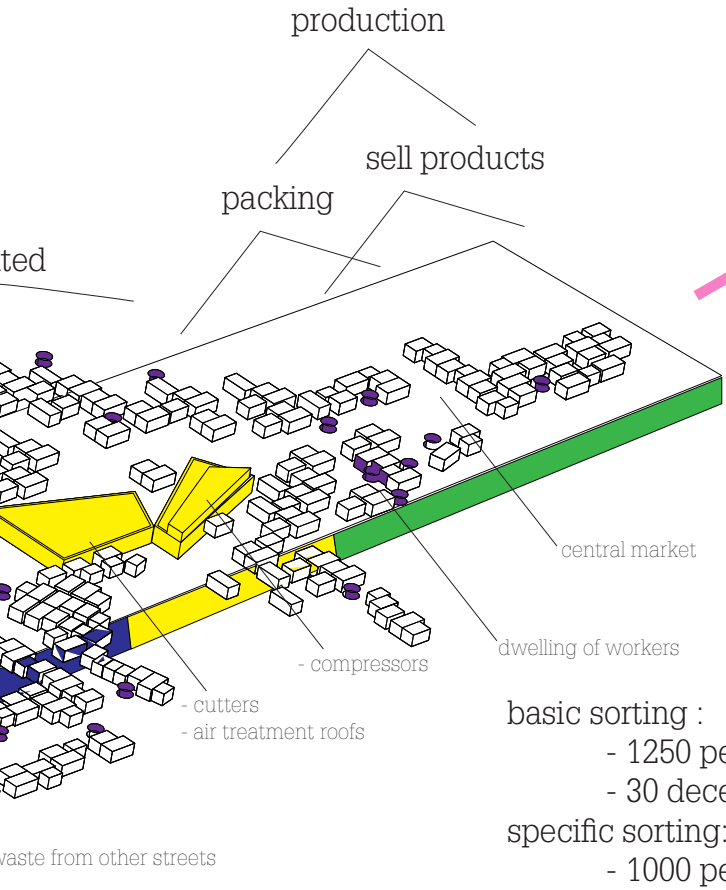
automated plant:
- cutters
- gravity tank,
- blow separator
- PE,PP,PVE separator
- Water basin
- plastic film screen

production:
- 2500 people
- 50 decentralized storages

Refuge derived fuel (RDF) street

All processes have a refuge which can be used as a fuel. This street is somewhat shorter than the previous streets. The produce is used immediately as a power source. Large bricks are the product of the street. The work like the old peat blocks we once used in the west. Perhaps a new brand of whiskey will be create by the slum.





basic sorting :
- 1250 people
- 30 decentralized storages

specific sorting:
- 1000 people
- 25 decentralized storages

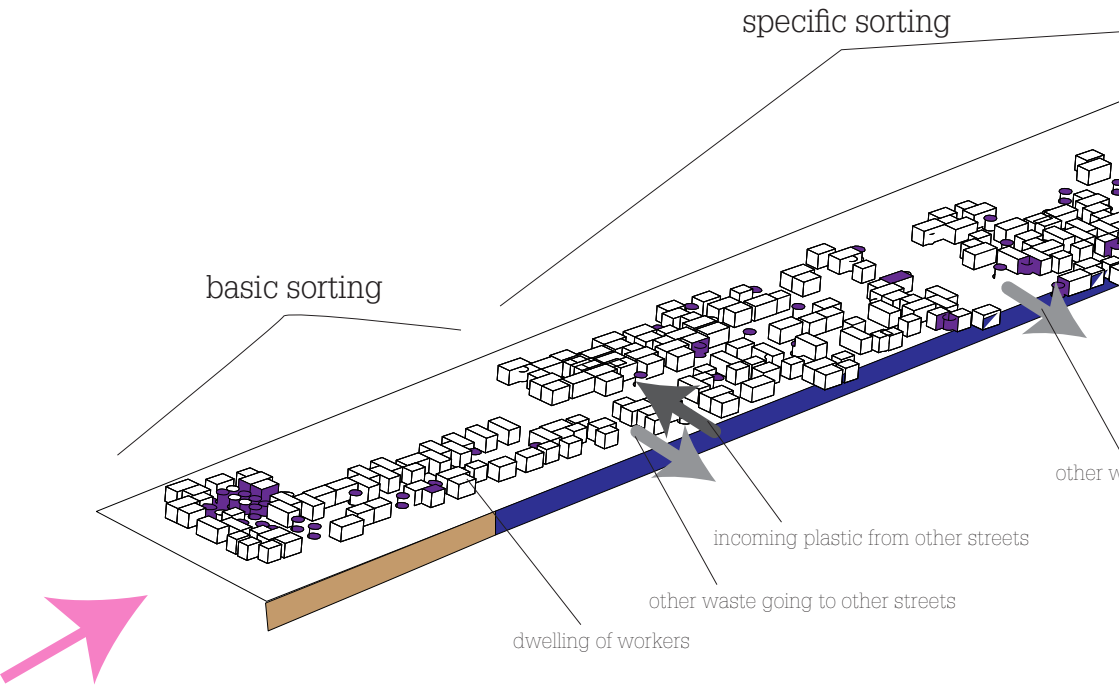
automated plant:
- cutters
- compresors
- air treatment

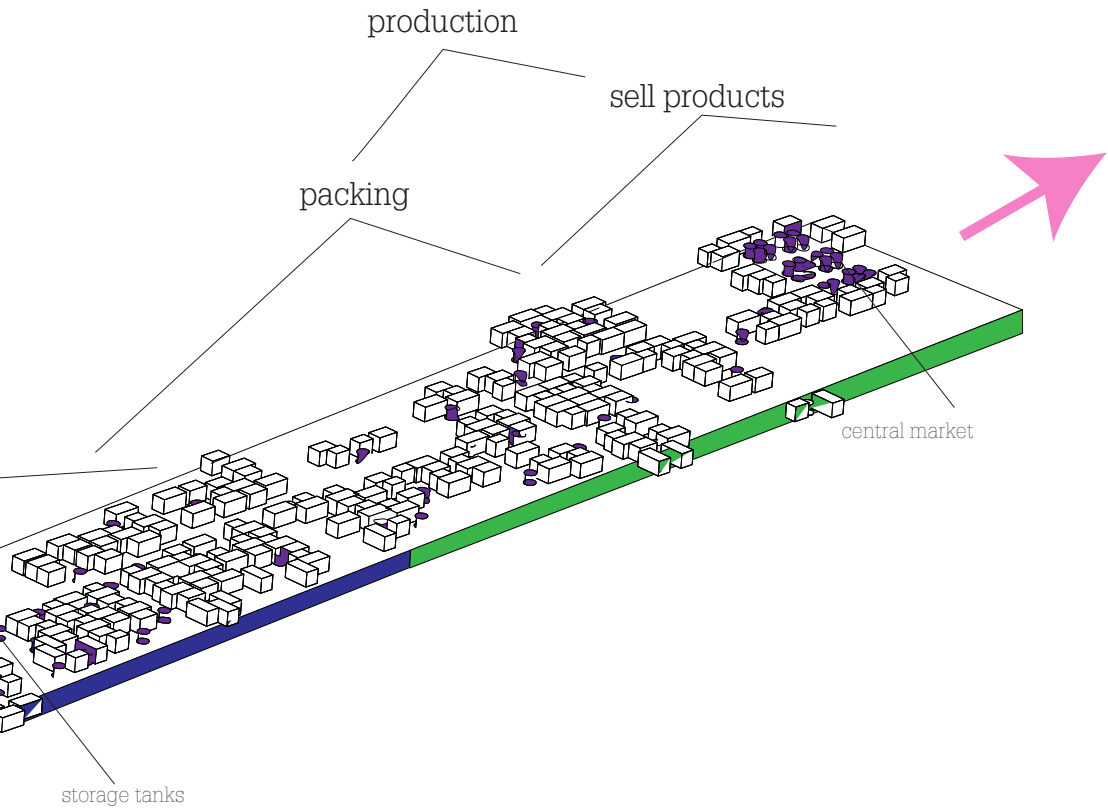
production:
- 1000 people
- 25 decentralized storages

Other materials street

Waste is comprised out of all types of materials. Although most of the waste will be processed by the first four streets, there will remain waste which cannot be processed. This street therefor does not need any automated facilities. It is and area where slum dwellers can scavenge through the waste and pick out all other materials, like metals, and stones.

Around 25 tons of waste will be processed here on a daily basis. In the vision chapter we will see how long it takes for the slum dwellers to create roads from the rubble





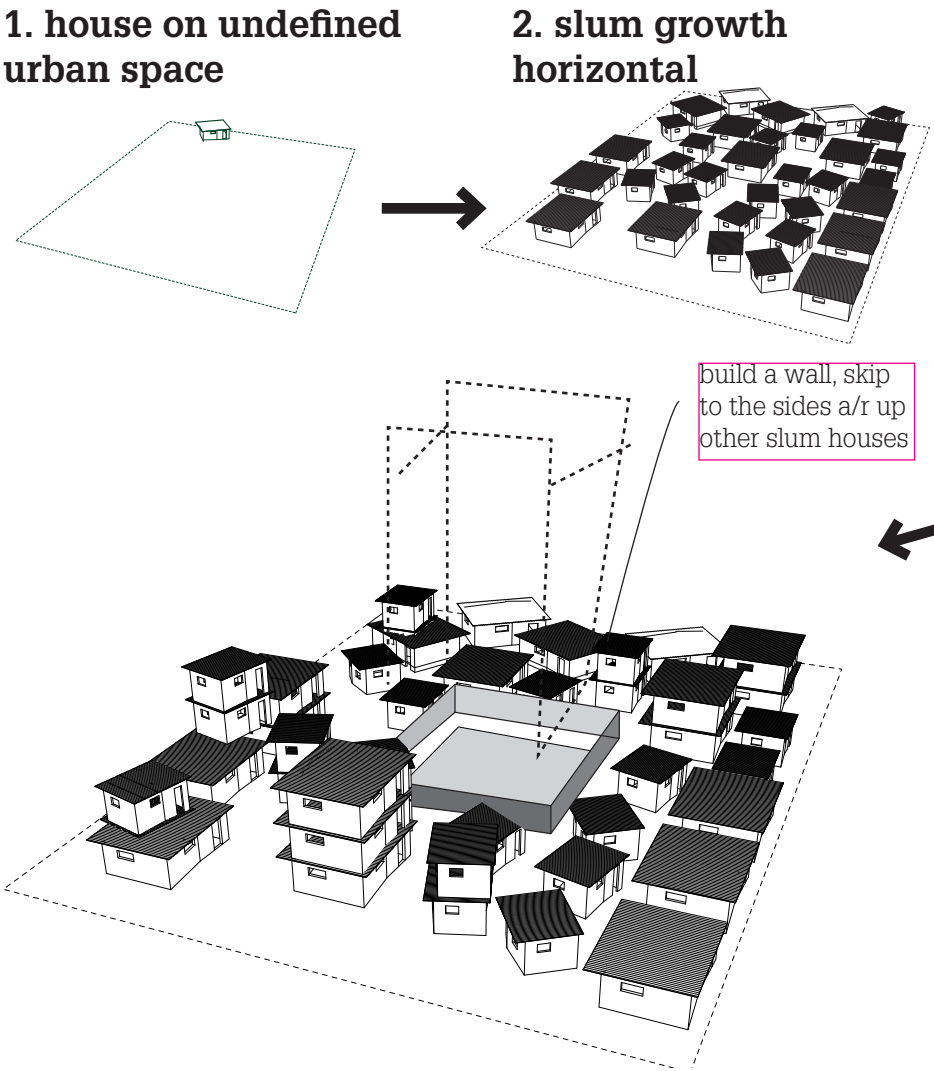
basic sorting :
- 1250 people
- 36 decentralized storages

specific sorting:
- 2000 people
- 40 decentralized storages

production:
- 2000 people
- 50 decentralized storages

5.4.1 Adaptation

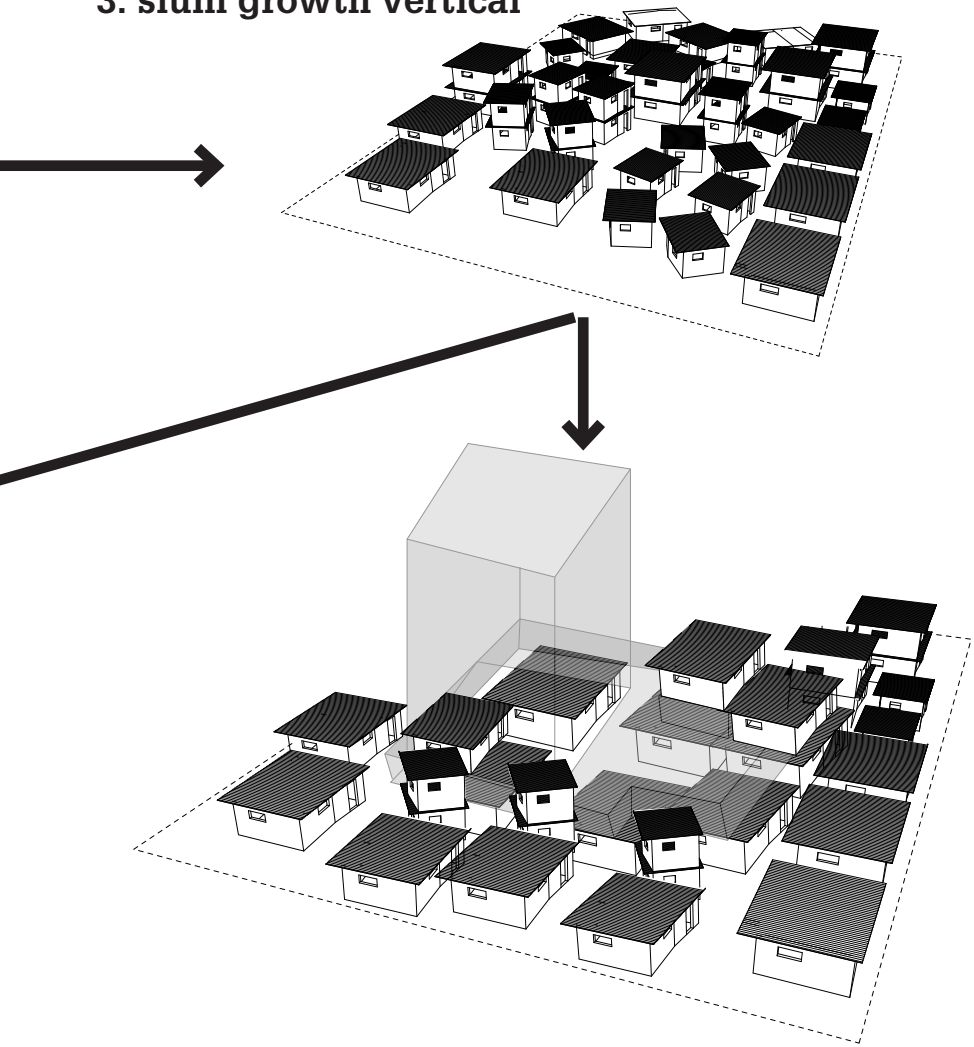
A slum starts to form on an undefined urban plot. As more people find the spot to be fruitful, or the next best thing the slum in making expands outward horizontally. When the slum hits the borders of the plot the next step is to build upwards. In this case the slum has already taken the full areas within the generic city. Slum boosters add even more program to the crowded slum. The reaction can go two ways. Either the slum will



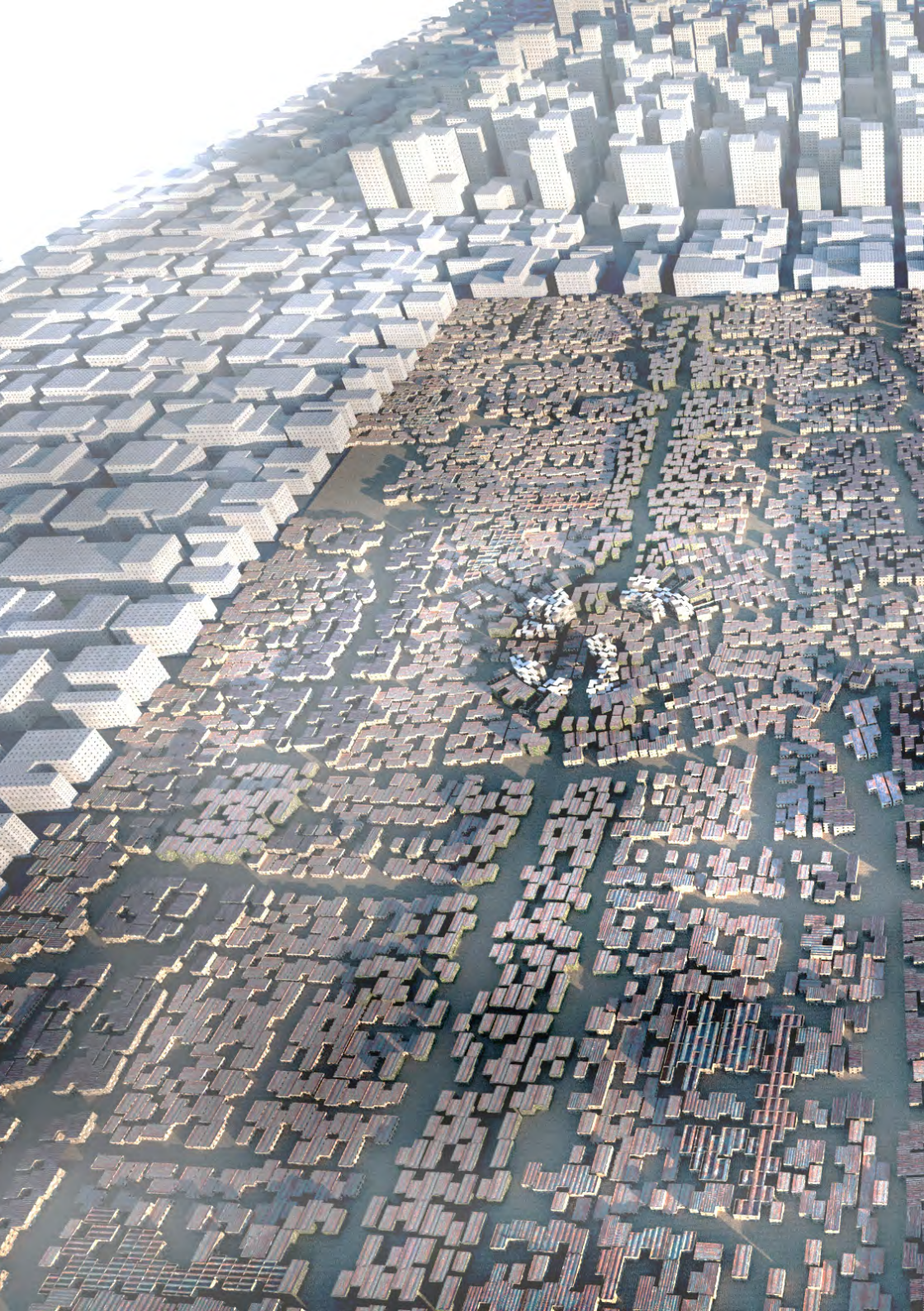
simply move aside or build even higher on the surrounding structures, the slum completely absorbs the new program, growing around and over it.

In schemes the process is seemly logic to follow. In the next chapters the physical implications of the process will be shown in a series of images.

3. slum growth vertical



4. slum integrate to new structures



Chapter 6 lets start!

This chapter will show how the generic slum changes as the implementation of the booster are set into motion. It starts with T=0, the situation as it is now. In 4 steps the implementation will be complete itself. There are two separate story lines to follow, the manual labor streets the automated areas.

The households involved with manual labor will change, the clusters they are living in and the neighborhoods will adapt to the new work. As the implementation continues products start to come free with which the slum dwellers immediately start to upgrade their own situation. The upgrading is good for the production process, because it allow for a higher productivity, which in turn allow for further development.

As the slum has a built area index of 0.69 it will not be possible to simply place small factories. Therefore specific machines will be placed in an order between and on top of the structures, as production starts and new products become available the neighborhoods will machines in them will change. The inhabitants of these areas will move a little and do something about the noise pollution by building a concrete envelope around the machines and the families living inside the perimeter will built new apartments next to it.

There is a direct influence of the manual labor parts and the automated plants. As the plants become more and more like factories, they demand more and more waste, but they also create more and more resources. These resources are used to be able to enhance productivity in the manual areas. The upward spiral is only limited by the amount of waste in the city. At T=1 the process hits its peak, re-allocating 450 tons of garbage daily.

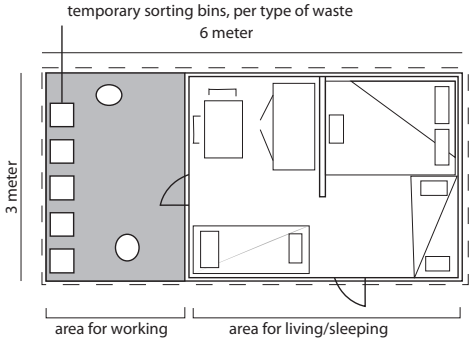
It is now time to see what happens to the slum. To do so two graphs are shown, the first is the same graph as seen before in chapter 2 based on the Legatum prosperity index[77], the second a new graph. This second graphs shows the amount of profit in the slum which can be used to new investments and new work. The blue line indicates the profit per year; the other lines are cumulative for each process. The initial investment for the implementation lays around 30 million, and with 15 million profit annually, the slum can pay back its loan in two years time.

In the next chapter we will speculate what will happen to the slum, up to T=x where the vision is complete.

6.1 manual labor

The implementation of the booster in for the manual labor parts is as follows.

The generic slum unit is projected, with 5 beds and a small desk and an outside area where the slum dwellers activities take place. It is in this area the slum booster will interfere with the slum dwellers.

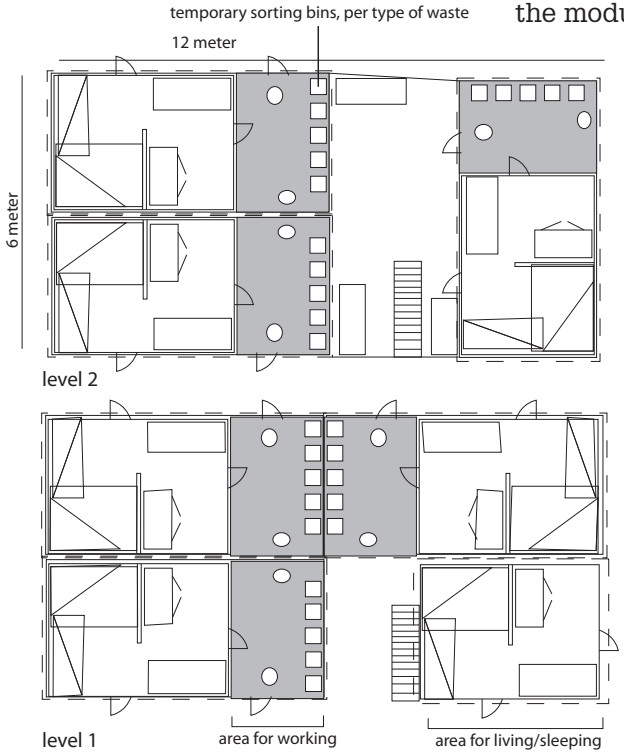


Five modular bins are placed for each household engaging in the booster.

Units are always part of a bigger cluster. These cluster are in the generic slum averaged at 7.25 units per cluster.[78]

The average cluster area is around 76m^2. This results in a generic setup as shown below. There are

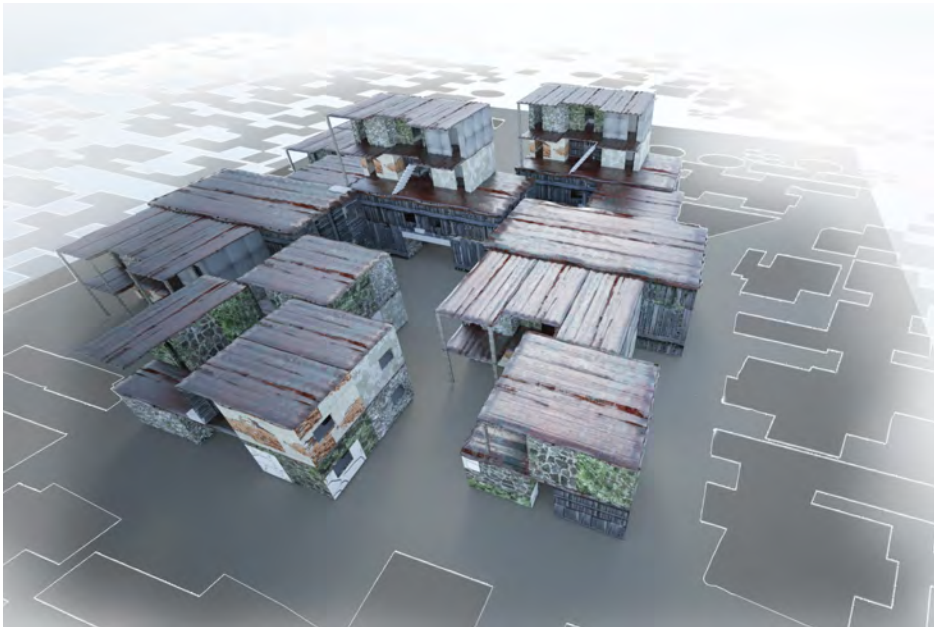
These floor plans already show the modular bins in front of each house.



The clusters are likely to work together. Much like this the current situation in slum areas at present.

The inhabitants in the clusters live in a primary circle of the neighborhood often with complete families a street for the village the slum dwellers originated.

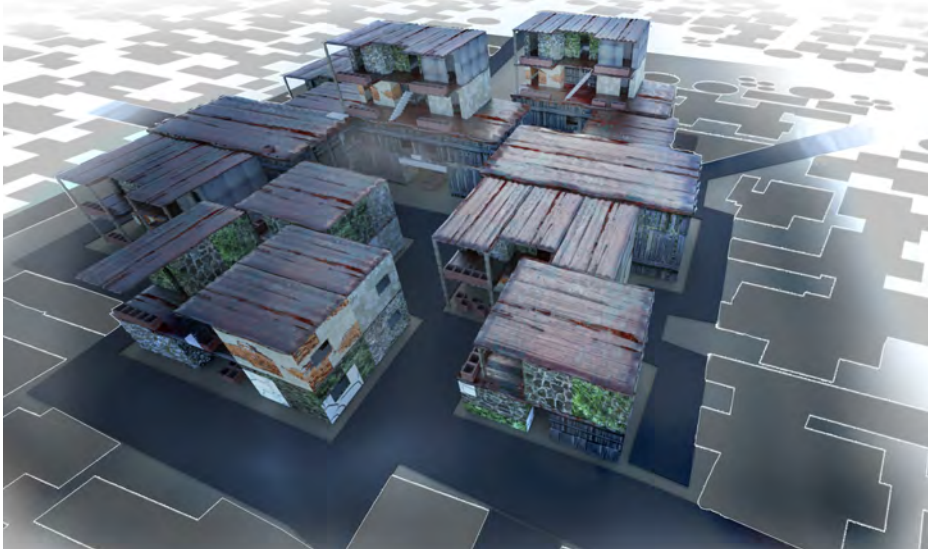
At T=0 a neighborhood within the slum will have the appearance of any slum. The structure durability of housing is absent. Trash is



thrown on the streets and children play in dirt. these impressions will be used to show the complete development of the slum areas.

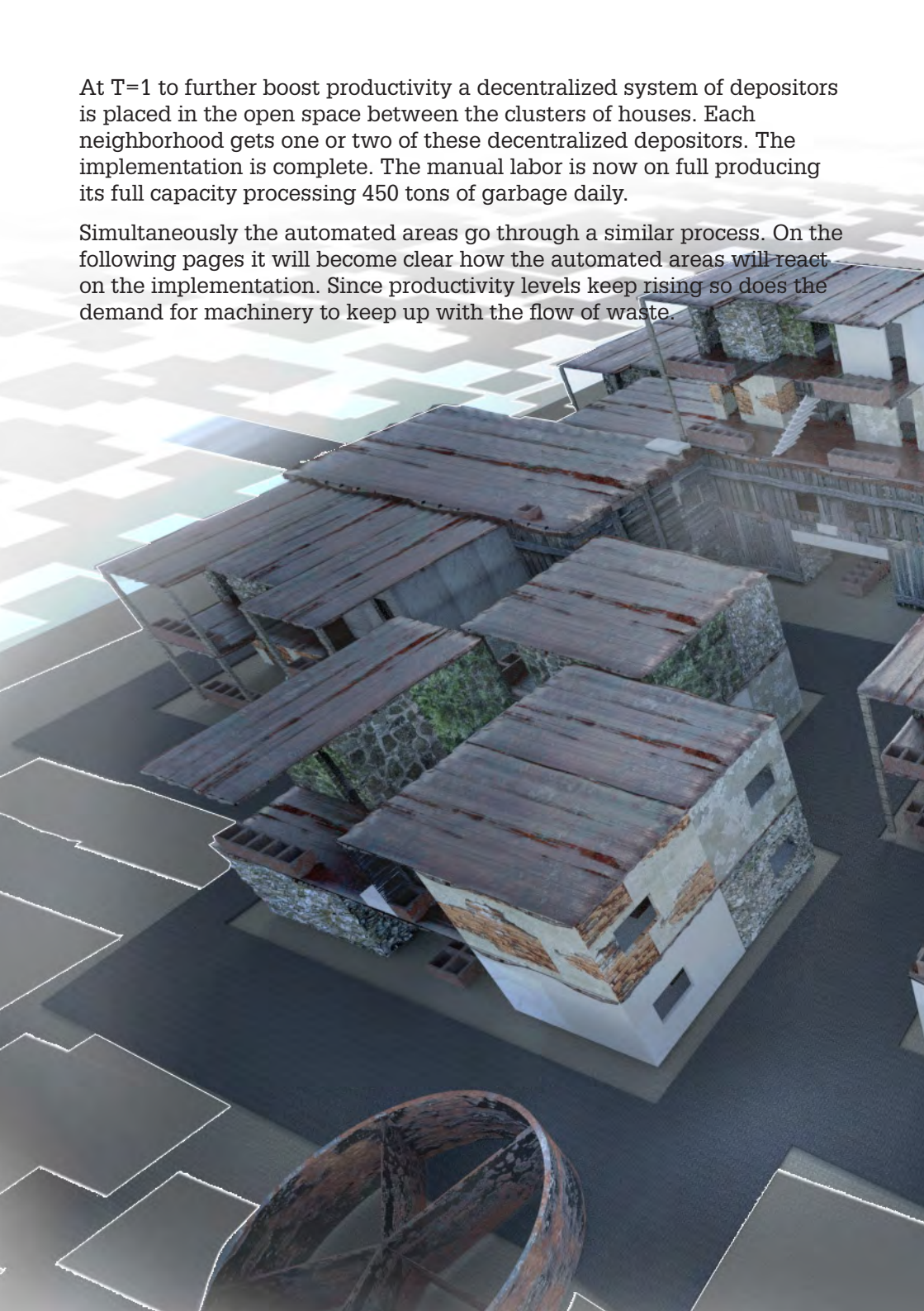
At T=0,25 the implementation of the booster has started. The bins are now used to separate the waste into the types of waste previously mentioned. Per day the bins are empty and the production is fed to the next step in the process. The bins are modular and can be universally transported through the slums. By this simply intervention productivity of the waste processing slum dwellers already rises. The waste worker no longer works in small group, but is now joining in the complete waste-processing plan. This allows them to focus on a single part of the process.

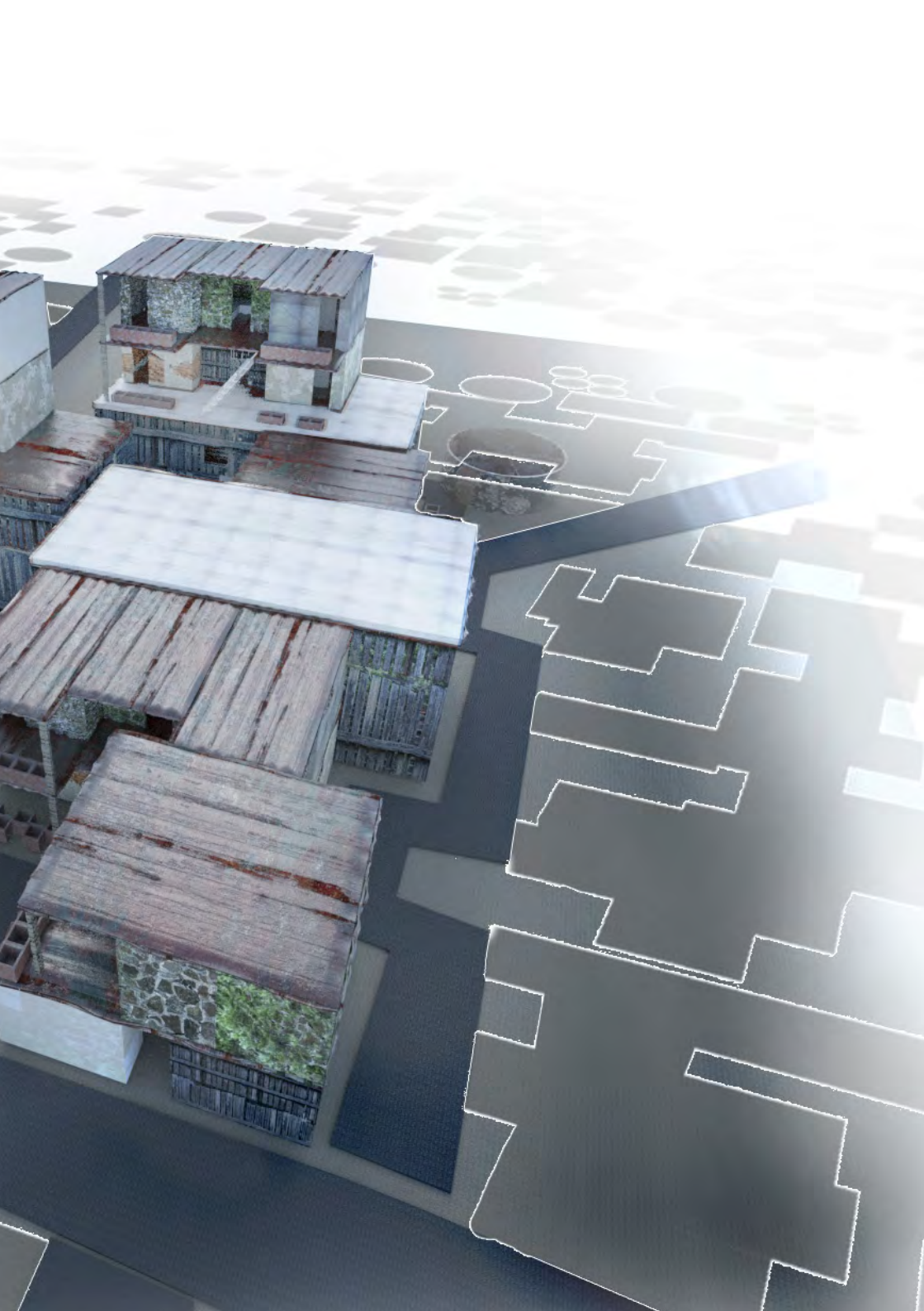
At T=0.5 roads and sanitation infrastructure increase productivity of manual labor. The concrete comes form the “other” street. By using the waste selection process suddenly it becomes possible for the slum dwellers to no longer have dirt roads, where sewer flow freely. Plastic found in the waste is remolded to piping. This gives the community sanitation. The manual productivity rises and the automated areas need to be able to handle more waste.



At T=1 to further boost productivity a decentralized system of depositors is placed in the open space between the clusters of houses. Each neighborhood gets one or two of these decentralized depositors. The implementation is complete. The manual labor is now on full producing its full capacity processing 450 tons of garbage daily.

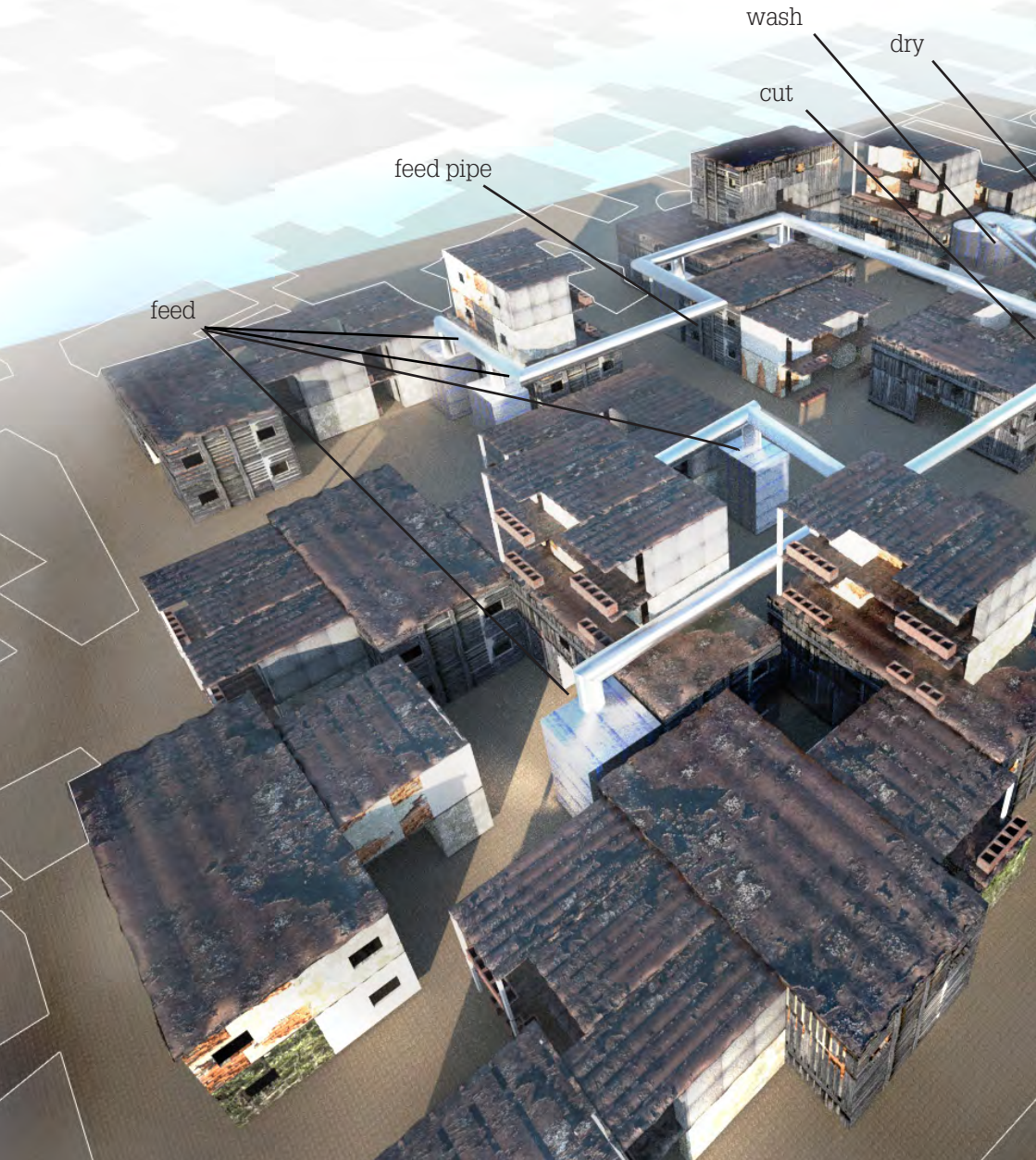
Simultaneously the automated areas go through a similar process. On the following pages it will become clear how the automated areas will react on the implementation. Since productivity levels keep rising so does the demand for machinery to keep up with the flow of waste.



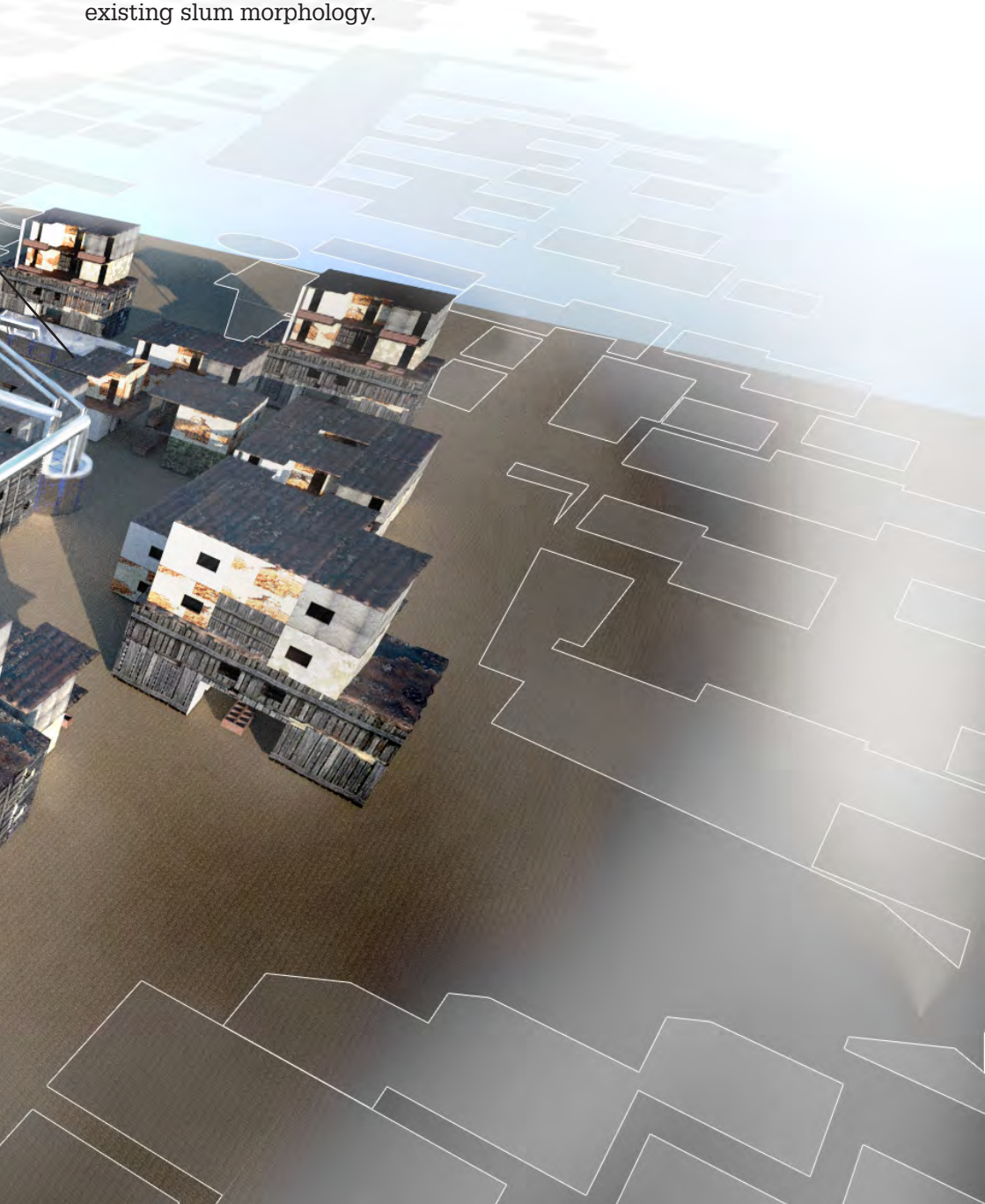


6.2 automated areas

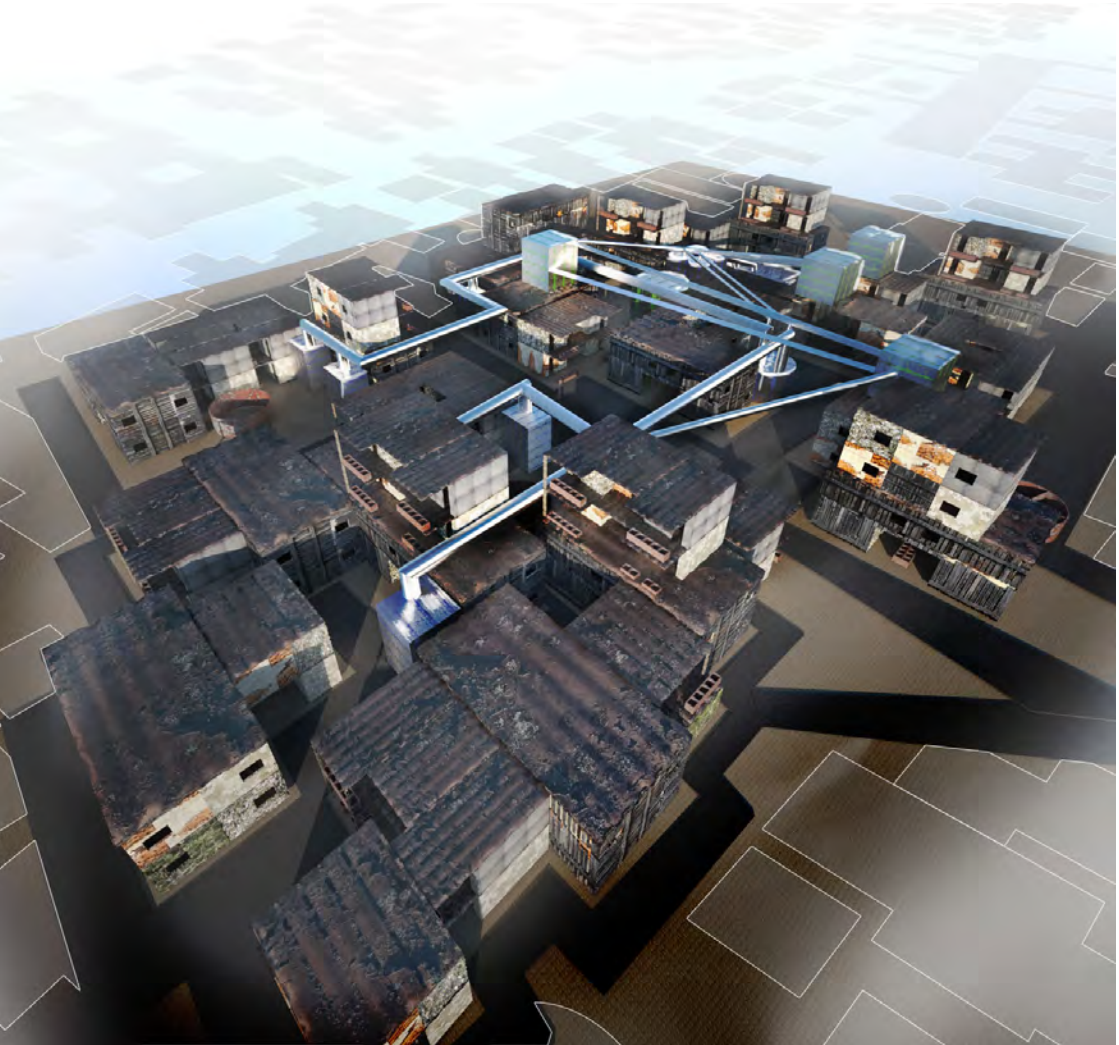
The transformation form slum into an automated waste processing facility is a gradual process. Shown here is T=0.25. A few specific machines are put in place to facilitate the initial production. The products created will be passed on in the street where they will be packed and



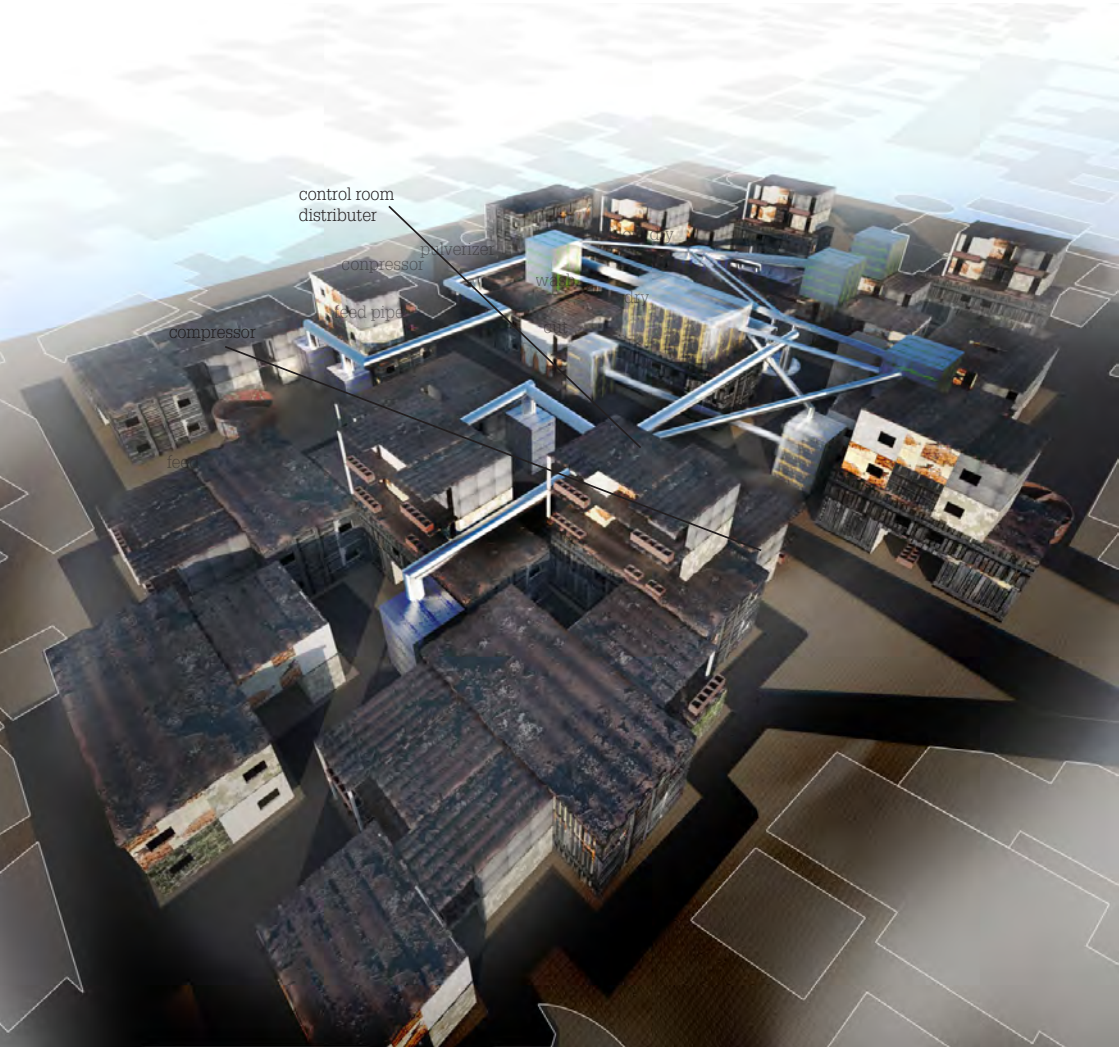
sold to the highest bidder. However along the way inevitably slum dwellers will take what they need first. Among the machines are cutters, washers and dryers, which are connected through pipes that run directly through the neighborhoods. An organic factory is formed within the existing slum morphology.



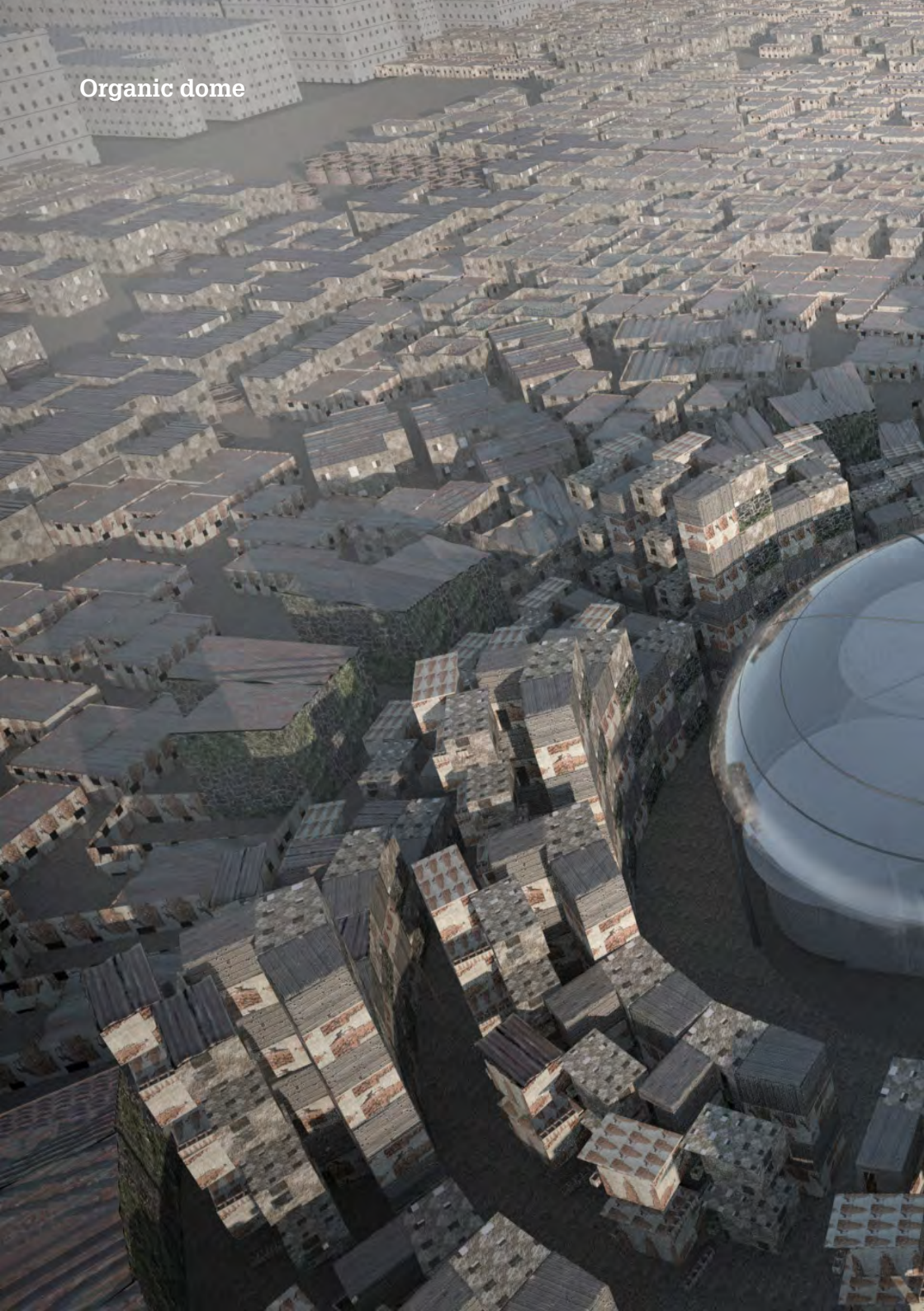
At T=0.50 the slum has a basic road and sanitation infrastructure. The manual labor area have an increased capacity, which result in a demand for more machinery in the automated areas. Slum booster provides the extra machinery. The affect area becomes more dense with piping and machinery, some households will already move away to the perimeter of the automated cluster.

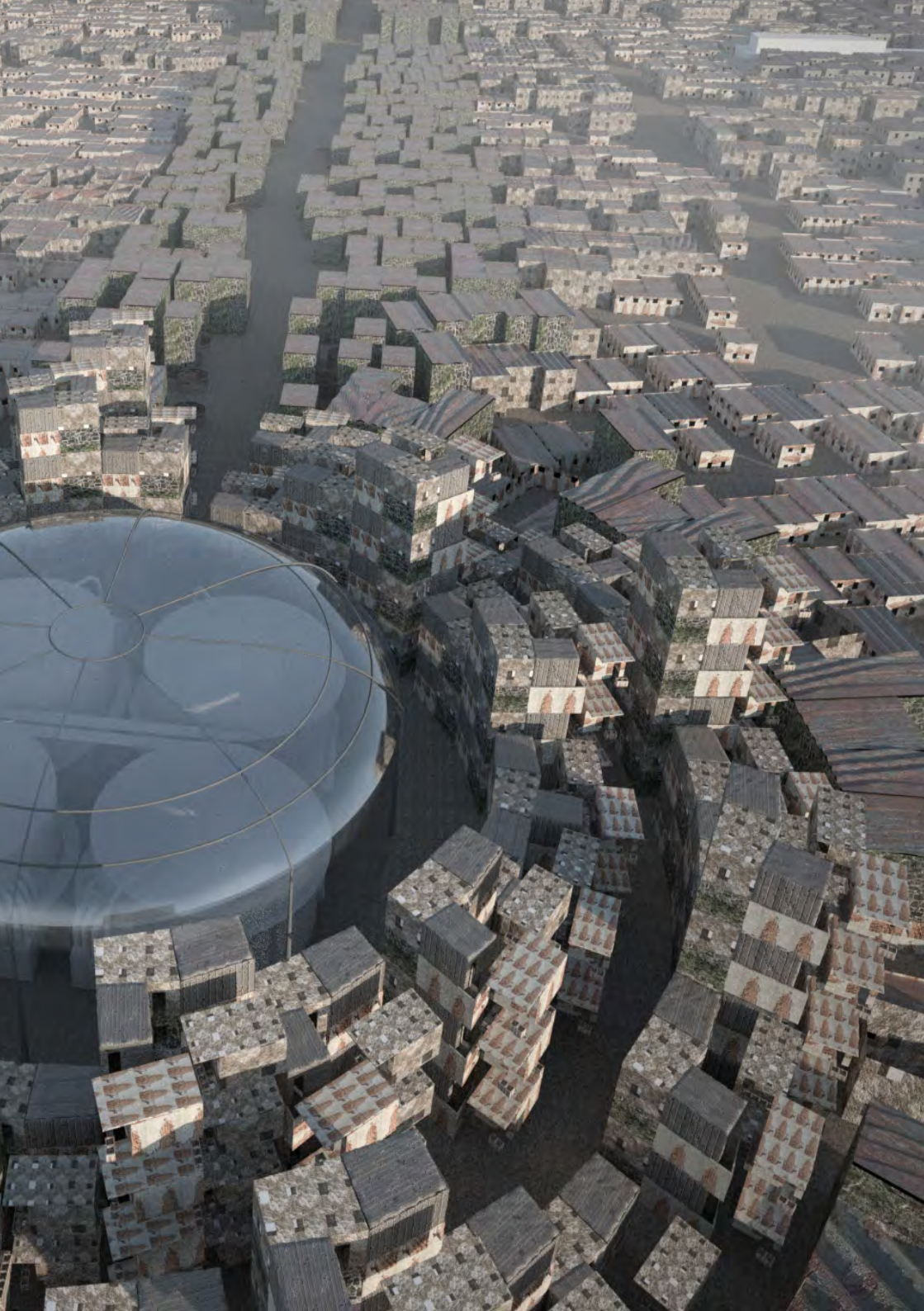


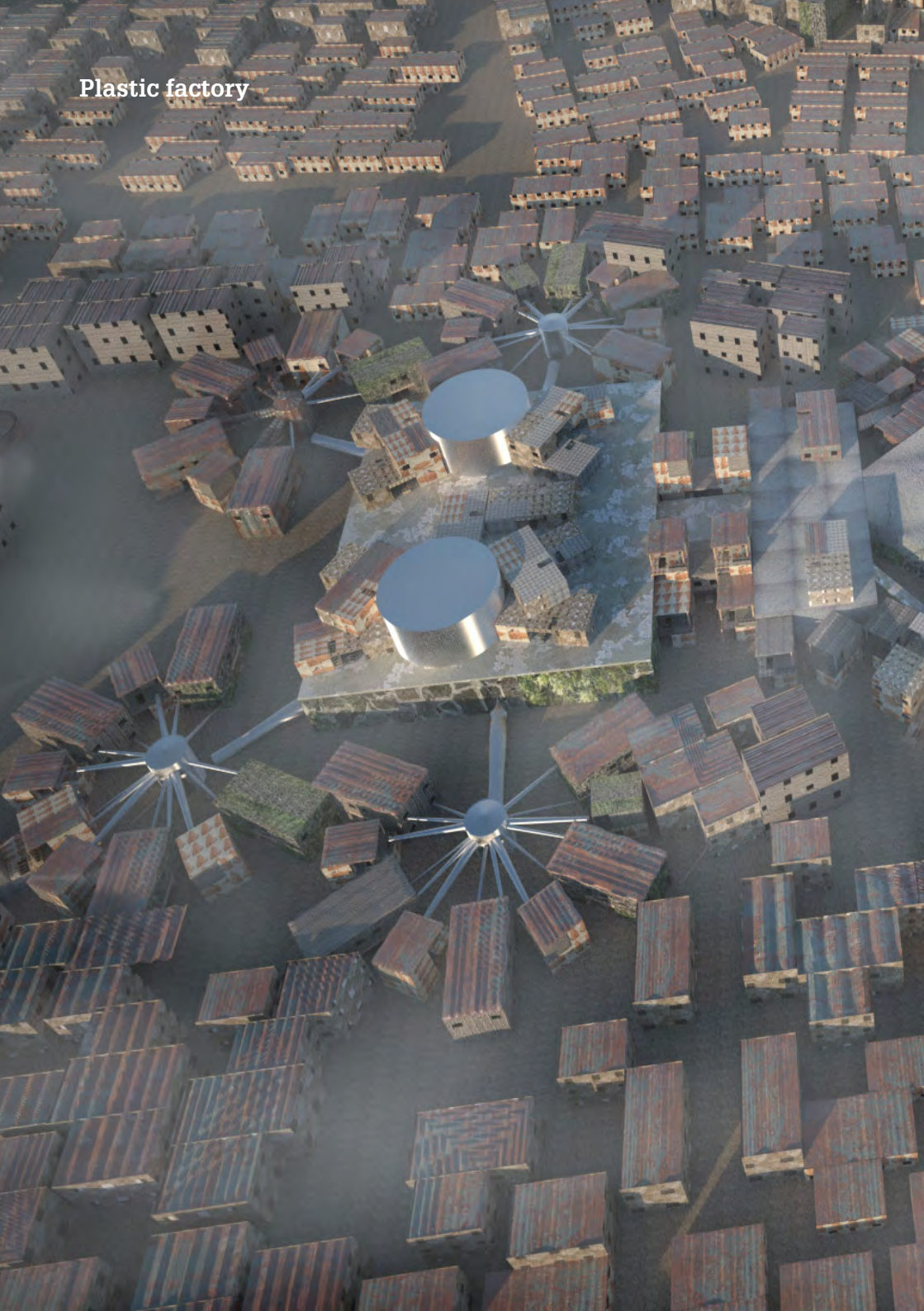
At T=0.75 the area becomes a fully functioning automated waste reallocation plant. There is a full integration of housing and factory functions.



At T=1 the slum has reacted to the growing noise and smell pollution. By creating a concrete dome around the area. Now the once integrated housing and automated processing area has become a mini factory for specific use. The houses that were once inside the perimeter have moved and built on top of the surrounding structures. On the following pages the resulted for the initial automated areas are showed


Organic dome




Plastic factory


Refuge Derrived Fuel factory

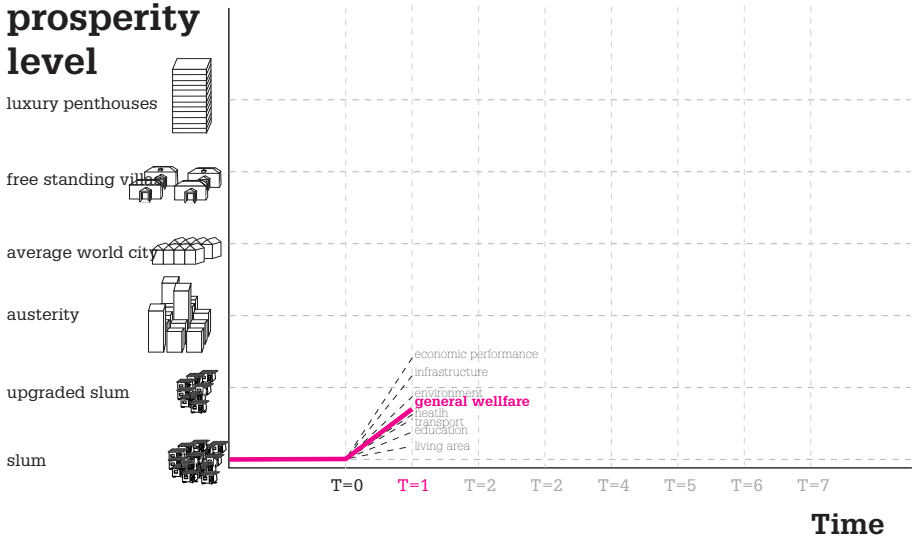
Paper factory

6.3 Implementation complete

The implementation is now complete; the slum has formed itself into a fully functioning re-allocation area. New resources boost the economic performance of the area. And the products are partly sold partly used inside the slum for further upgrading of the lives of those who dwell in the area. On the next page an overview of the generic slum is shown after the implementation of the booster. In the centre of the slum one can clearly identify the automated factories. The streets run north to south, form the edge of the city towards the centre. Near the centre markets specialized in product types, papers, plastics, organics, refuse derived fuel and “other” materials have a clear location and function. This makes the markets ease to find and use bringing the complete re-allocation process close to the city. By maximizing the proximity in all 5 ways at this point of the city the chances of success are increased.

To assess what the result is of the implementation two graphs are used. The first graph shows the predicted prosperity levels. Based on the Legatum prosperity index[79] this is a mere estimation. The estimation is derived through a rational logic.

At T=1 the economic performance has been booster. Within this boost lay the reason for the increase of prosperity of the other parameters. Environmental prosperity is increased. Even though the reallocation process will increase the amount of waste in the former slum, by processing waste back to the original resources the former slum is of course decreasing its pressure on the environment.

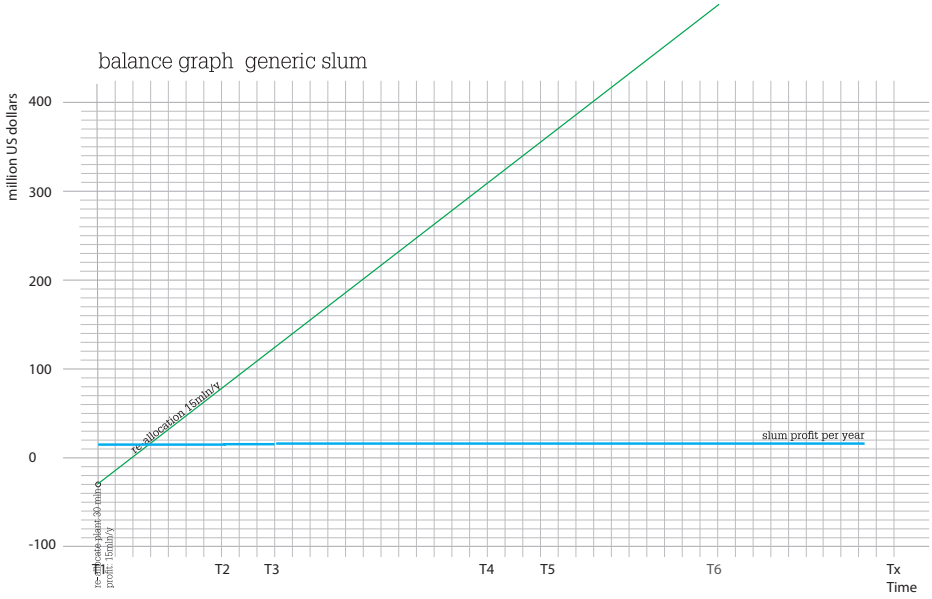


The usage of rubble to create roads (T=0.50) increases the possibilities of transportation. Dirt roads are converted in to paved roads. This also increases the safety on the roads and allows for a quicker response to trouble in the area. Through the new pipe system for sanitation and water health is greatly increased. The hygiene of the area is as it has never been before. The slum has come from the Middle Ages into the 21st century. Threats of diseases like the Pest in Western Europe, which has costs entire populations of cities to die in outbreaks because of poor sanitation, have been averted in the former slum.

The new processes have also increase education in the area. People are learning new trades and production methods. The slum communities' children learn form their parents, when their ability increases so does the education of the children. [80]

Finally there is but one parameter on the prosperity index which is not yet growing very steeply upward. The living area of the slum dwellers has as of yet not changed a great deal. But with the rising in savings and the possibility to further develop surely this issue will be resolved in the future.

The second graph indicates the financial state of the slum. As the slum booster will cost around 30 million the green accumulative line start below zero at T=1. Horizontally years and vertically the balance is indicated in green. The blue line indicates the profit per year. As the re-



allocation plant creates 15 million in profit per year it remains a straight line. In the next chapter new work will be added which affects the balance and the profit per year line When new work is added and money is invested the balance line will drop from time to time. However new work should lead to more profits, the balance line will become steeper and steeper. The more work added the more profits are made and the higher the economic performance of the former slum area.

concrete creation[81]
25ton of rubble daily or

profit: 60 m^2 * 0.18 m concrete per day
time: 18.9 years openspace concreted

0.69 built area index > .031 * 1.500.000 m^2 = 465.000m^2 area is open space

concrete class b25 weights 2050kg/m^3,

average thickness of pavement = 0,18 m

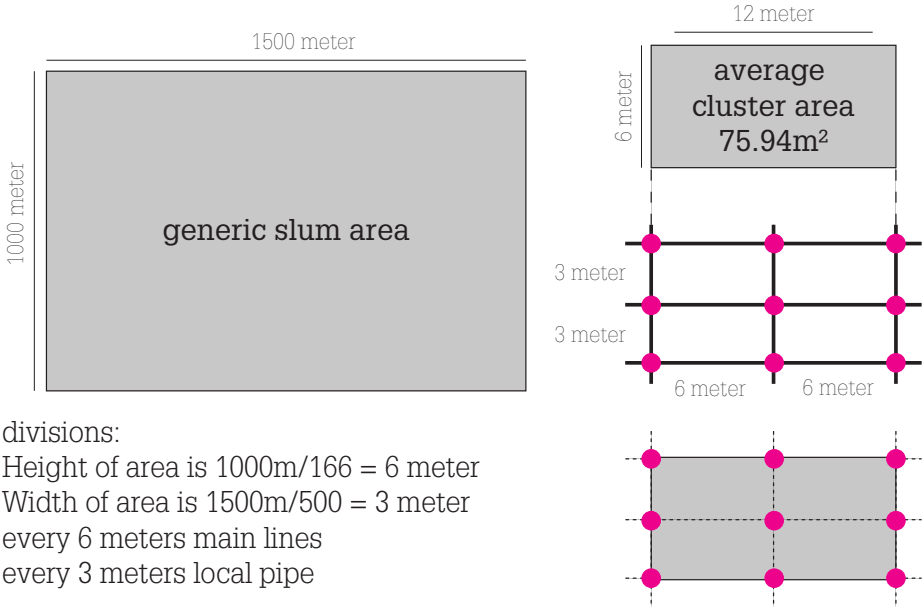
1m^2 pavement = 369 kg

There is 465.000m^2 x 369kg/m^2 = 171.585.000kg = 171.585ton needed

25ton/day x 365 = 9.125ton per year

This results in 9.125/171.585= 18,9 years

water and sanitation infrastructure calculation[82]



divisions:
Height of area is 1000m/166 = 6 meter
Width of area is 1500m/500 = 3 meter
every 6 meters main lines
every 3 meters local pipe

- 166 x 1500m x 315mm main sewage pipe
  315mm pipe = 13.2kg/m
  166x1500m = 249.000m
  249.000m = 13.2kg/m = 3.286.800kg = 3286.8 ton

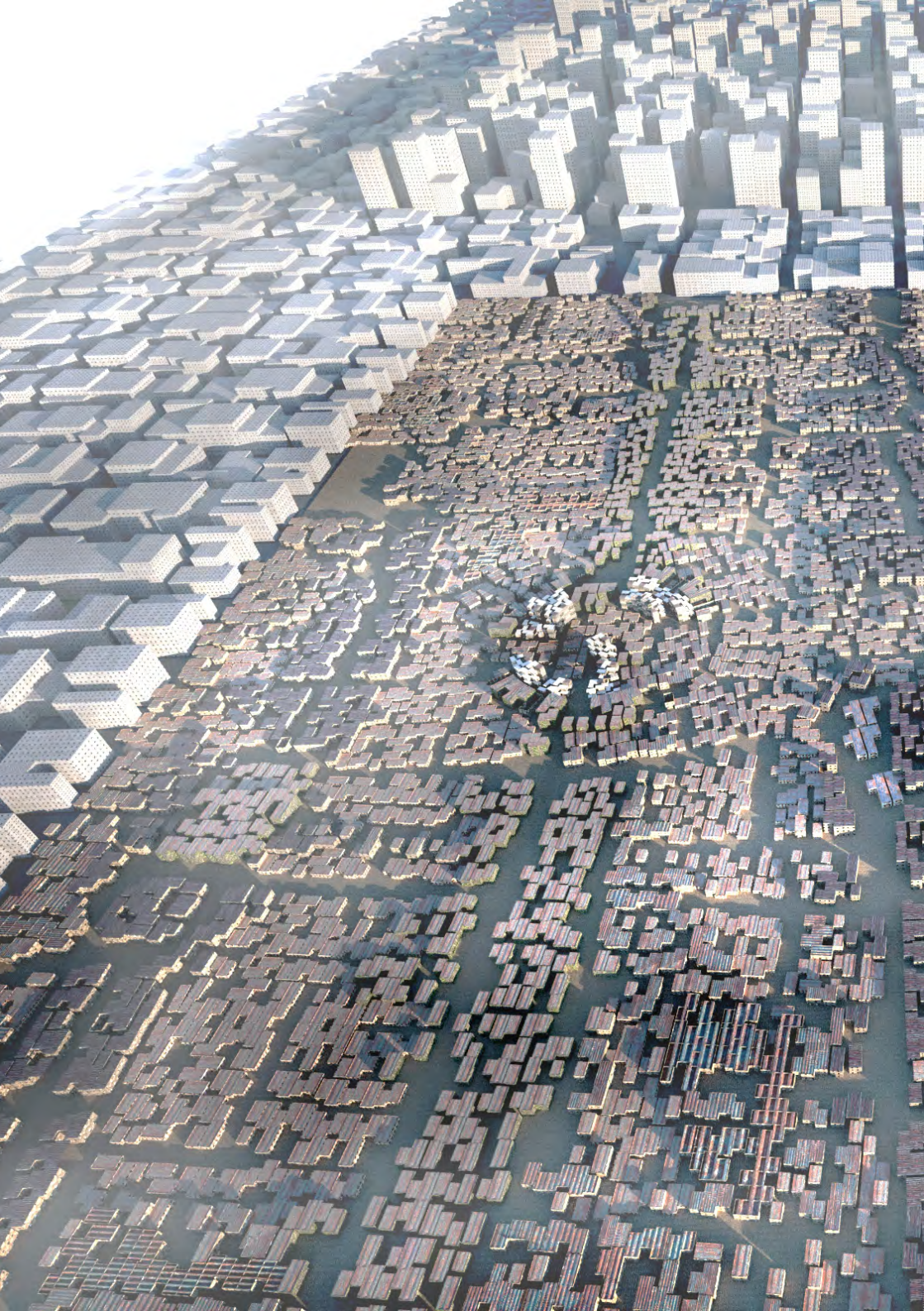
- 166 x 1500 x 40mm main water pipe
  40mm pipe = 0.33 kg/m
  249.000m x 0.33 kg/m = 82900kg = 82.9 ton

- 500 x 1000m x 110mm local sewage pipe
  110mm pipe = 1.64 kg/m
  500 x 1000m = 500.000m
  500.000m x 1.64 kg/m = 820.000kg = 820 ton

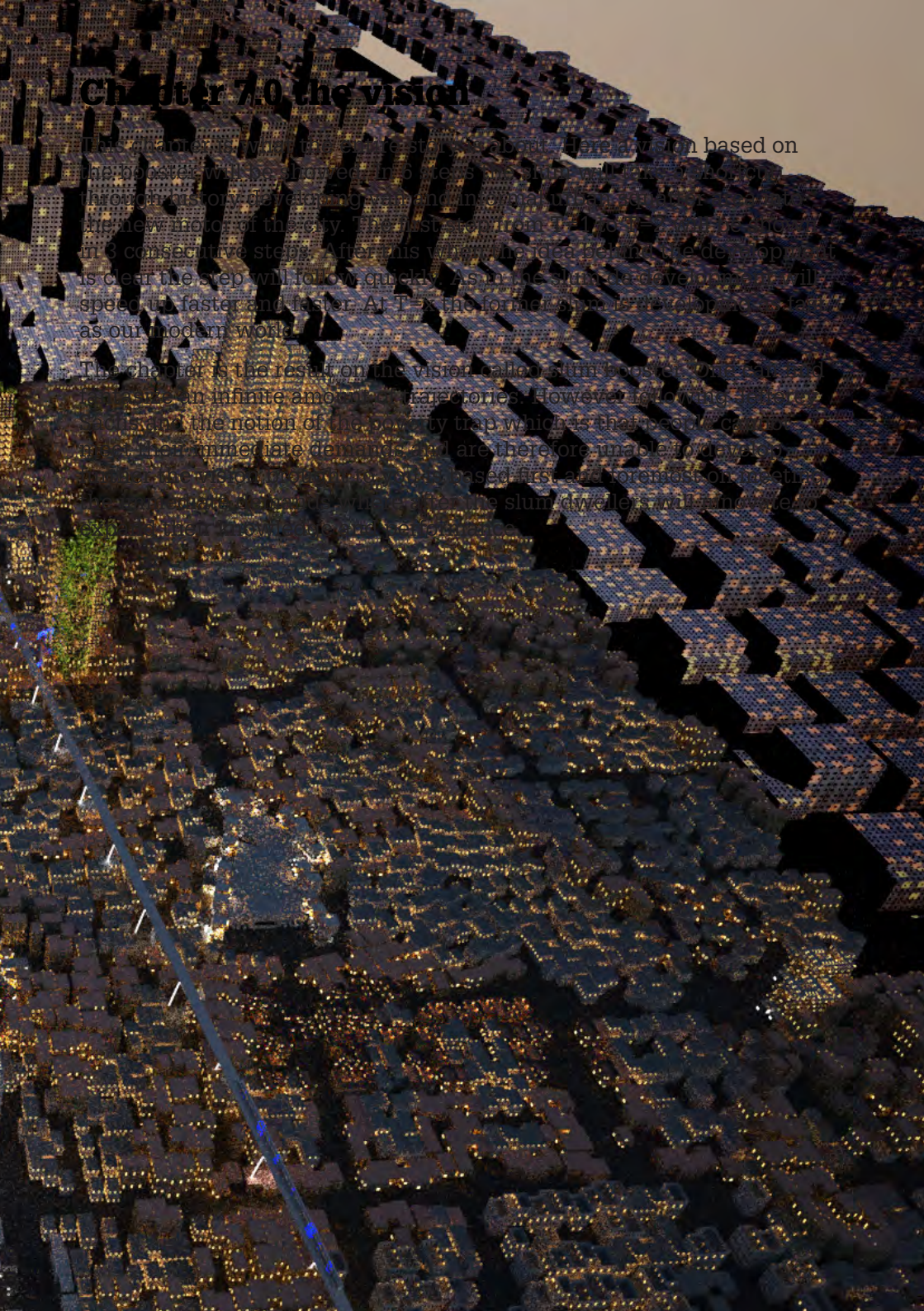
- 500 x 1000m x 40mm local water pipe
  40mm pipe = 0.33kg/m
  500.000m x 0.33kg/m = 82.500kg = 165 ton

In total there is 2176.985 ton plastic needed for safety 25% is added leaving an estimated 5.442,4625 ton

With 50 tons a day it would take about: 110 days to produce the pipes needed for water and sanitation.

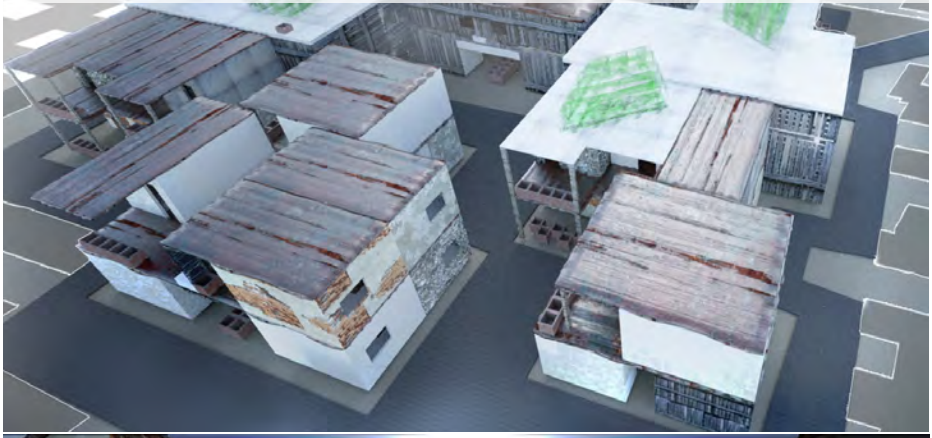


Chapter 7.0 the vision

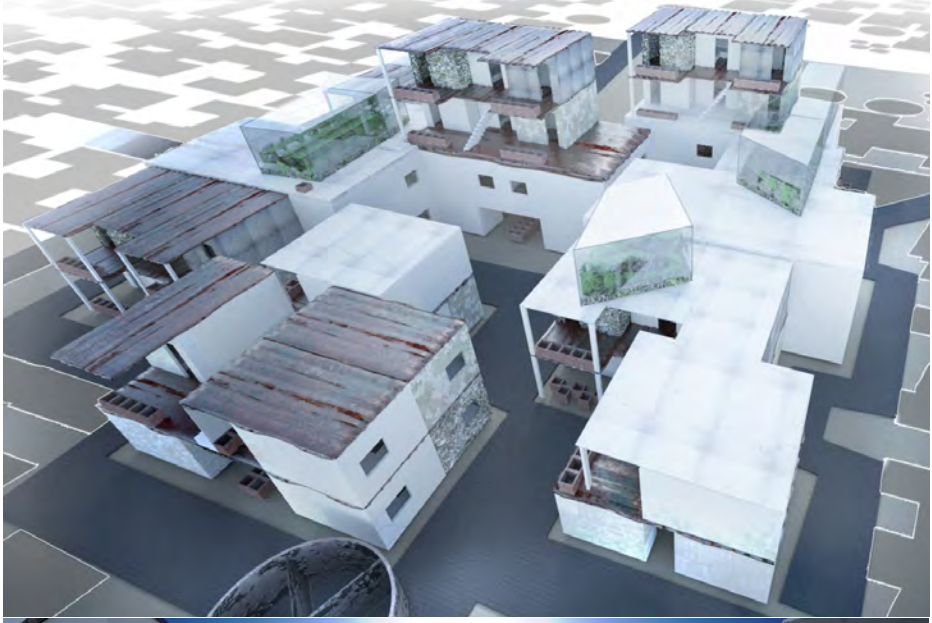


7.1 urban farming[83]

T=1.25; The first step slum dwellers will undertake after the and during the implementation of the slum booster is the need to have enough food to feed themselves. The re-allocation process will give them the opportunity to feed themselves. There are two essential elements produced which allows for the harvest of food. First the plastic line provides piping for sanitation and water. Second the organic process produces fertilizer and compost. The two combined allow for the slum dwellers to create small roof gardens, thereby enabling them to feed them selves. This process will start around the organic street where people can easily come by fertilizers.



At T=1.5 a new element is added to the roof gardens. Using plastic film and basic other materials the production of the garden is increased by creating greenhouses which allows the crops to grow faster and all yearlong. The simple roofs gardens expand towards the plastic street. Collaboration between the two different lines is inevitable.

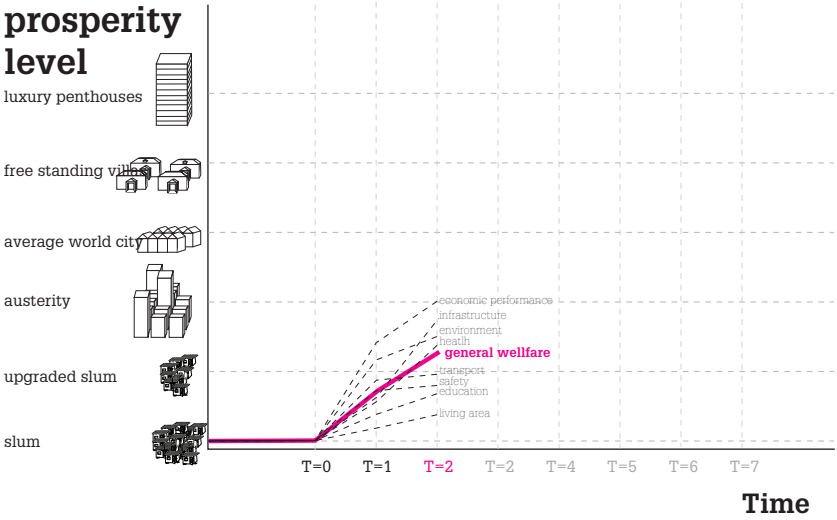


T=2 shows the innovative and entrepreneurial mind of the inhabitants, the rooftop greenhouses are expanded by connecting the green houses. Green snakes appear on the top of the slum. Urban farming has become a reality. This process requires another investment, equivalent to that of a vertical farm. At this point in time the horizontal urban farm produces so much food the slum starts to export towards the city. The organic markets are expanded to facilitate the selling of urban-farmed foods.

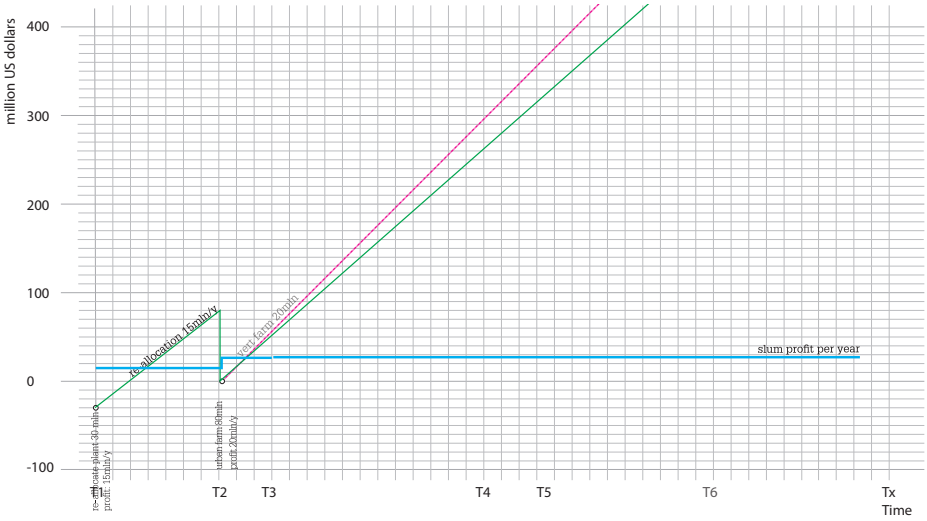
On the graph shown below is what happens with the prosperity of the slum. When the horizontal urban farm reaches its full capacity the economic performance of the slums grows. Sanitation and water infrastructure expands and the harvest of food result in better nutrition of the population, thereby increasing the health index.

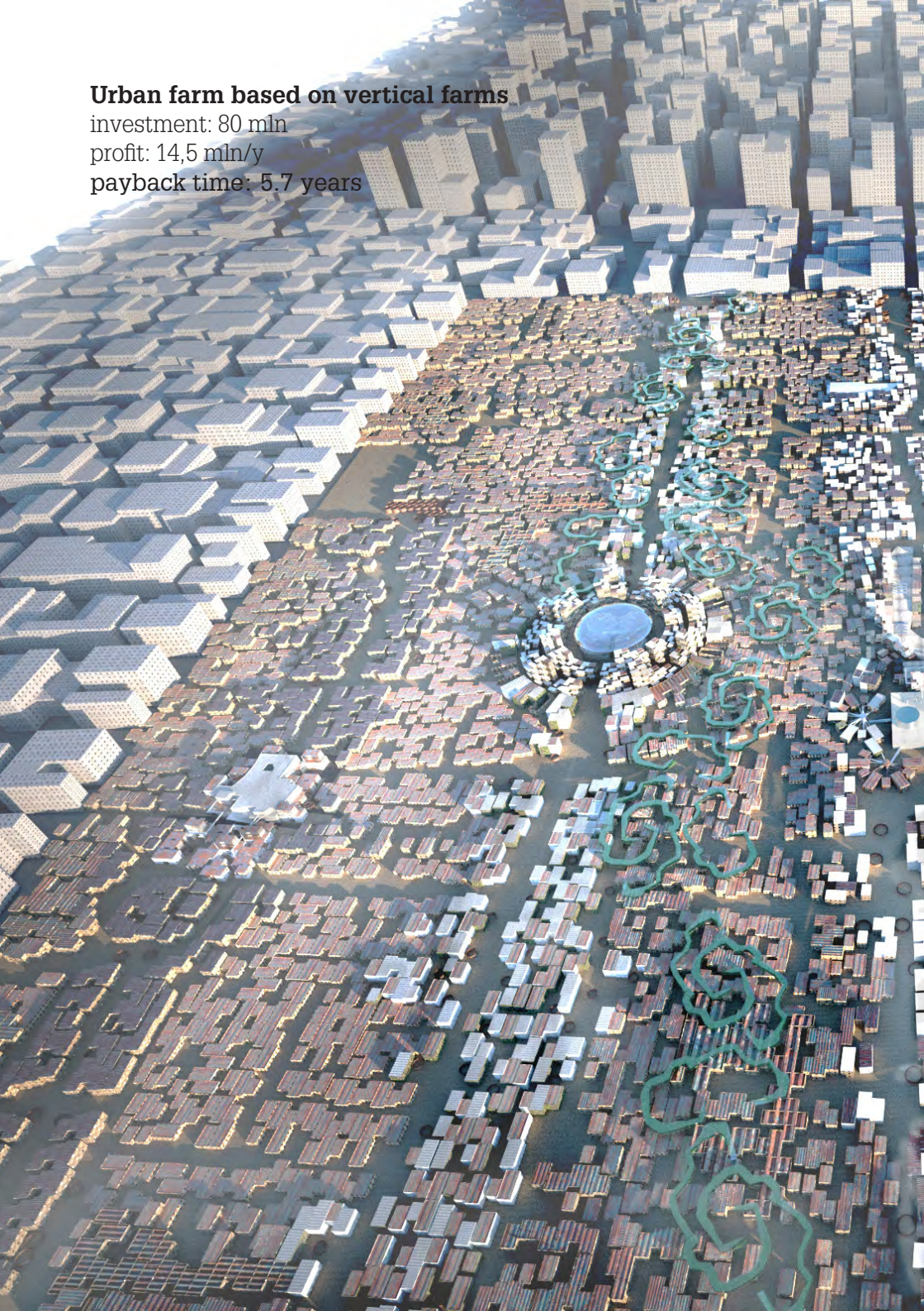
The environmental index also grows as the crops also clean the air in the air. Crops have the capability to seize CO2 and produce O2 as a bonus.

The rest of the prosperity index is bound to also grow because of the continued re-allocation process. More resources are produced daily and while a great part is sold on the local markets, some of it will be used inside the area. The combination of higher economic performance and the creation of resources will insure development of the area as a hole.



The financial graph of the area is given an extra line, namely the urban farms which result in a profit of 14.5 million for the area. The blue line indicating the profit per year grows with 14.5 million, and a pink line shows the accumulated wealth from the urban farm.


million US dollars
400
300
200
100
0
-100
re-allocation 15mln/y
vert.farm 20mln
slum profit per year
T1
T2
T3
T4
T5
T6
Tx
Time



Urban farm based on vertical farms
investment: 80 mln
profit: 14,5 mln/y
payback time: 5.7 years

7.2 Electricity[84]

The next essential need of the slum dwellers after food sanitation and water is electricity. While some might indicate that the living area is more important electricity holds the key to further development. It allows for the slum to increase its speed in the shortcut through history.

At T=3 biomass produced in the organic process is used in small decentralized power plants each producing around 500Kwh of electricity. [1]An investment of 10 million will allow for the creation of 10 mini power plants with a combined power of 5MegaWatt. This is the equivalent of 17857 TL lights of 28 watt, one for every household.

The prosperity graph shows what happens to the slum when electricity becomes widely available. The economic performance is again boosted; inhabitants can now work longer and are no longer depended on daylight for their activities. Through the added amount of light the streets become a safer.

The re-allocation process is remain producing resources, which allow for a further expansion of general development and by doing so also for further growth of prosperity. Financially the green line shows a slight dip where the power plants are bought. The profit can not me shown in terms of money earned directly for the power plants, so after the dip the growth continues gradually.

1 BluEnergyControl - Michele Giacalone; - email conversation found on the internet.

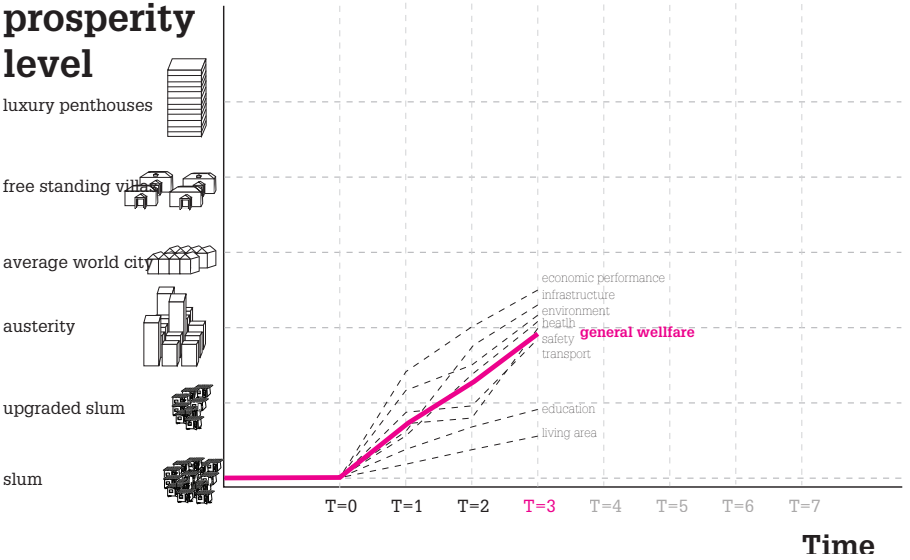
mini biogas power plants

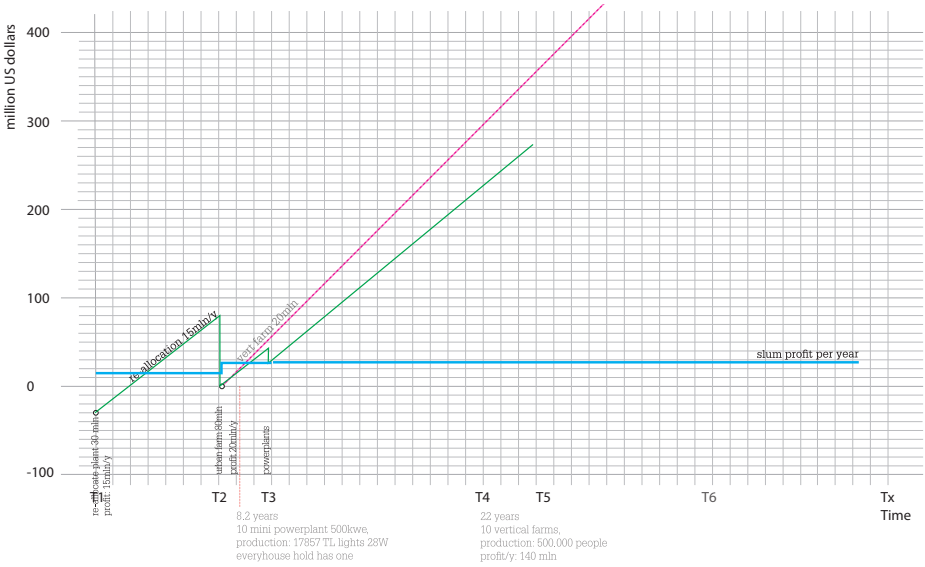
200 ton of organic waste produced daily
it takes 20 ton/d to generate 500kW
this means a maximum of 10 mini power plants can run on the waste.

total energy gains are 5MW

which is the equivalent of 5000 100W bulbs running for 10 hours

or 17 857 28watt TL lights which is enough for each household to have one.

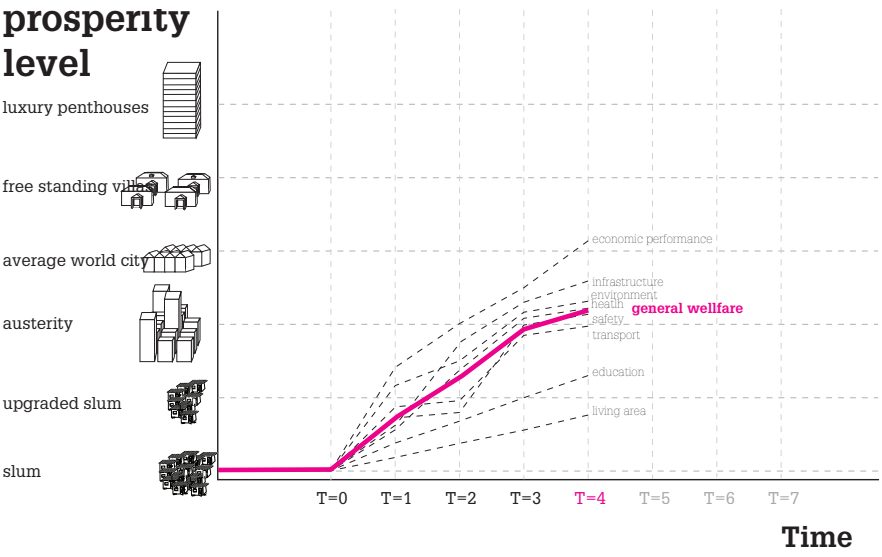

prosperity level
luxury penthouses
free standing villas
average world city
austerity
upgraded slum
slum
economic performance
infrastructure
environment
health
safety
transport
general wellfare
education
living area
T=0
T=1
T=2
T=3
T=4
T=5
T=6
T=7
Time

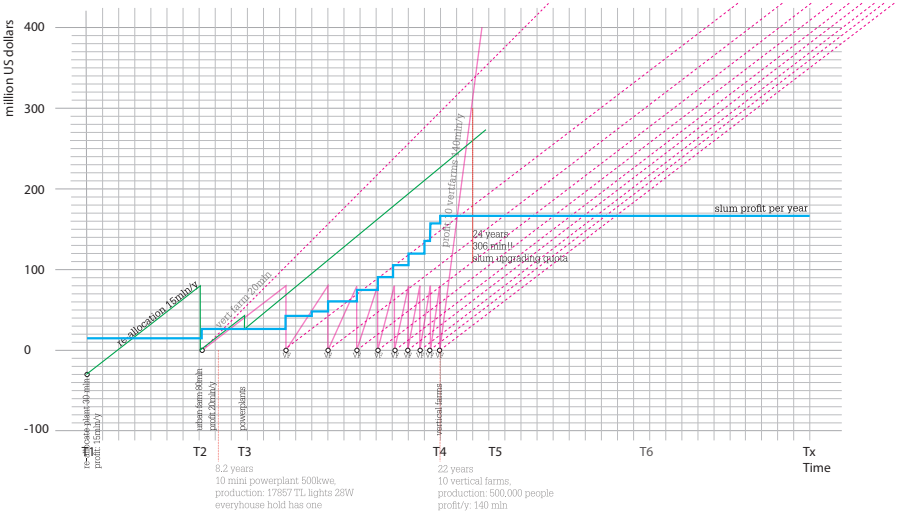

million US dollars
400
300
200
100
0
-100
re-allocation 15mln/y
very large 20mln
slum profit per year
T1
T2
T3
T4
T5
T6
Tx
Time
8.2 years
10 mini powerplant 500kwe,
production: 17857 TL lights 28W
everyhouse hold has one
22 years
10 vertical farms,
production: 500.000 people
profit/y: 140 mln


Biogas powerplant
investment: 10
profit: 50

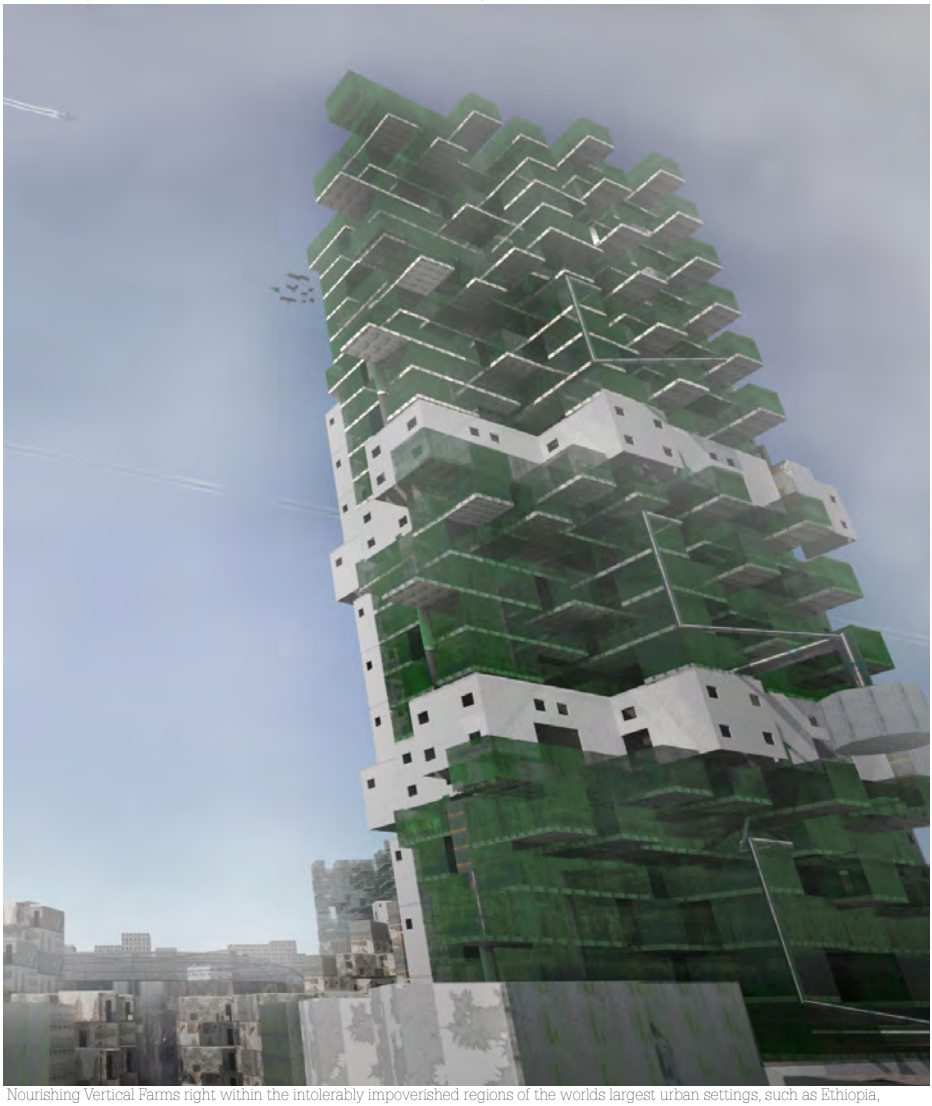
7.4 Vertical farms[85]

Now the slum is developing steadily. Since the organic process produces the most products and the slum dwellers are already used to working with urban farms the visions will extrapolate on this primary development. The urban farming industry has a profit of 14.5 million per year. After 7.2 years a total of 80 million will have accumulated. A vertical farm is built duplicating the profit per year form urban farming





to 29 million annually. In 3.2 years another 80 million and one more vertical farm, there by increasing the profit with another 14.5 million to 43.5million annually. This scheme goes for a total of 9 times. Which results in a profit of 145 million annually based on urban farming. The products are exported to the city, the nation and even internationally. The process invokes so much attention worldwide that companies start moving to the heat, thereby increasing education and infrastructure.



Nourishing Vertical Farms right within the intolerably impoverished regions of the worlds largest urban settings, such as Ethiopia, India, Central African Republic, the Gaza Strip, etc. is not only realistic, it's practical. Taking these ideas from outer space and deploying these strategies in the space of our cities is not only rationally feasible it may be one of the best vehicles we have to take on agricultural challenge of the near and now future

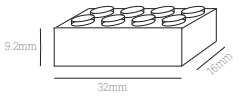
Urban farm based on vertical farms
investment: 720 mln
profit: 126 mln/y
payback time: 12.5 years

7.5 Stolen plastics

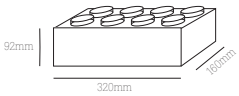
The urban farming industry is taking up so much attention the plastic process becomes overshadowed in its wake. A network of underground criminals starts to seize the plastic pellets and remould them to building blocks. Thee blocks are sold on the local markets. Finally the inhabitants of the former slum have the possibility to expand their living area. The blocks are cheap and easy to use. Depend on how much plastic is stolen it would take 48 years or more to duplicate the entire slum. [86]

This rogue business dents the safety of the slum. And it decreases the profit from the re-allocation process, as no more plastic is sold to third parties. All is used within the slum for expansion. The plastic mafia however will be a highly structured enterprise. Brides with the local police soon make it a semi legal business. The mafia takes take of its people in an orderly fashion and because of the mutual benefits safety is soon back to the old state.

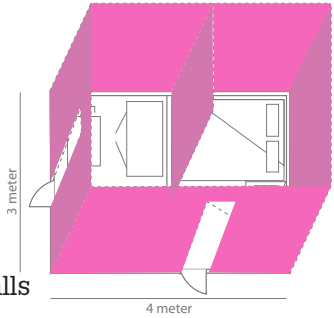
times 10x



One lego brick weights 2.5 grams
400 brick weight precisly 1kg



One lego brick weights 2.5kg
400 brick weight precisly 1000kg

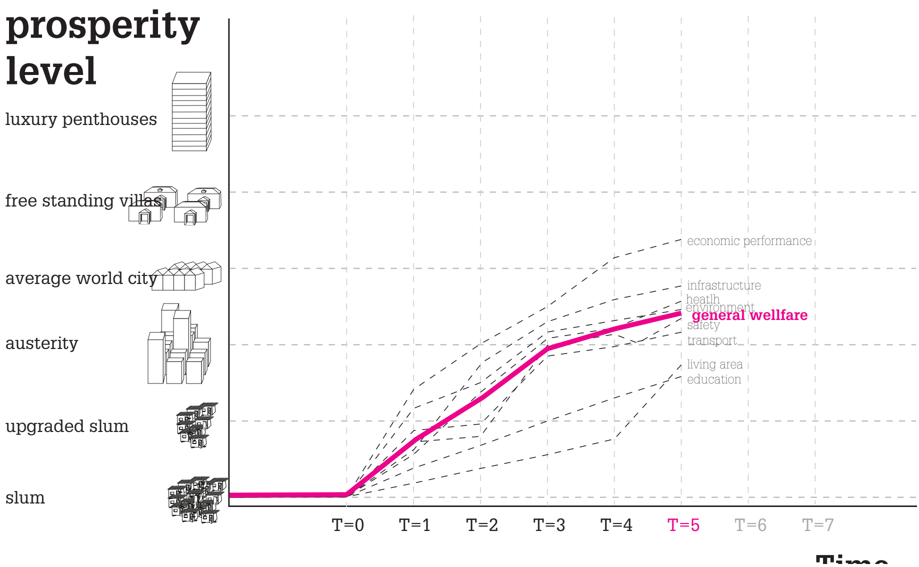


one unit has five walls all 320mm thick:

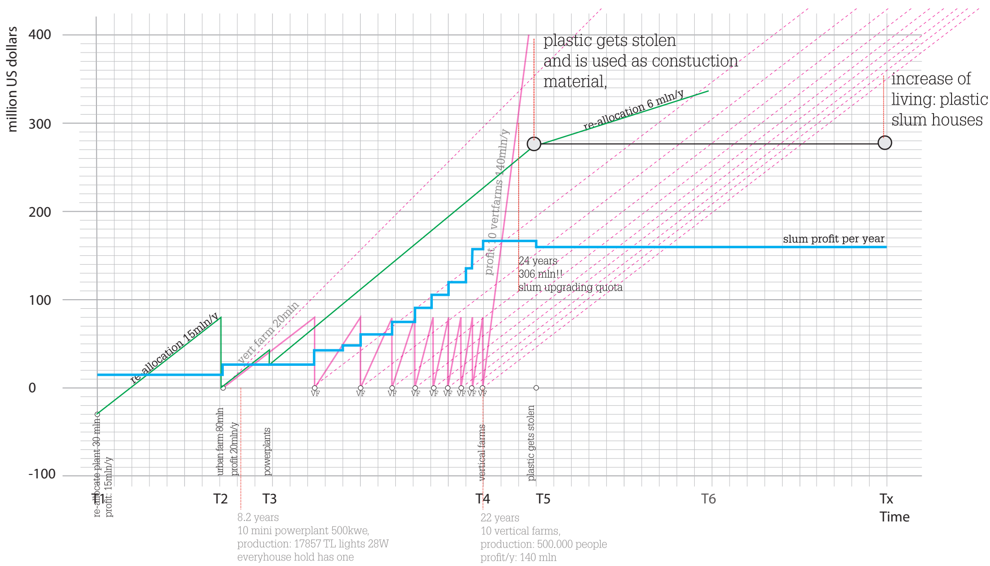
2x 3mx3m	= 18m2
2x 4mx3m	= 24m2
1x 2mx3m	= 6m2
total	= 48m2

lego times 10 covers an area of: 0.02944m2
there are 3310 bricks To construct the five walls
8.264 kg of plastic is need per unit
105.998 units x 8,264kg plastic per unit results in:
869.142.068,4 kg = 869.142 ton

with 50 ton per day it takes 48 years to replace all walls



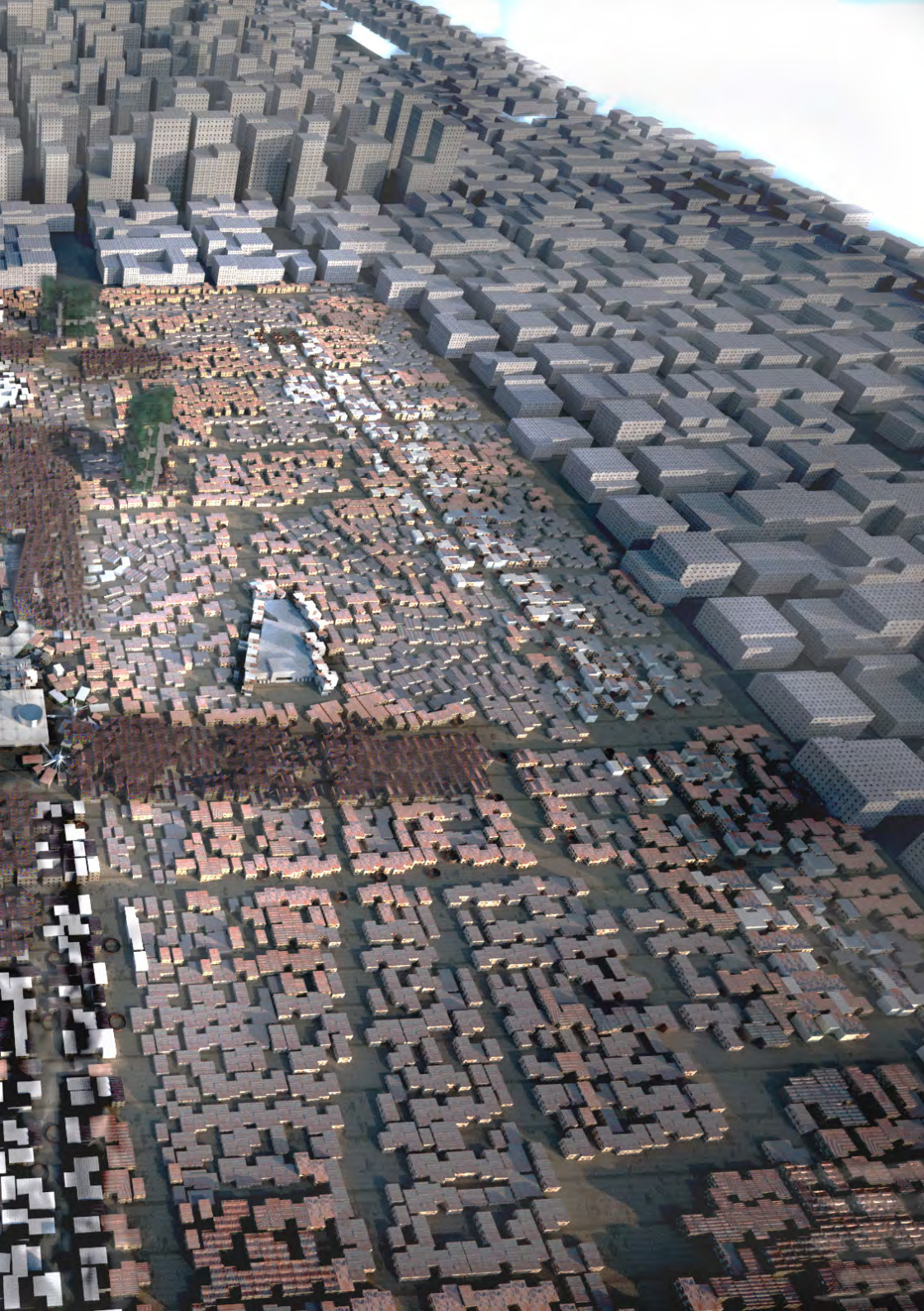
prosperity level
luxury penthouses
free standing villas
average world city
austerity
upgraded slum
slum
economic performance
infrastructure
heatlh
environment
general wellfare
safety
transport
living area
education
T=0
T=1
T=2
T=3
T=4
T=5
T=6
T=7



million US dollars
400
300
200
100
0
-100
plastic gets stolen
and is used as constuction
material,
increase of
living: plastic
slum houses
re-allocation 6 mln/y
profit 10 verfarms 140mln/y
slum profit per year
24 years
306 mln!!
slum upgrading quota
re-allocation 15mln/y
vert farm 20mln
VF
re-allocate plant 30 mln
profit: 15mln/y
urban farm 80mln
profit 20mln/y
powerplants
vertical farms
plastic gets stolen
T1
T2
T3
T4
T5
T6
Tx
Time
8.2 years
10 mini powerplant 500kwe,
production: 17857 TL lights 28W
everyhouse hold has one
22 years
10 vertical farms,
production: 500.000 people
profit/y: 140 mln

Plastic houses
Investment:$0
Profit: 18000T plastic/y

It takes 48 years to duplicate slum (869.142T)



7.6 paper pulp insulation[87]

One street not spoken about as of yet is the paper line. Around 25 tons of paper pulp are generated daily. This is exported to the city for use in paper factories. At the time of stolen plastic the next demand inhabitants have is comfort in their houses. For this goal they will use paper pulp, which is a very cheap insulation material. To use paper pulp as insulation is very common in Scandinavia. The properties of paper pulp insulation are extraordinary, it easily keeps houses warm in cold times and cool in warm times, this is not unexpected of and insulation material, but paper pulp is also a safe. It cannot burn. The paper fragments almost instantly turn to charcoal, which stops potential fires. The population of the former slum are now closing in on the prosperity levels of developed western countries, with an annual profit of 170 million annually they are making serious money and using it to further boost their area as motor of the city.

paper pulp insulation Profit calculations

investment: 25 mln

profit: $6 387 500 per year

payback time: 3.9 years

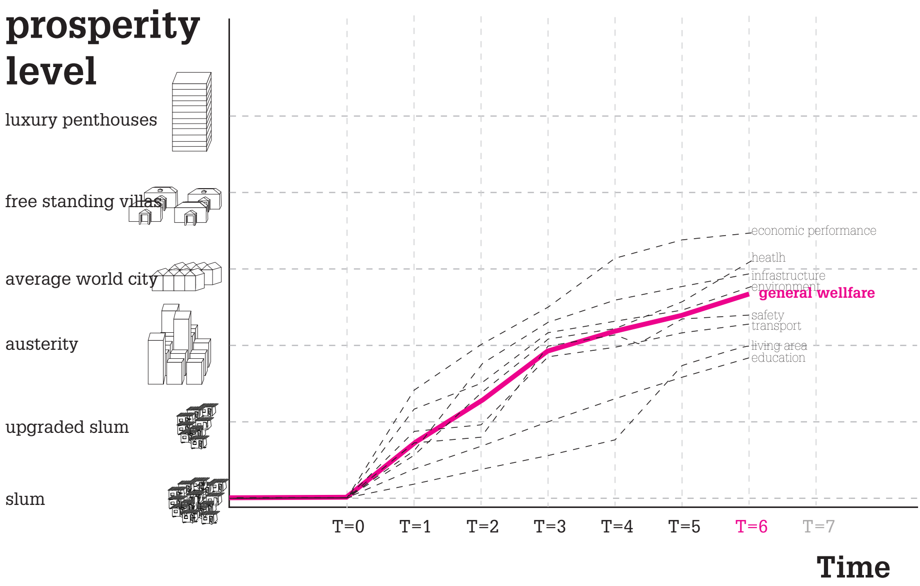
1 m3 paper pulp isolation: 50kg = revenue = $50

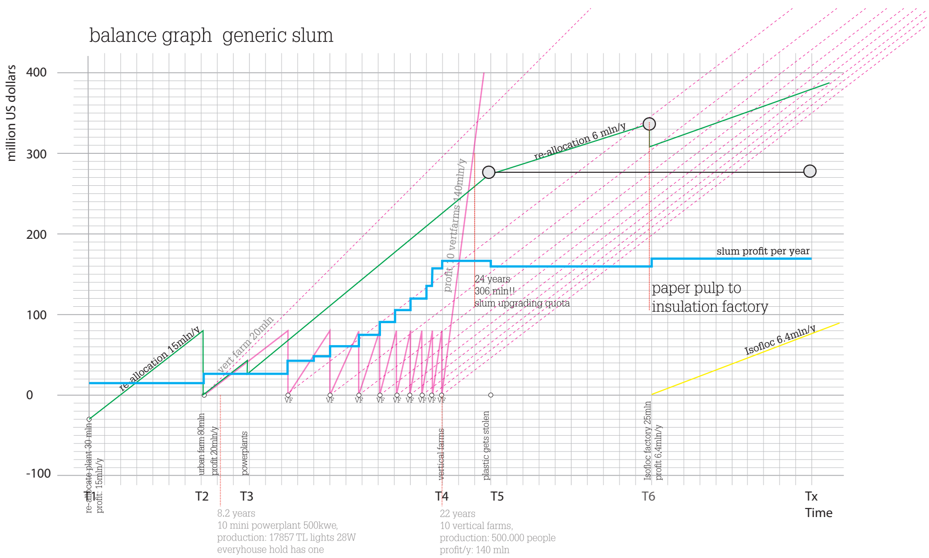
isolation 160mm > 1m3 = 6.25m2

plant produces 25T per day, revenue: $25000

costs: $7500

profit: 17500 per day = 6387500 per year


prosperity level
luxury penthouses
free standing villas
average world city
austerity
upgraded slum
slum
economic performance
heatlh
infrastructure
environment
general wellfare
safety
transport
living area
education
T=0
T=1
T=2
T=3
T=4
T=5
T=6
T=7
Time


balance graph generic slum
million US dollars
400
300
200
100
0
-100
re-allocation 15mln/y
vert farm 20mln
profit 10 vertfarms 140mln/y
re-allocation 6 mln/y
slum profit per year
24 years
306 mln!!
slum upgrading quota
paper pulp to
insulation factory
Isofloc 6.4mln/y
re-allocate plant 30 mln
profit: 15mln/y
urban farm 80mln
profit 20mln/y
powerplants
vertical farms
plastic gets stolen
Isofloc factory 25mln
profit 6.4mln/y
T1
T2
T3
T4
T5
T6
Tx
Time
8.2 years
10 mini powerplant 500kwe,
production: 17857 TL lights 28W
everyhouse hold has one
22 years
10 vertical farms,
production: 500.000 people
profit/y: 140 mln

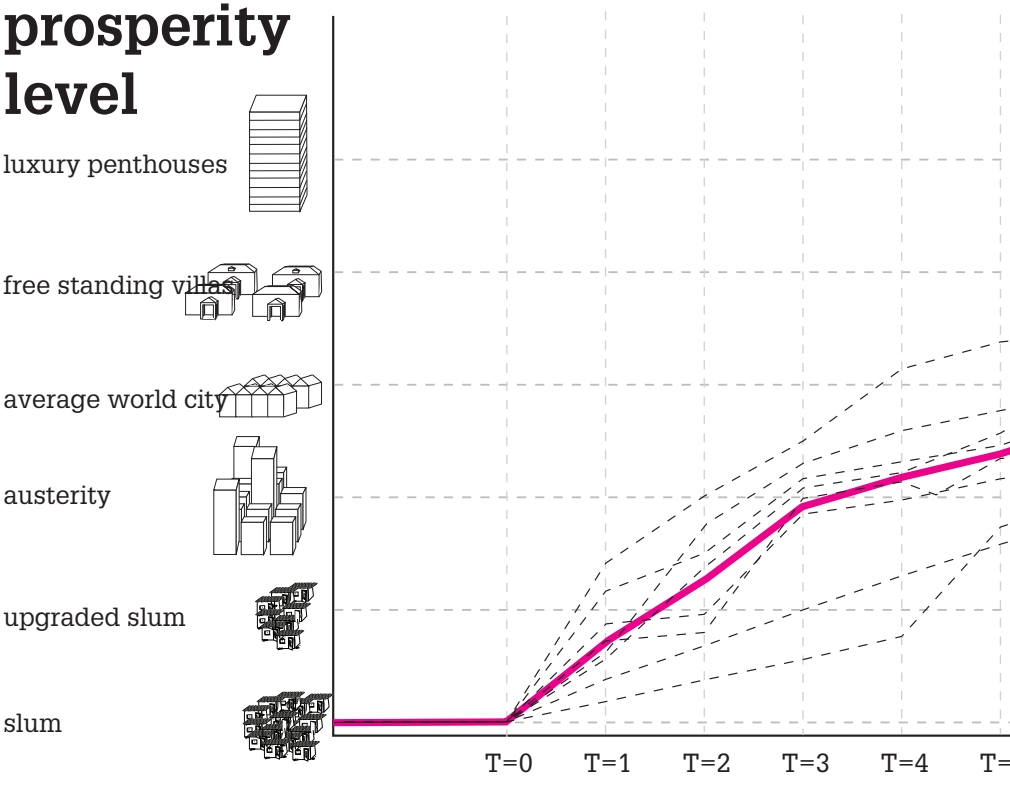
Paper pulp insulation
Investment: 25 mln

Profit: $6 387 500 per year

Payback time: 3.9 years

7.7 A vision to pray for

At T=x the former slum area has come a long way. From an almost inhabitable place it is now the centre of attention of the city, which it belongs to. Productivity levels have risen so much international companies are fighting to a spot in the area to expand their business to the growing middle and upper class citizens of the former slum. Leisure activities like cinemas and nightclub are prevalent and youth hostels hotels and convergence areas are created to allow for a further expansion of the local economy. A strong transportation network is created with the centre of the city, a cable train concepts the two areas. The former slum is now one of the most important areas in the city where creativity and entrepreneurship are the two generators of new business. Even the academic community has acknowledged the potential in the area, special departs of international school will start studios and the city dedicates a university to the area so it to can climb on the shoulders of giants.



green city initiative

investment: $25 per tree

12.5 mln one tree per person

laboratorium

investment:
$200mln

university campus

investment: $500 mln

profit:???

shopping mall

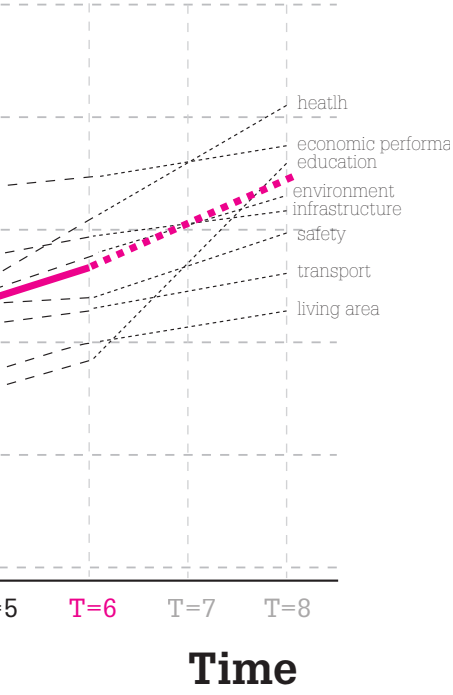
investment: $110 mln
profit: 25mln/y

hospital

investment: $150 mln

profit:...

indirectly: 20mln/y



museum

investment: $25 mln
profit: none
indirectly 5mln/y

cable train

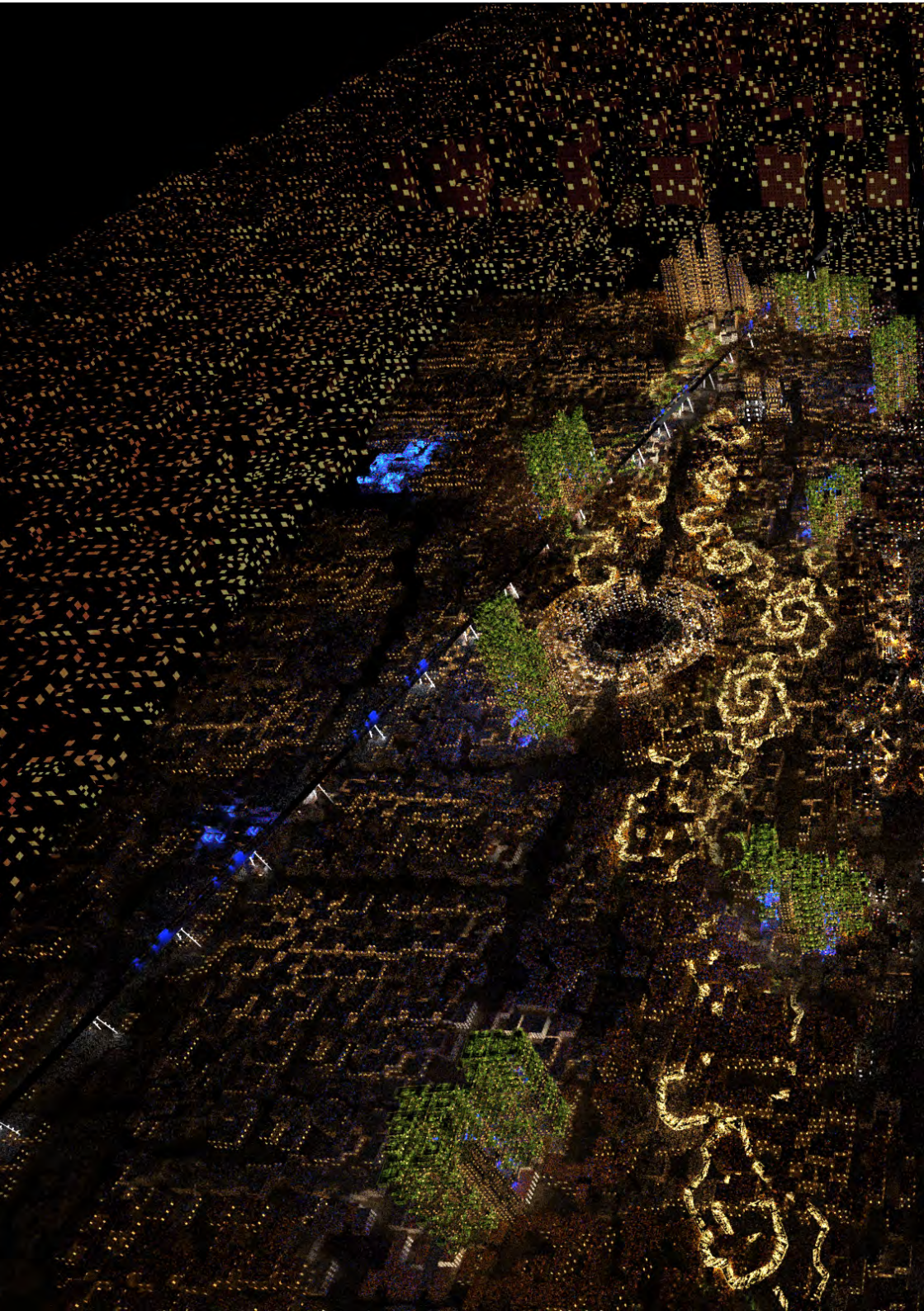
investment: $190
mln
profit:???

Music venue

investment: $50 mln
profit: 2mln

night club

investment: $15 mln
profit:5mln



Chapter 8 final word

The research and story told in this book is a dream. Fully aware of its potential one must also see the pits falls. The slums across the globe are in dire need of help, as proven by Berkeley, slum dwellers are trapped in poverty, and they are stranded in an urban jungle, with a blinking light on the horizon. Western society should not project their own difficult road of development on the areas, but ride on the promise slums hold.

Now is the time to create visionary projects, and shine a new light on the slums around the globe. It is not the time for millennium goals and conferences for the elimination of a definition questionable at the start, now is the time for thinkers, for business, philanthropists and humankind to see the potential and harvest its promise, now is the time ignite an explosion with a far going consequence, now is the time to make dreams come to life.

This project is the result of an extensive research, and long nights of frustrated "Google" searches. Much of the information used for the project is found in open source documents, every source was screened carefully with academic standards in mind.

This book is an overview of the research and design done during the graduation period at The Why Factory. Special thanks are in order! first my wife Elske, with her unfailing patience and ever lasting reassurance has stimulated me to continue my work. The project would not have had the process it had without the guidance of Huib Plomp, Daliana Suriwinata and Winy Maas, who have all contributed through relentless critique, tips and tricks. They have forced me to constantly doubt the project and pushed to the edge of what I believe to be possible. I cannot forget my co-graduate Chris Cornelissen who has in his own struggle for graduation kept me from going insane. Finally Bas Kalmeyer, who formed an incoherent jungle of data and ideas into something tangible, it was the push for graduation it self and kept me from being stranded with Winy for eternity... Many thanks!

I hope one who reads this book will take it as it is: an educated vision, a dream, a story, a goal perhaps. Most of all I hope the book can inspire to keep discussing about the realm of possibilities in slums, and perhaps have a small place in the discourse of urban planning on a visionary scale.

Chapter 9 limits and recommendations

The vision sketched in this book is based on facts, extrapolated into fiction. Let there be no misunderstanding. This book is not a handbook for global enlightenment, it is merely a view on the realm of possible outcomes from our current state of urgency.

As with any research there is room for improvement. In this case, the project tries to envelop a rather broad array criteria, there are many aspects which can all be, by themselves, a life time of research and work.

The primary goal of THE WHY FACTORY is to answer a question by asking more questions. To quote Winy Maas himself: "A good project will spawn an endless line of researches and questions to be answered." This objective I think holds true in the case of the slum booster.

If anyone undertakes the daunting task of continuing where I left the studio the follow recommendations are to be made:

1. Unlike the approach here stick to your particular field of science. You can use other fields to argue your case but don't go to far into detail. You will fail trying to grasp every aspect of a vision like this. A collaboration (the magic word) with other faculties might present an outcome.

2. Narrow your scope! Take only one single aspect. for example the waste facility or any other step in the vision. These can all become great architecture projects. I'll even throw in my 3D model to help out. It would be great to see what a year study on a single piece of architecture could do with the plan.

2. Dive deeper into the mechanics of the implementation.

3. Try to involve a governmental party which works in third world countries

4. Go and visit slums for an extended period of time, the few visits I have had over the years were without a predefined goal of research, primarily during personal travels. Where in this project it was perhaps very important to remain unbiased, further research should go hand in hand with on site experience

5. Don't forget to e-mail me, who knows I might be able to help in some ways neither of us know to date. kboersma@gmail.com

6. Good luck!

Is there a design for the poor that isn't designed for the poor?

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Slum Booster is a visionary study.
Through an investigation of reciprocating economic systems, the project describes how to boost informal urban areas (slums) into an era of sustained growth and shows the evolution of slum areas from poor communities, living in shacks, towards a thriving society.
Slums are the motor that will drive the global civilization towards a future we cannot foresee yet.
The project tries to capture the potential held within these areas by visualizing and calculating possible scenarios, in which the informal city thrives and will no longer depend on charity initiatives.

In short: Slum Booster is a shortcut through history.

TU Delft