

MOKATTAM

WORLD'S LARGEST RECYCLING HUB

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THE MIDDLE EAST STUDIO
Wintersemester 2010

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MOKATTAM

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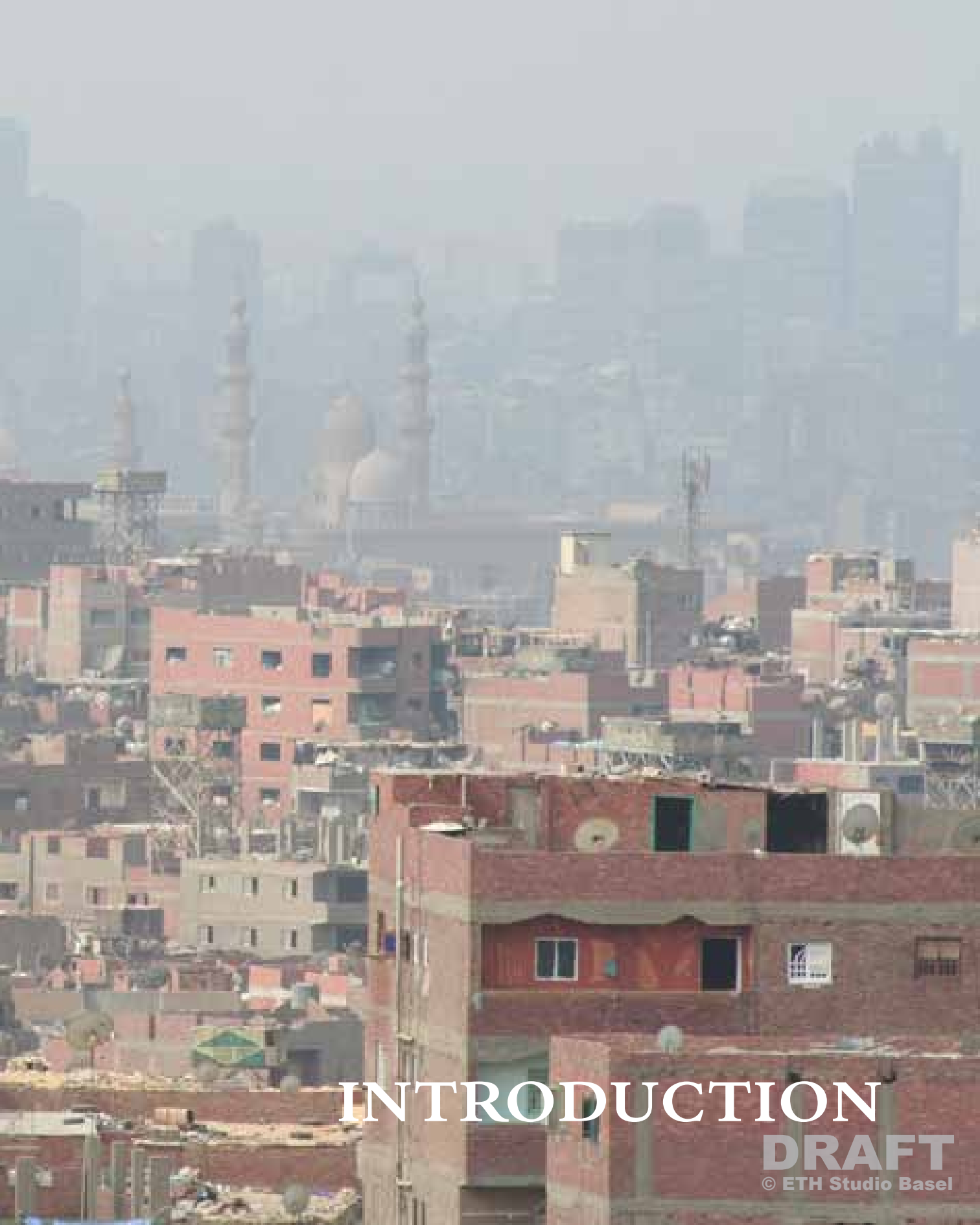
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INTRODUCTION

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INTRODUCTION

Every year around 932 billion metric tons of wastes are produced worldwide. This is equivalent to the weight of the Cheops pyramid, the biggest pyramid in the world multiplied by 150 million. To lower the emission of CO₂, recycling is of prime importance. The US manages to recycle 46 percent of the municipal household waste and Germany reaches numbers of 65 percent. But the garbage collectors in Cairo's Mokattam¹ settlement manage to recycle up to 80 percent of the daily household waste of Cairo. How come this minority within Cairo is one of the most efficient recyclers worldwide?

The industrialized countries recycle to protect the environment and to preserve resources. This is the result of a big change in western society over the last decades. People in western countries feel responsible for the waste they are producing. The initiation, of the raising awareness towards our limited resources, demonstrated the publishing of the book *the limits to growth* in 1972 by the *Club of Rome*². There is a different approach towards recycling in the mega cities of third world countries such as Cairo, Lagos and Mumbai. Informal waste management is a job generating industry in third world countries, on which thousands of families are currently depending. The lack of governmental waste management gives them the chance to make a living with recycling and selling often under worst living and working conditions.

Done so in Mokattam settlement of Cairo by a marginalised community of Coptic Christians who are reaching a rate of 80 percent recycling due to

manual sorting by women and girls. The *Zabaleen*³ reach the striking number of 80 percent recycling due to this informal system of generating more income with better recycling rates. These efficiency rates of the families living below poverty level are the aims of the western government to reach within the next five to ten years.

This paradox relation between high efficiency and the dependance on garbage to make a living is in some ways tragic and unhuman. Is there any other way to reach maximum recycling without paying this high price on humanity? The issue is discussed on the example of the Zabaleen in Cairo, who succeeded in inventing a system of garbage collecting and recycling over the last 50 years, which is unique from a global point of view. Their segregation in different terms, is outlined in this essay regarding the settlement as an isolated island, their community as marginalized, their business and the presence of the garbage economy in the urban space as exceptional worldwide. As a solution it is proposed to integrate their micro and mono ecoomy system into a official waste managment programme. This is of prime importance to have them benefit from their own excellent results of recycling.

1 *Mokattam is a settlement in Cairo named after the mountain of Mokattam. On the bottom of it the informal Mokattam settlement has been built*

2 *Limits to growth*, Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, William W. Behrens III, Universe Books, New York, 1972

3 *Zarrab (arab. Zeriba = pigsty), Garbage collectors*

MOKATTAM ISLAND

An island is a segregated piece of land with only few connections to its surroundings. Mokattam settlement is an island from several points of view.



MOKATTAM ISLAND

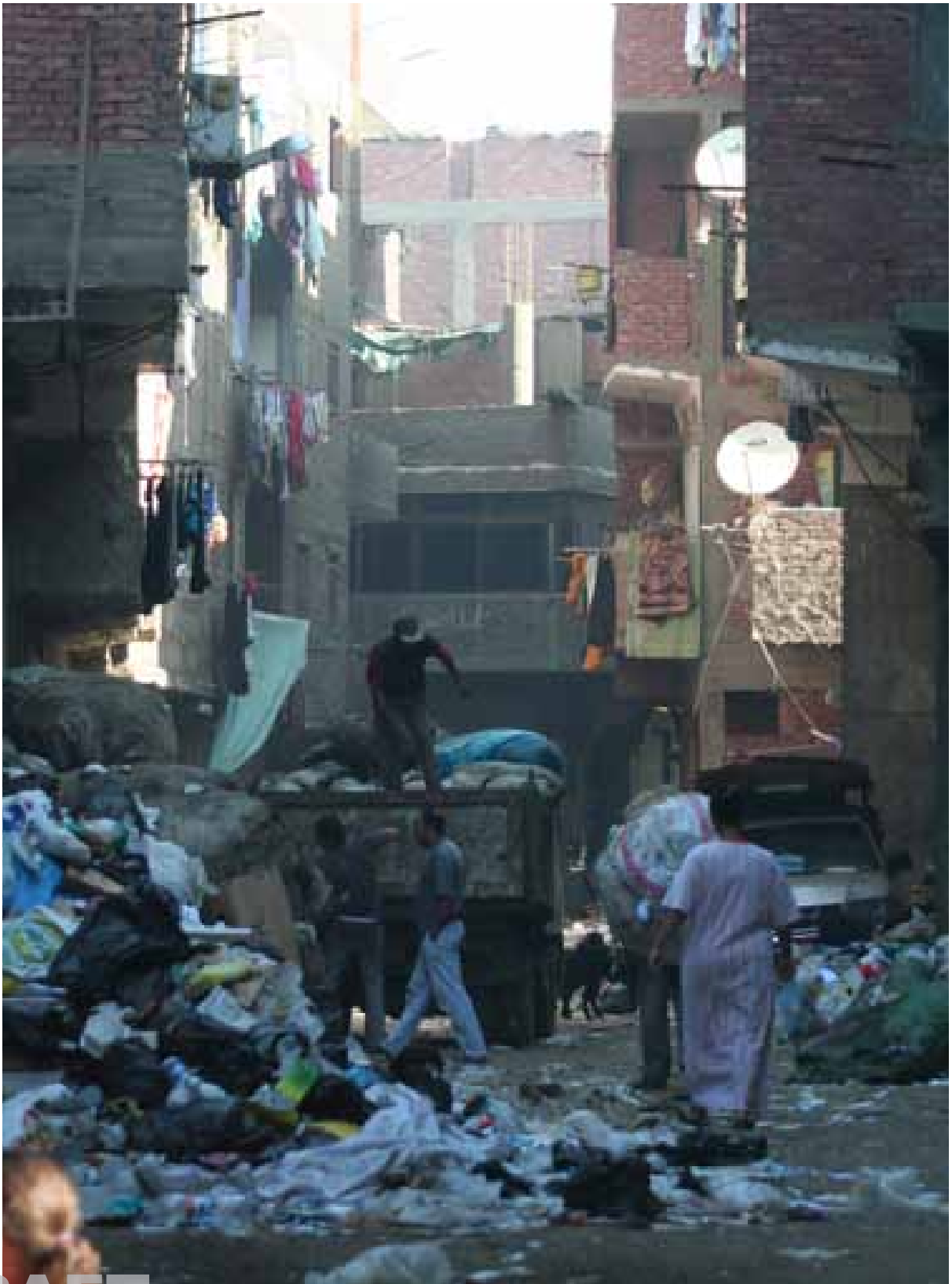
Through the topographical cliffs of the Mokattam plateau the settlement is separated from the surrounding area of Manshiyat Naser. The inhabitants are a marginalized group of Coptic Christians involved exclusively into businesses around garbage and recycling. The complex garbage recycling system is managed through mono and micro economies all settled in Mokattam. Garbage is present in the urban structure and has a high influence on architecture. Mokattam is globally a unique form of a hub where everything spins around the garbage business. The Zabaleen managed to develop a complex system of waste management bounded to the settlement of Mokattam.

fig1













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LOCALIZING MOKATTAM

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LOCALIZING MOKATTAM

Cairo and the Mokattam 22

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Upgrading Mokattam 64

CAIRO AND THE MOKATTAM

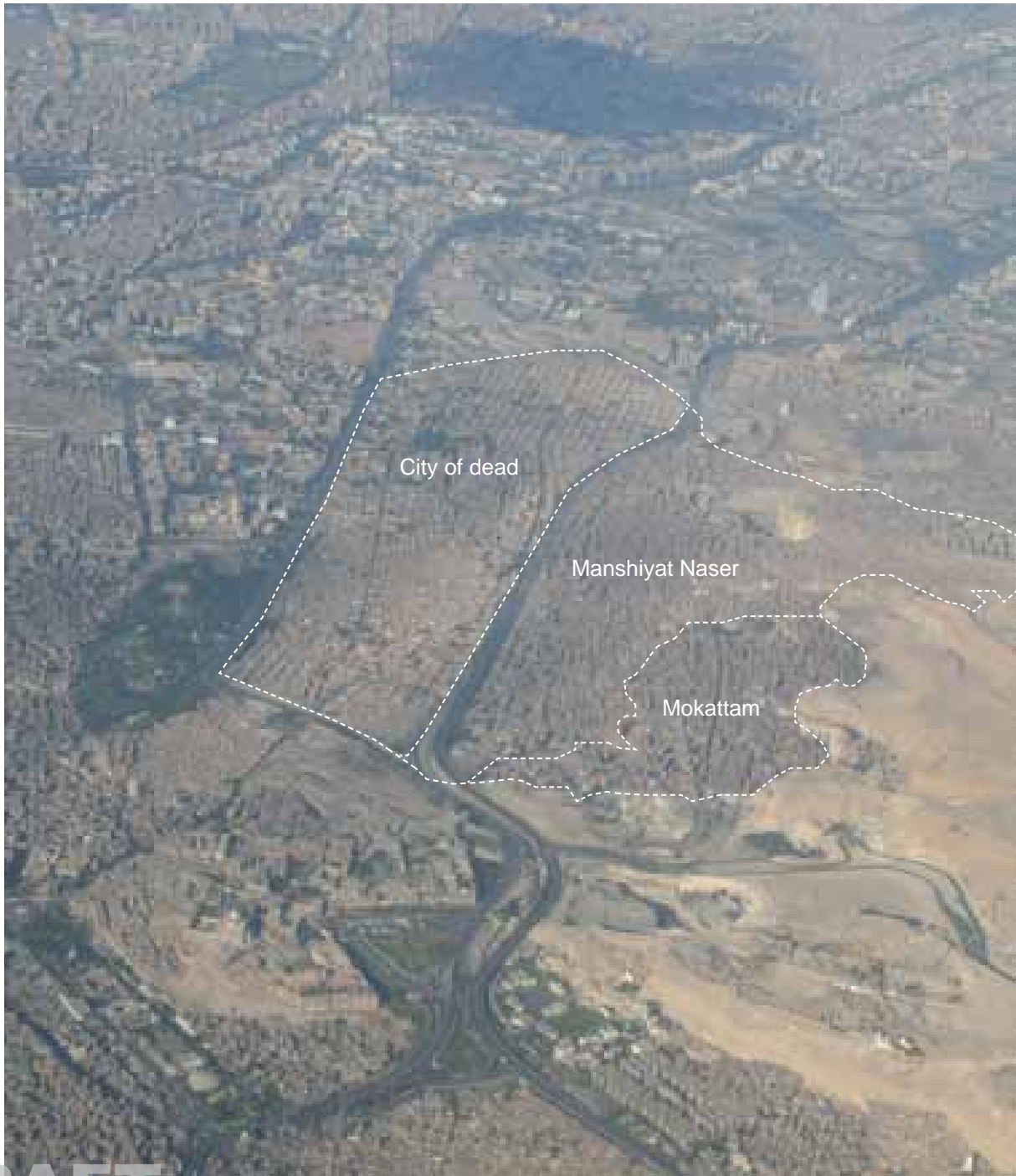
The Mokattam settlement belongs to the administrative area of Manshiyat Naser. The settlement is situated on Cairo city's Eastern edge at the bottom of the Mokattam mountain. Historically the settlement has been at the outskirts area of the city, while Cairo was growing towards Mokattam mountain, the settlement has a central position today.





MANSHIYAT NASER

The whole district of Manshiyat Naser is considered the biggest informal settlement within Cairo. It is divided into three parts, the so called „City of Dead“, Manshiyat Naser at the lower Mokattam plateau and Mokattam settlement at the higher plateau. Mokattam settlement is also known by the name of „Garbage city“ referring to the business people are involved in or „Zabaleen settlement“ referring to the people living there.





Mokattam settlement

The settlement is situated on a higher plateau along the cliffs of Mokattam mountain. Population has tripled since 1981, but there was little expansion of the physical boundaries of the settlement. Growth is limited due to its position at the cliffs.



City of the Dead

The two story area of the old cemetery is called the „City of the Dead“. There is a long tradition of people settling inside the tombs houses and slowly it transformed from a ancient cemetery into a important residential area with informal housing.



Manshiyat Naser

This part of the area is the most populated one with around 1 million inhabitants. It is like City of the Dead and Mokattam an informal settlement developed on governmental land. People have no land tenure. Manshiyat Naser is famous for its high number of workshops, producing goods for the touristic markets as well as for everyday life.





MOKATTAM

35 000 inhabitants live on 0.25 square kilometres on the upper plateau of Mokattam. It is one of the densest populated areas of the world with about 140'000 people/sqkm. The density of canton Basel-Stadt is around 5078 people/sqkm. 4750 families collect 700 tons of garbage daily of around 230 000 households in Cairo.



MOKATTAM

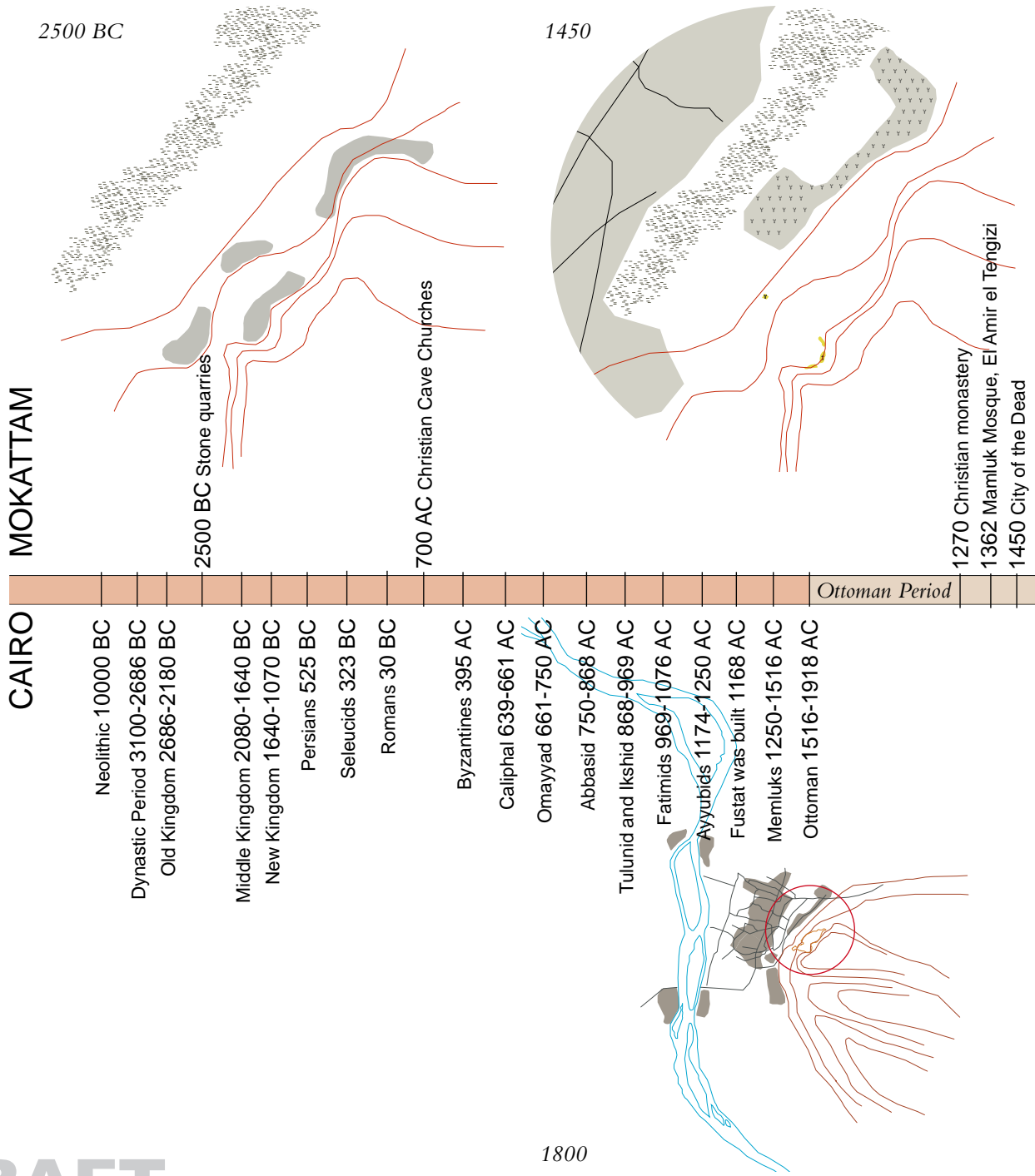
The figure ground plan shows the small structured area of Mokattam settlement. Compared to the neighbouring Manshiyat Naser the area has a high appearance of lanes through the building structure. Due to the necessity of truck accessibility and businesses occupying open space there is a lot of unbuilt space. The borderline of the settlement follows the contour line towards Manshiyat Naser and the steep cliffs of Mokattam to the East.

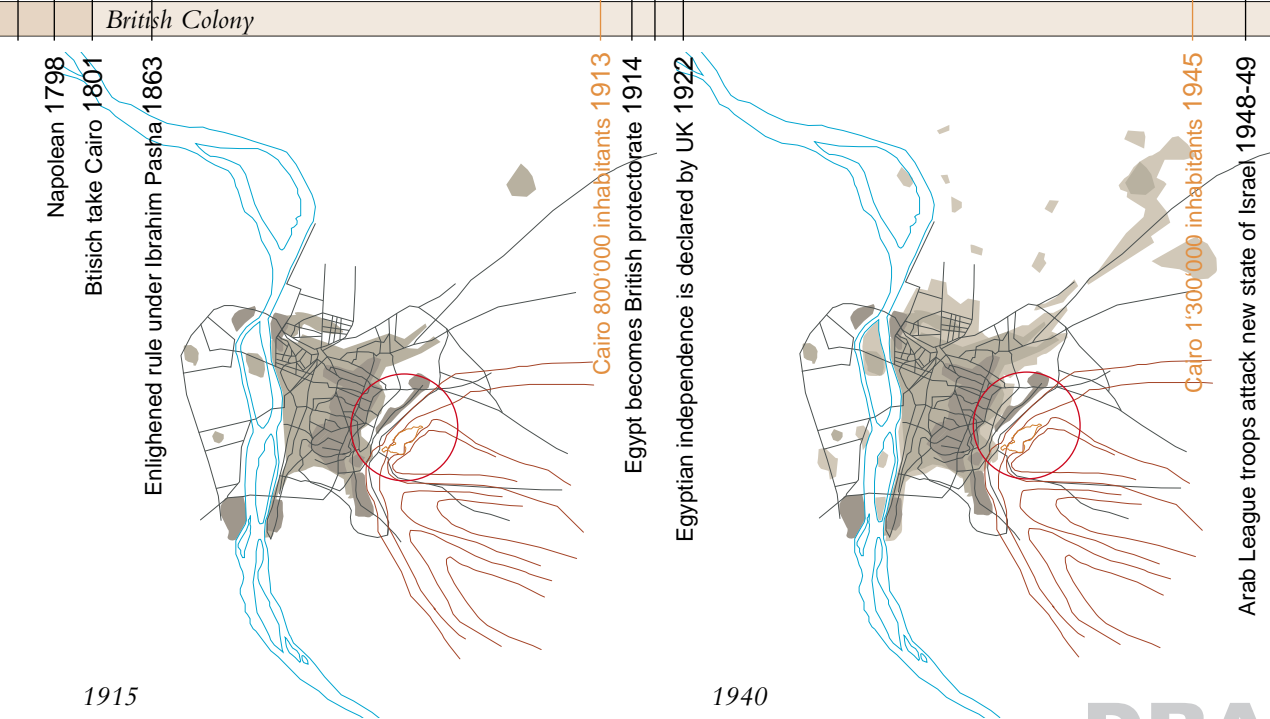
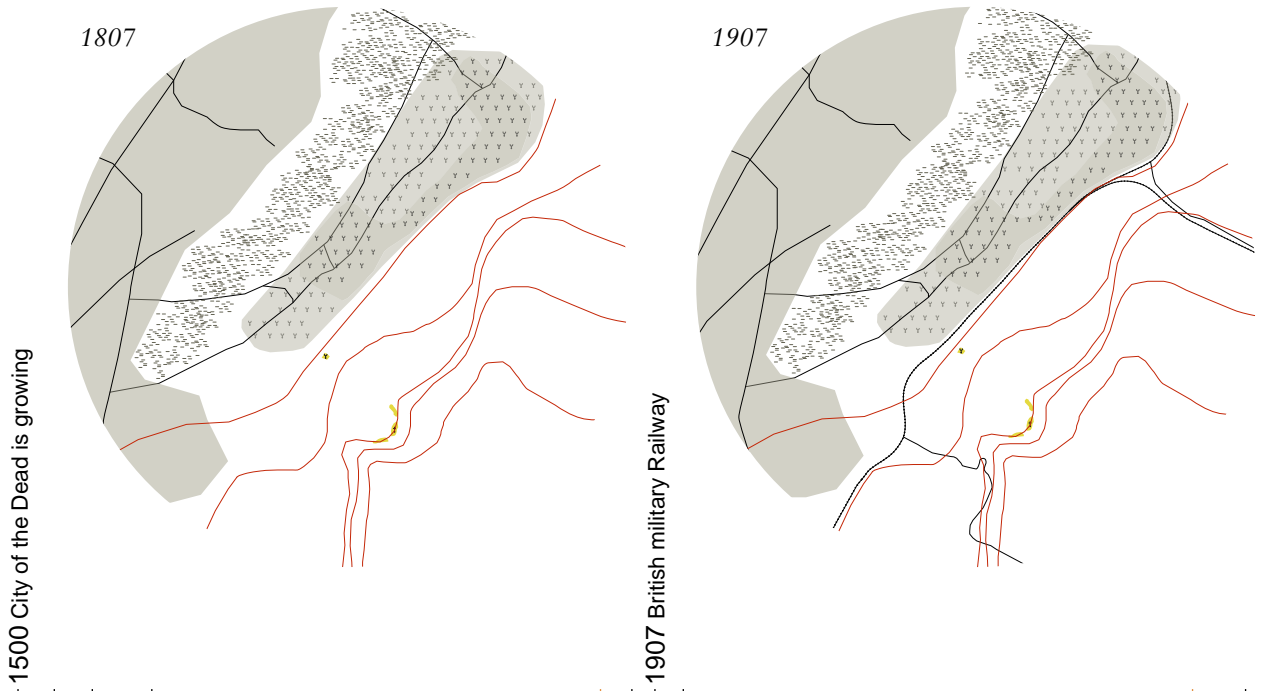




HISTORIC DEVELOPMENT

2500 BC- 1950





HISTORIC DEVELOPMENT

1960- 2010

1960

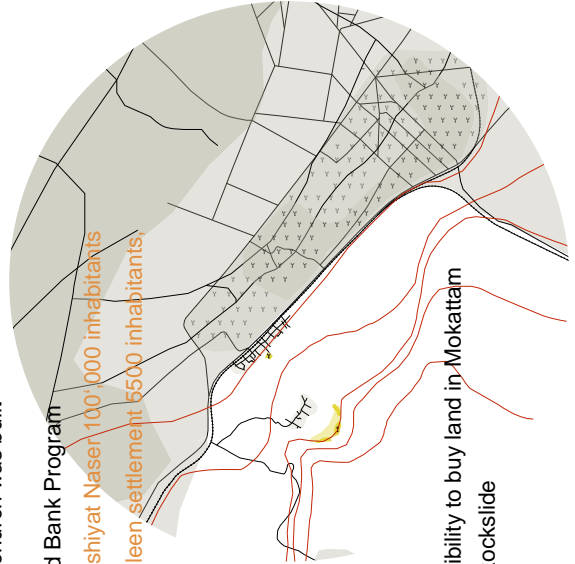


1960 Autostrad

1960 First settlements along Autostrad

1960 Naser implements electricity, water and sewage pipes

1975



1972 Resettlement of Zabaleens from Imbaba to Mokattam

1974 First church was built

1980 World Bank Program

1980 Manshiyat Naser 100,000 inhabitants

1980 Zabaleen settlement 6500 inhabitants

1984 Possibility to buy land in Mokattam

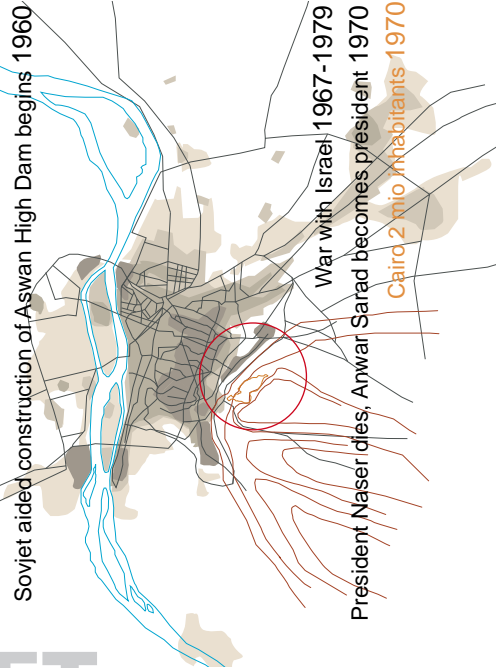
1985 1st Rockslide

Naser Period

Sarad Period

Mubarak Period

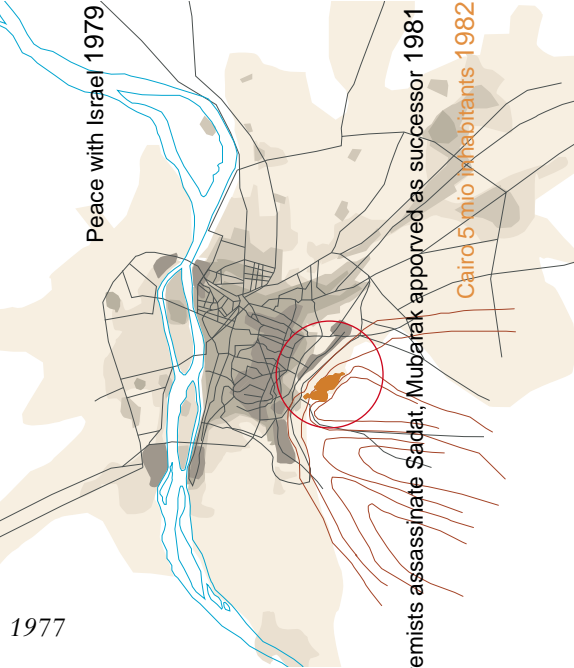
1950
 Abdul Naser, overthrow King Faruk, Egypt is declared a Republic 1952
 Suez War 1956
 Rise of Nasser 1956
 Soviet aided construction of Aswan High Dam begins 1960



War with Israel 1967-1979

President Naser dies, Anwar Sarad becomes president 1970

Cairo 2 mio inhabitants 1970

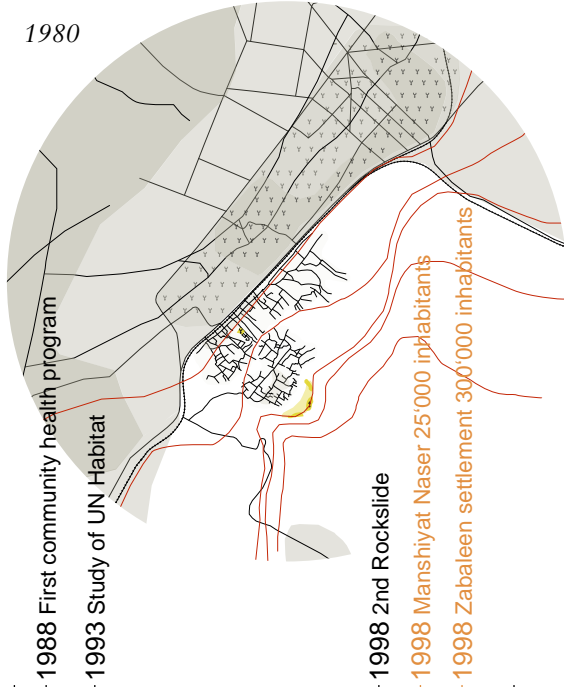


Peace with Israel 1979

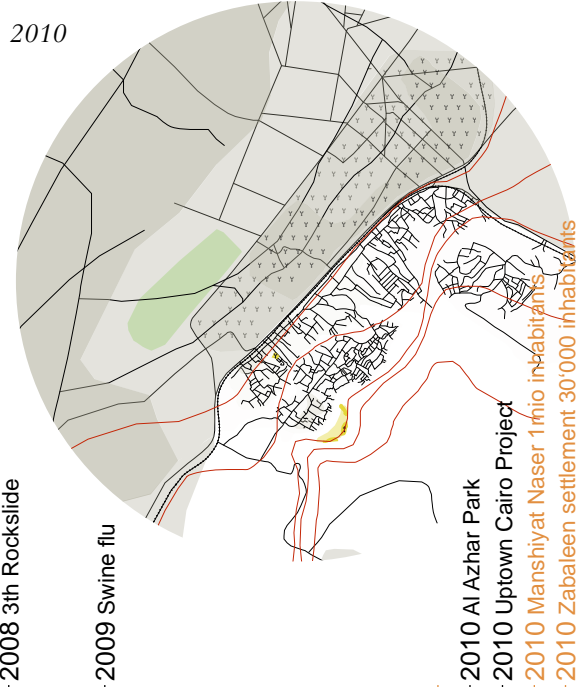
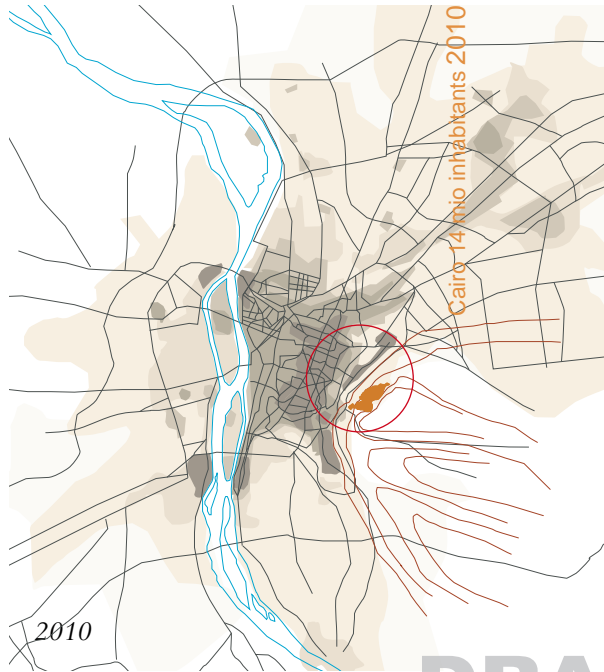
Extremists assassinate Sadat, Mubarak approved as successor 1981

Cairo 5 mio inhabitants 1982

IMF and beginning of economic liberalization 1985

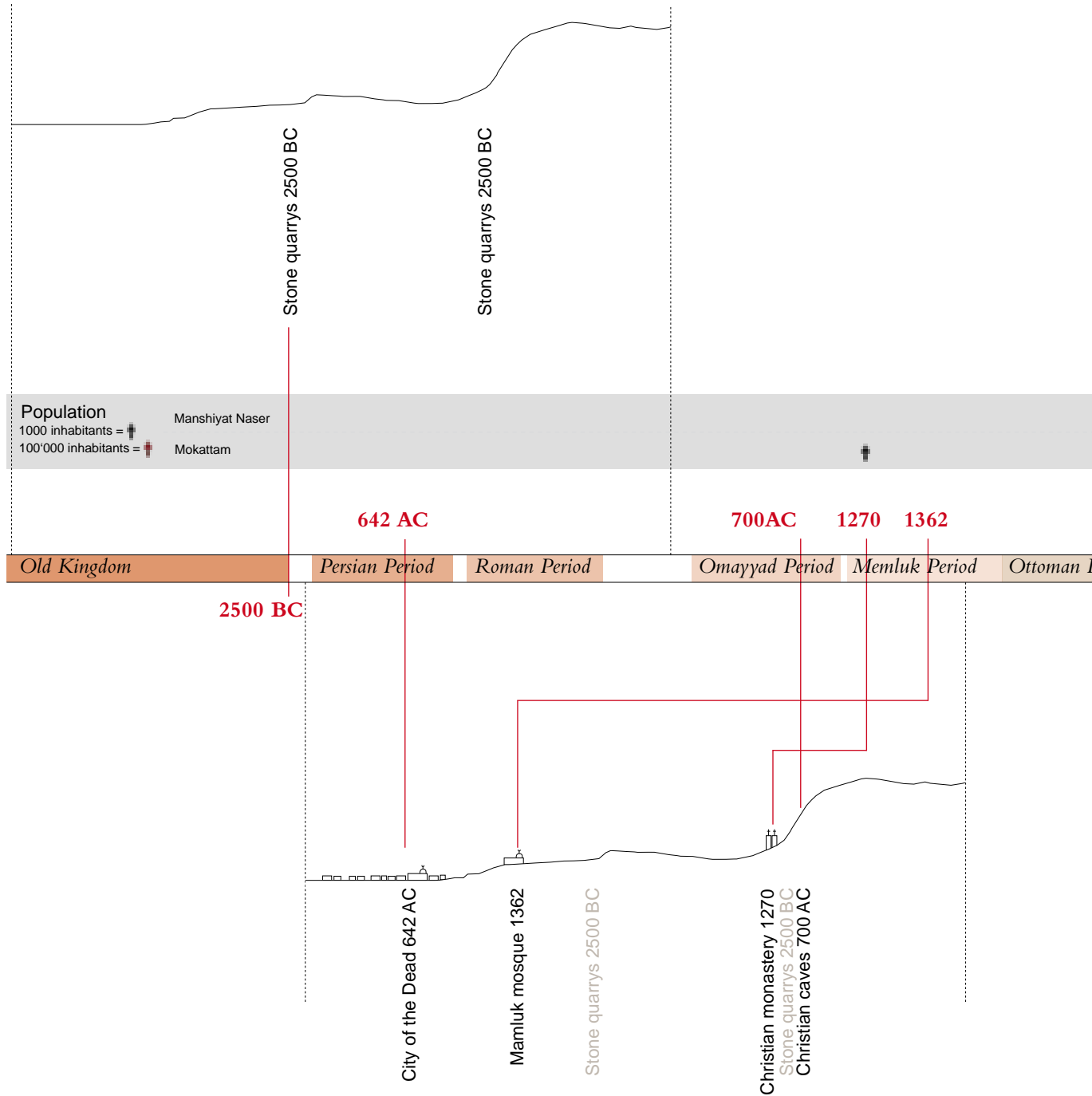


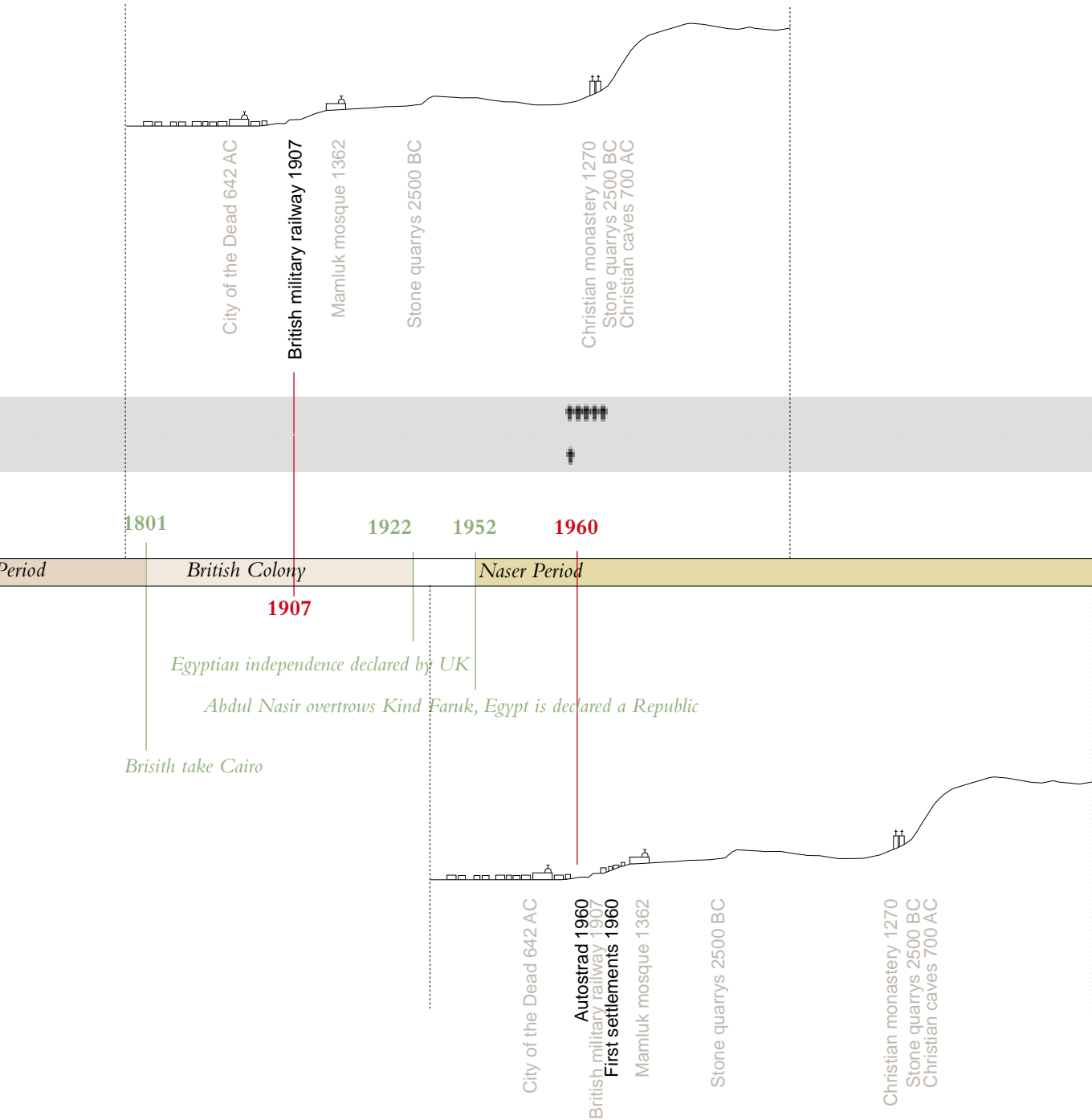
Egypt contributes troops and political support to Gulf war 1990-91



MOKATTAM

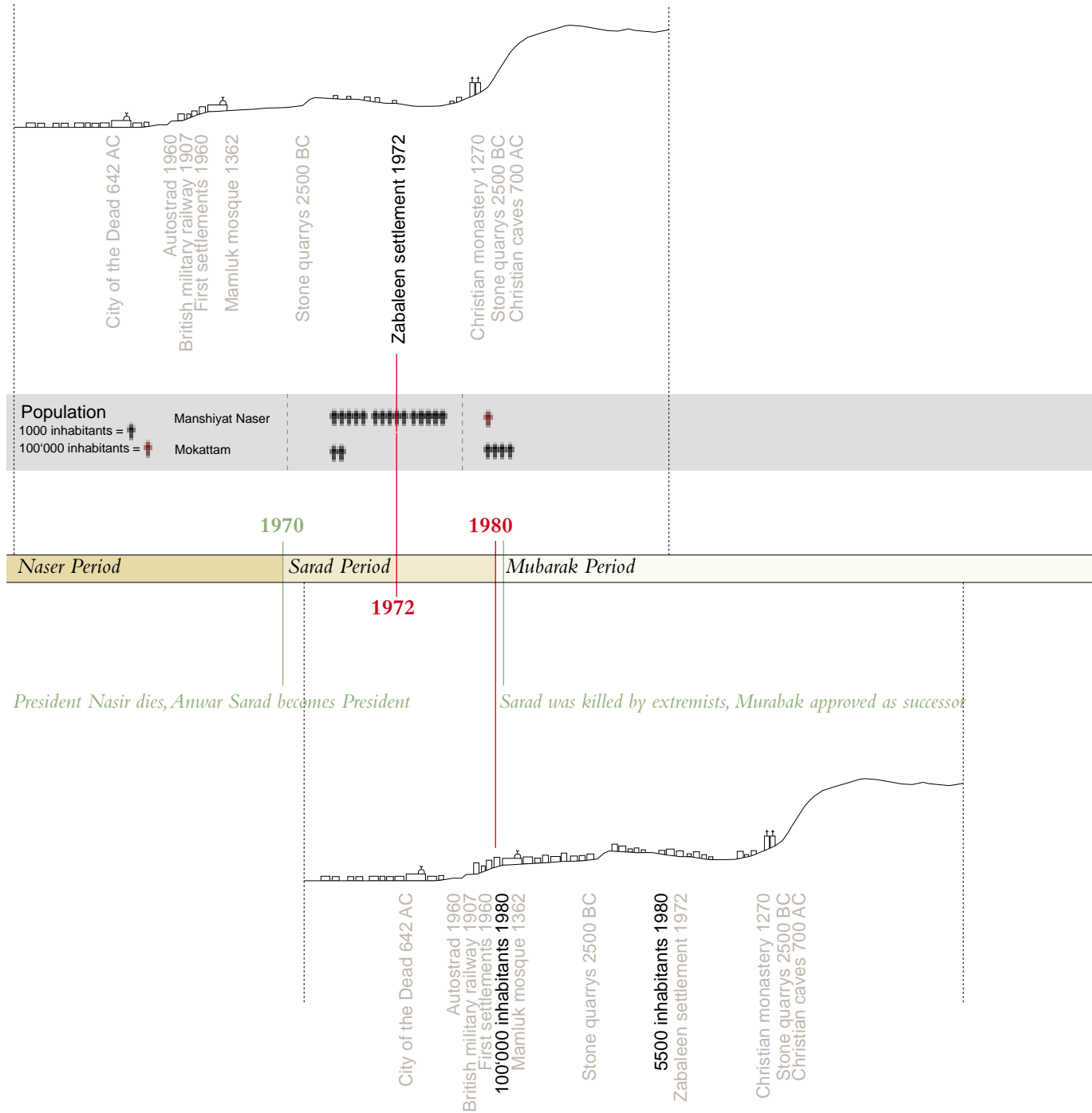
settlement development 2500 BC- 1960

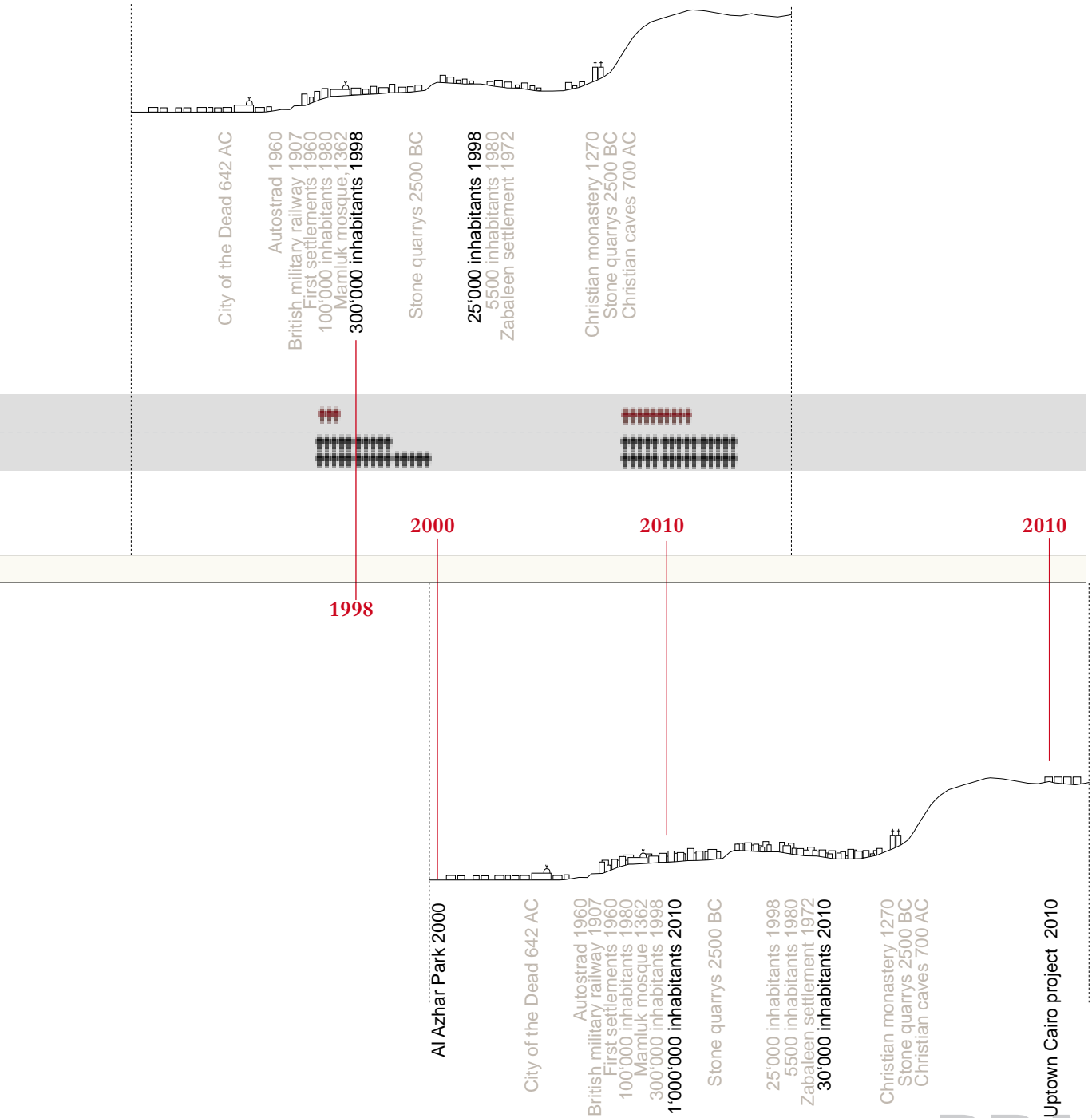




MOKATTAM

settlement development 1970- 2010





BORDERS

There are two main borders which shaped the development of the area. First one is Mokattam mountain to the East, second is the traffical border of the 1960ies Autostrad to the West. Both of them block the urban growing of the settlement horizontally and clearly separate the settlement from its surroundings by difficult accessibility.





Highway Autostrade
Main road
small lanes

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MOKATTAM MOUNTAIN

[arab. to part, to cut]

The mountain of Mokattam is the historical edge of the city. While growing over the last decades the city developed around the ridge. Mokattam are of limestone and have provided the city with its main, durable building material since Pharaonic times. The name Mokattam is Arabic for „to part, to cut‘, and refers to the hill division into three parts.

Antique print wooden engraving of Mokattam

fig 2



The Mokattam from the Citadel of Cairo

fig 3



THE MIRACLE OF MOVING MOKATTAM

Saint Simon the Tanner lived at the end of the tenth century by then Egypt was ruled by the Fatimid Caliph Al-Muizz and Abraam.

The Caliph Al-Muizz used to invite different religious leaders to debate about religion in his presence. During one of those meetings in which the patriarch Abraham, also known as Pope Abraam and a Jew named Yaqub Ib Yusuf Ibn Killis (Moses) were present. Abraham was leading the debate, taking revenge, Ibn Killis quoted the verse where Jesus Christ, said in Matthew: „If you have faith as small as a mustard seed, you can say to the mountain, „move from here to there‘, and it will move, nothing will be impossible for you.‘, (Matthew 17:20). He asked the Pope to prove his religion is right by means of this verse. After hearing Ibn Killis saying the verse, the Caliph asked Abraham: „What sayest thou concerning this word? Is it your gospel or not?“ The patriarch answered: „Yes, it is in it.“ After hearing Abraham answer, the caliph demanded that this very miracle be performed by Abraham’s hand or else he would be killed by the hand of the sword. The patriarch asked for three days to complete the miracle.

Abraham compiled a group of monks, priests and elders. He told them to all stay in the church for three days for a penance. On the morning of the third day, Abraham was praying in the Church of the Holy

Virgin al-Mu‘allaqa, when he saw the Holy Virgin. She told him to go to the great market, there he will find a one-eyed man carrying a jar full of water on his shoulder. It will be him, whose hands this miracle will be manifested.“ Abraham then went to the market where he found the man, he was Simeon the tanner.

Simeon told Abraham to go out to the mountain with the caliph and all his soldiers. Simeon then told Abraham to cry out „O Lord, have mercy‘, three times, and each time to make the sign of the cross over the mountain. The patriarch followed the words of Simeon the tanner and the mountain was lifted. After the miracle was performed in the presence of the Caliph, the Pope turned left and right looking for St. Simon the Tanner, but he had disappeared and no one could find him again. The caliph then turned to Abraham and said. „O patriarch, I have recognized the correctness of your faith.‘,

Shortly after the miracle took place, Al-Muizz decided to convert to Christianity. A baptismal font, large enough for the immersion of a grown man was built for him in the Church of Saint Mercurius. This font still exists today and is known as „Maamoudiat Al-Sultan“. In commemoration of this miracle, the Coptic Orthodox Church observes three days of fasting before the beginning of the Nativity Fast.

fig 4







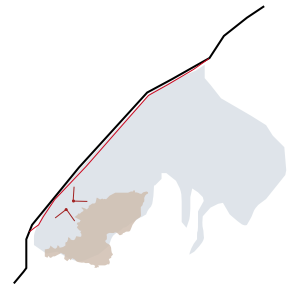
STREETS

The Autostrad was built in the 1960ies. It is an important connection between Helwan and the Cairo International Airport, passing through Maadi and Nasr city. For Manshiyat Naser symbolises a border, which is difficult to cross. Due to upgrading programmes in the 1980ies transit passages were built to reconnect Manshiyat Naser and the City of the Dead. 40'000 people are crossing the Autostrad daily, in the evening with 50 LE earned in their pockets, said so by Hany el Miniawy an Egyptian architect. The Boulevard is the busiest street in Manshiyat Naser, where shops and cafés are located.

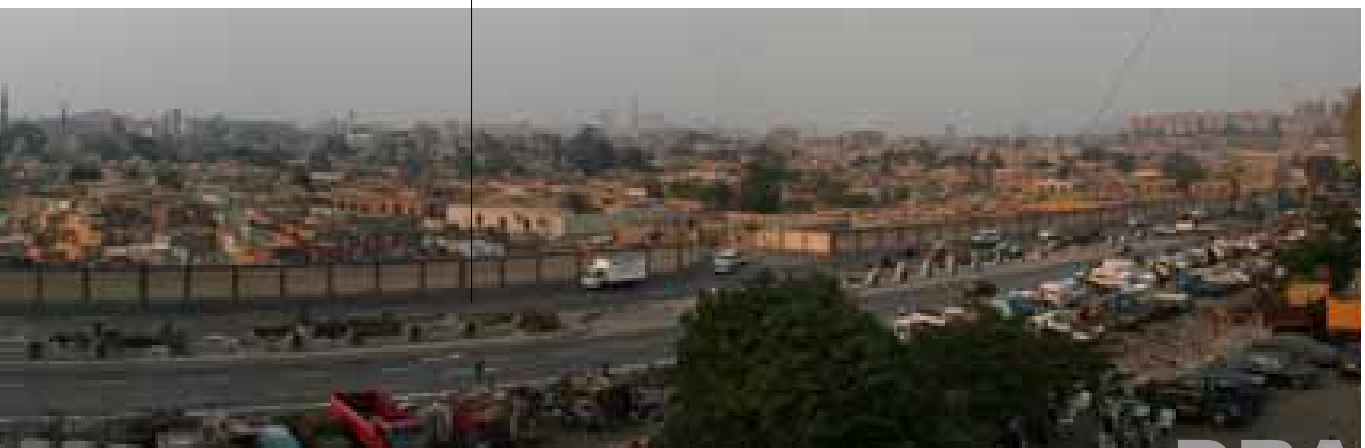


grocery store

construction store



Autostrad











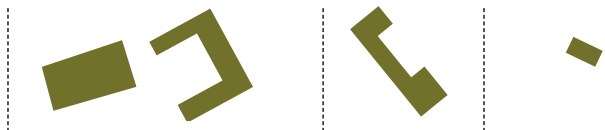




COMMUNITY FACILITIES

The Zabaleen settlement is characteristic to have a low density of community facilities. Of major importance are the different churches spread over the area. Since the 1980 several schools were built and there is one more to open by the NGO APE. Community facilities are with no exception linked to the Coptic Church, one among others the settlements hospital.

SCHOOLS



	Primary morning	Preparatory evening	Primary full day	Primary full day	Preparatory full day	Secondary full day	Secondary full day
course	morning	evening	full day	full day	full day	full day	full day
boys	983	1966	1023	331	153	-	69
girls	887	-	1019	227	89	89	-
total	1870	1966	2042	558	242	89	69
classes	40	36	42	14	8	4	4
type	public	public	public	private	private	private	private

14% of the population is of primary school age, 38% of those are registered in local schools
 8% of the population is of preparatory school age, 33% of those are registered in local schools
 6% of the population is of eligible for secondary school, 6% of those are registered in local schools

CHURCHES



- Samaan monastery
- five churches
 - a meeting area
 - a residential hostel
 - administrative buildings and souvenir outlets
 - plant nursery
 - animal husbandry unit

graph 1



School
Church
Hospital
Community

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EL MOKATTAM STREET

El Mokattam street is the main access to the Mokattam settlement. Trucks with garbage arrive from this South-western entrance to the area, whereas people normally enter from West, over the Manshiyat Naser district and the Boulevard. El Mokattam Street is the only street in Mokattam settlement where shops and cafés houses can be found. It is a meeting point for the community and gives access to all the dead end streets of Mokattam.

recycling facilities shop

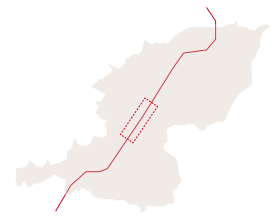
vehical repairing shop

El Mokattam street



café

grocery store







UPGRADING MOKATTAM

WORLD BANK 1981-1991

The first urban development project was initiated by the World Bank in 1981. It was funded through OXFAM, USAID, Catholic Relief Services, Ford Foundation, the European Economic Community, EMMAUS and the Association des Amis de Soeur Emmanuelle.

Established as a bottom-up oriented project it managed to improve the living and working conditions of the Zabaleen. 120 houses were built from scratch. Each household had a budget of 1150 EGP [circa 200 CHF] to being improved. 50% of the money were given as a fund, the other 50% had to be paid back by the families. The child death rate could be lowered

due to sanitary and health facilities. The goal of the project was to provide infrastructure such as sewage system, water supply, main access and circulation roads, street lightning and electricity network and selfhelp construction material loans. New community facilities were established like schools, health center, community center and a composting plant. Loans for repairing and replacement of garbage collection equipment were given.

A.P.E 1984-today

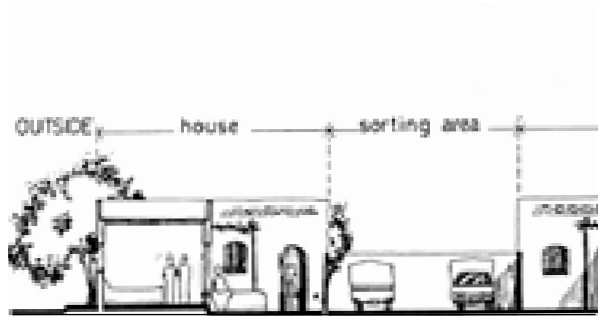
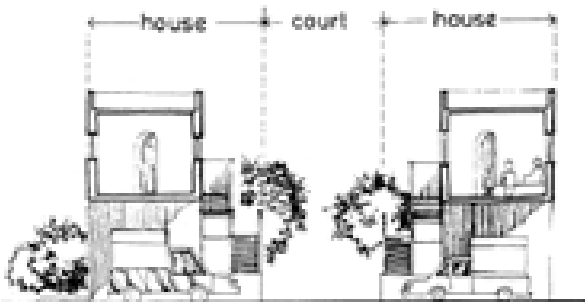
The A.P.E. (Association for the protection of the environment) was founded in 1984. It consists of a board of wealthy and influential Christians such as Yousriya Loza Sawiris. In 1985 A.P.E was in charge of the first composting plant built by the World Bank programme.

Since 1999 the composting plant is situated outside Mokattam in Quatameya, which offered to convert the composting site of the settlement.

Today the organisation offers a high variety of educational programmes such as child protection, health support services, recycling programmes and

income generating activities. One among others is the so called „Learn and Earn“ programme, where girls get an education including reading and writing and afterwards manage to earn their own money. The organization offers a clean and secure work to the women of Mokattam, apart from their sorting activity.

The products which are produced in the workshops are sold in a shop in the Mokattam settlement, in Fustat and outside of Egypt.



The buildings conditions were improved and there were vertical expansion plans

graph 2

Girls working at A.P.E taking part in the weaving workshop



UPGRADING MOKATTAM

PROCTER & GAMBLE RECYCLING SCHOOL

The so called ‘Mokattam non formal education project’ was founded in 2008 and is financed by the NGP USAID and Procter&Gamble itself. It offers education in exchange for plastic bottles brought to school by the students.

The boys learn to write, read, mathematical science, computer programmes such as excel, photoshop and the correct way of recycling plastic. Management, business administration and economics are other subjects listed on their timetable. At the end of the educational programme, the students should have the knowledge to become successful entrepreneur in the recycling business.

The school generates about 10 000 US\$ per year through recycling plastic bottles such as shampoo. Companies like Procter&Gamble have interests in recycling the empty bottles to prevent them from being refilled with cheaper products and sold again on the market.





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HISTORIC EDGE

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HISTORIC EDGE

Topographical border 72

Cliffs of Mokattam 76

Geological hazards 78

Rockslide 2008 84

TOPOGRAPHICAL BORDER

The quarries shaped the plateau dramatically into two main levels, the Lower quarries approximately at the elevation of the existing Autostrad and on a higher shelf beginning at approximately the 90 metre contour, the Upper quarries, where the settlement is located. The pattern of built development is distinctive in each of these areas.



fig 5







CLIFFS OF MOKATTAM

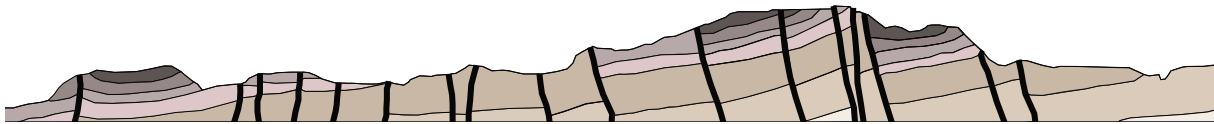
The boundaries of the Zabaleen settlement are defined by the sharp change in topography, mainly man made. The topography of the area is distinctive, the cliffs separate the Mokattam settlement strongly from the Manshiyat Naser district. The steep border is more than a topographical border, it is a clear cut between the two settlements also in a sociological term as it is a barrier to pedestrian movement. Mokattam settlement is limited to its borders and it is impossible to grow in a horizontal direction. Increasing of the settlement is only possible in a vertical densification.





GEOLOGICAL HAZARDS

The actual and potential hazards to human life and urban development in Manshiyat Naser were highlighted in 1994 when a severe cliff collapse resulted in the deaths of 40 people and the resultant of demolition of the development in the vicinity of the collapse. Further problems in nearby areas have led to the closure of schools close to cliffs. The stability of rock formations in the area are affected by three conditions, the form of the rock facades left after quarrying, the constitution of the rock formations and the impact of urban occupation.



Section A-B

graph 3

- Upper Dolomitic Unit
- Upper Clastic Unit
- Lower Dolomitic Unit
- Lower Clastic Unit
- White Limestone Unit
- Upper Buildingstone Unit
- Gelzahenses Unit

GEOLOGY

The Mokattam hills are predominantly limestone, interrupted by thin strata of expansive clays. The limestone varies in character from extremely hard and stable dolomitic limestone in the south of the area, pure but less stable limestone to the east and combinations of limestone and clay to the north. The clay lenses expand when heated or exposed to moisture, reducing the stability of the exposed rock facades. This stratification is present in most exposed rock outcrops left after quarrying.

CLIFF HAZARD

When area adjacent to exposed rock facades are occupied by urban development the risks of collapse increase. Burning refuse at the base of the cliffs heat and expanded the clay lenses. Sewers installed by residents to drop sewage over the cliffs, normally in plastic pipes, frequently lead, allowing penetration of corrosive liquid into the clay lenses. As the clay lenses react to temperature changes and the intrusion of corrosive liquids they expand and the cliff facades become less stable.



High risk
Moderate risk
Low risk

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„The power went out, we heard a loud bang like an earthquake and I thought this house had collapsed. I went out, I saw the whole mountain had collapsed.“

Hassan Ibrahim Hassan, 80 years, victim of the rockslide 2008

ROCKSLIDE 2008

In the rockslide 2008 24 people were killed and over 30 were injured. It was the already the third rockslide in ten years happening in the area of Manshiyat Naser.



Deadly rockslide hits Cairo homes

At least 24 people have been killed by a rockslide which destroyed homes in Cairo, emergency services say.

Dozens of houses in a shanty town east of central Cairo were hit by huge boulders and rocks.

Witnesses said a six-storey building in the impoverished Douqaya district near the Heliopolis hills had been completely reduced to rubble.

Some people are believed to be still trapped in the rubble and police have confined off the area.

More than 30 people are reported to have been injured and the number of casualties is expected to rise.

Reports said that at least eight boulders - each estimated to weigh about 50 tonnes - fell from the towering cliffs overlooking the district of about 6000 (out of 100 000).

"It was horror," said Hassan Ibrahim Hassan, 80, whose house escaped the destruction.

"The power went out, we heard a loud bang like an earthquake and I thought the house had collapsed. I went out, I saw that whole mountain had collapsed."

Witnesses described seeing hundreds of distressed people gathered around the site of the destruction, saying they had relatives and friends trapped under the rubble.

Some were insisting all the rubble will their loved ones.

The remains of the town have been covered by a thick layer of dust.

Rescue teams were forced to wait for the arrival of cranes and heavy lifting equipment to allow them to move the huge rocks, but as night fell the help had not arrived.

"I couldn't find my house this morning," said Mustafa Abdel-Fatah. "I could only see marks on top of the rubble."

It was not clear what had triggered the rockfall but residents of the area were blaming construction work on the hill for causing the disaster.

A BBC correspondent says there have been previous fatalities in the area.



Hundreds buried in Cairo rockslide Huge boulders bury people inside scores of homes in mountain landslide.



Egyptians search for survivors under the rubble of homes at the site of a massive rock slide off [AFP]

Up to 500 people are feared to have been buried in their homes after a mountain landslide crushed a town on the outskirts of Egypt's capital.

At least 30 people have been declared dead and 35 injured after at least eight rocks, some measuring 30m high, buried more than 50 homes in the poor district of Manshiyat Nasron on Saturday, officials said.

A six-storey building was reduced to rubble by the rockfall, one witness said.

Hassan Ibrahim Hassan, 80, whose house escaped the destruction, said: "It was horror.

"The power went out, we heard a loud bang like an earthquake, and I thought this house had collapsed.

"I went out and I saw the whole mountain had collapsed."

Slow response

Relatives and neighbours dug with their hands among the rubble for survivors or bodies, while police brought in sniffer dogs to locate those trapped.

Soldiers from the Egyptian military used heavy machinery to lift the rocks, some weighing between 60 and 70 tons.

Locals were enraged at what they said was an inadequate response by the government.

Witnesses described hundreds of weeping and screaming family members cursing the local authorities and saying they had relatives and friends trapped beneath the rubble.

"You've just got your hands in your pockets, you're not doing anything!" one man yelled at police nearby.



Rescue teams struggled to make progress because of the size of the boulders [AFP]



Egypt rockslide probe criticised

A human rights watchdog has criticised the Egyptian government for not doing enough to ensure the safety of thousands of Cairo slum dwellers.

Amnesty International says Egypt failed to fully investigate a deadly rockslide in the Douqaya area in September 2008.

The authorities say 107 died but the BBC's Christian Fraser in Cairo says many more are still unaccounted for.

An official government investigation into the tragedy has yet to report its findings.

Amnesty said Egypt needed to do far more to ensure a tragedy like this was not repeated.

The rights group said the government had to help investigate why the disaster was not avoided, despite the risk of a rockslide being well known.

Forced evictions

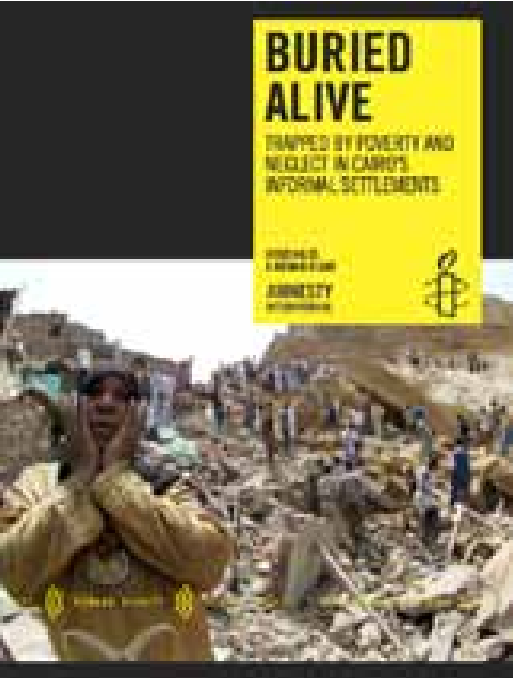
Our correspondent says Douqaya is part of an enormous settlement on slopes in the east of the Egyptian capital where thousands of people still live due to city with the same risks.

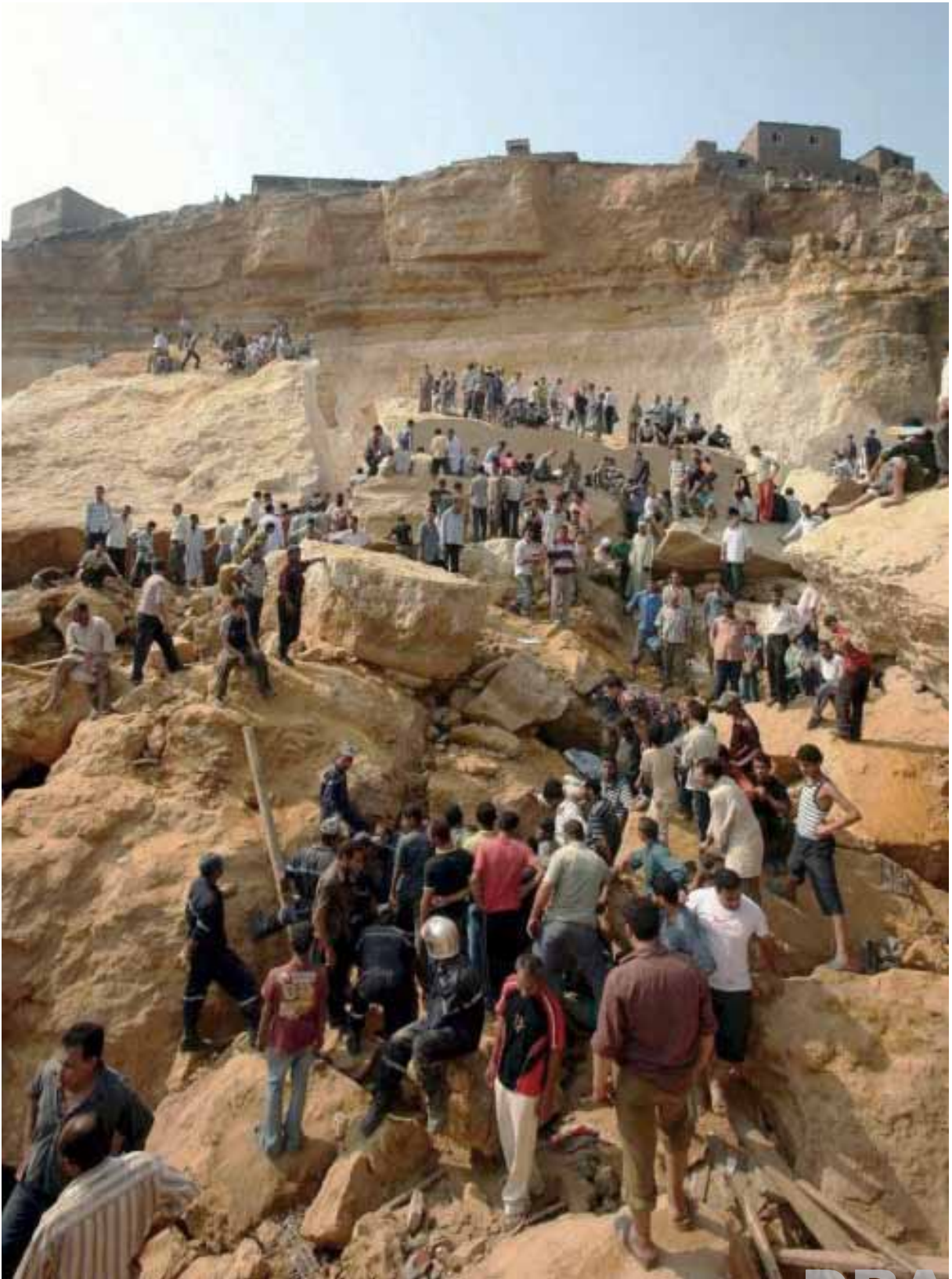
He adds 18 areas in greater Cairo have been identified as a result by the government as part of their plan to modernise the city by 2010.

But so far there has been little or no consultation with affected communities and the residents now face a double risk: a lack of safety and the ever-present possibility of forced eviction, he says.

Amnesty International's Middle East and Africa director, Maroun Simen, said the Douqaya rockslide had been "a disaster waiting to happen".

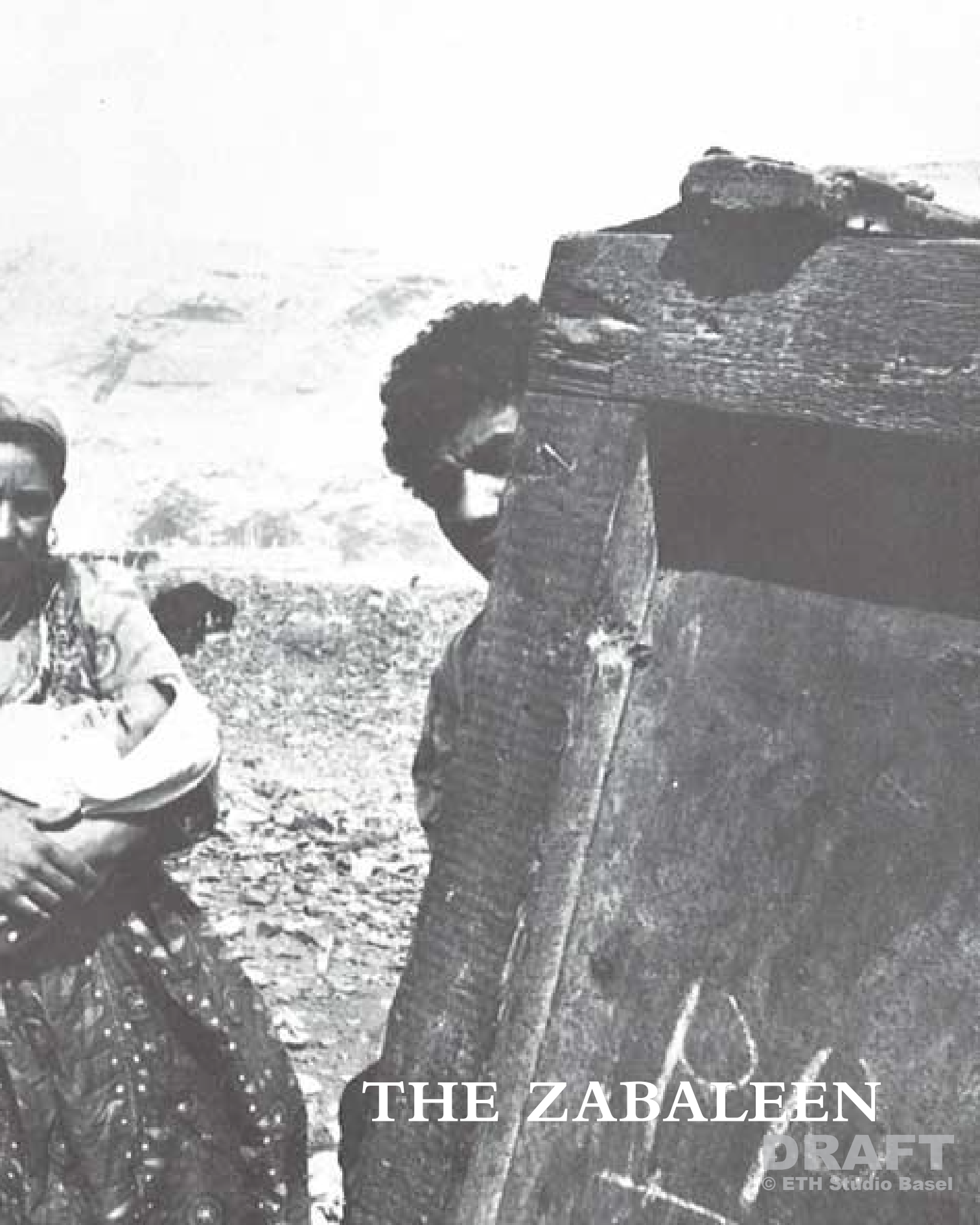
"People poor should not have to live any longer with the threat of being buried alive."







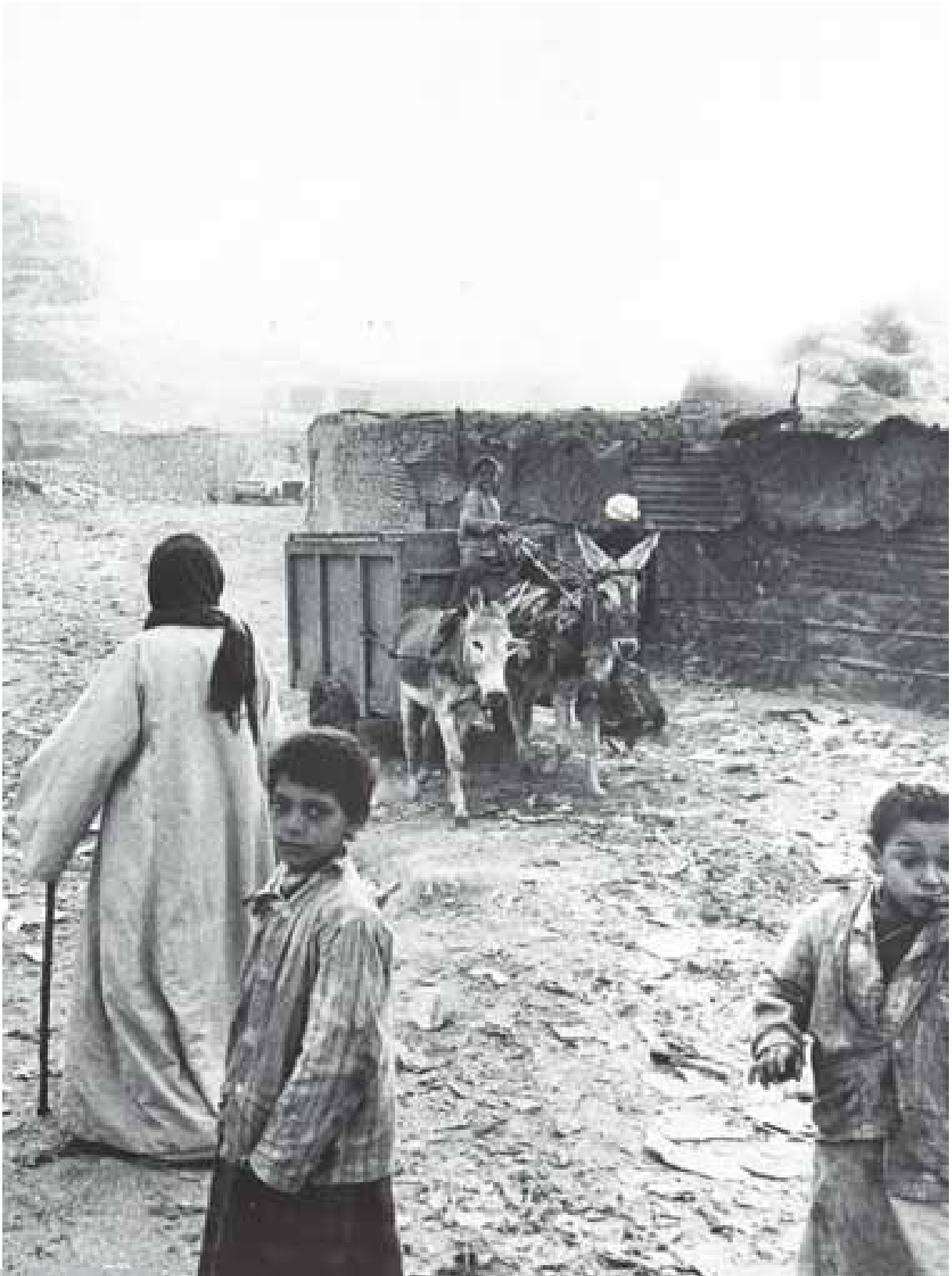




THE ZABALEEN

DRAFT

© ETH Studio Basel



THE ZABALEEN

Origin 92

Image of the garbage people 98

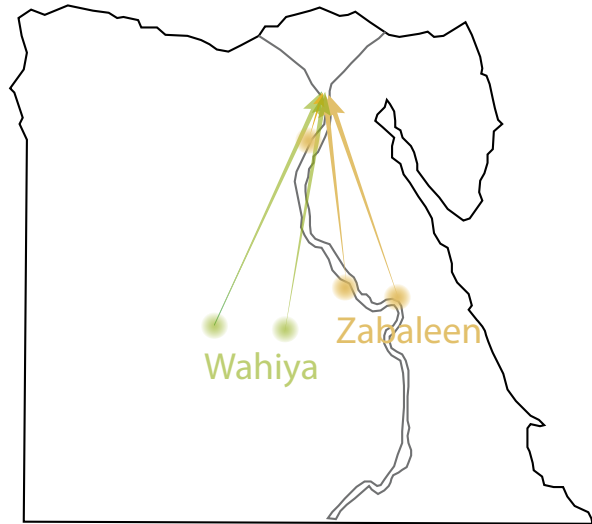
The Coptic Christians 102

Samaan monastery 108

previous page fig 6
left page fig 7

ORIGIN

The garbage collectors in Cairo are called Zabaleen, which is the Arabic word for garbage collectors. In the Egyptian history the garbage collectors have a long tradition and are present in every big city. The collecting Zabaleen are visible in Cairo's daily life same as the sound of the muezzin.



WAHIYA [arab. people of the oasis]

The derivation of the garbage collectors goes back until the end of the 19th century, when the Wahiya came to Cairo. The first wave of immigration from the Dakhla oasis in the western desert of Egypt was due to the fact that there was a water shortage so working on the fields was very difficult. For this reason a lot of mainly young people migrated to Cairo to look for work. As these people could not find work immediately they started to collect used paper to dry it and then sell it to bakeries and bathing houses who needed it as fuel. After a while the Wahiya gained the responsibility for the collection and disposal of Cairo's household waste. A complex network was developed in which every family had their routes through the city to collect the households waste. The collectors had contracts with the building owners to have the permission to collect the garbage on a monthly fee. These routes were inherited from father to son. Later the wahiya established themselves and they started to rent out their garbage routes to the newly immigrated Zabaleen.

ZABALEEN [arab. garbage collectors, sing. Zabal]

In the 40ies another immigration started with the Zabaleen, they were pig breeders and farmers from Asyut, a rural region in Upper Egypt. As they were not able to manage their subsistence anymore due to high payments to their landlords, they had to move elsewhere to find work and income. At their arrival in Cairo the Zabaleen settled in Imbaba. To find feed for the pigs the Zabaleen started to buy the organic waste which the Wahiya collected. As the Wahiya establish themselves they started to rent out their routes and donkey carts to the Zabaleen. The organic waste was used to feed the pigs and afterwards they were sold to merchants. The Zabaleen were resettled several times within Cairo. In 1972 they came to Manshiyat Naser to developed a new settlement on the upper plateau of the Mokattam mountain. They succeeded in establishing a waste management system within Cairo which grew in complexity over time. The biggest city of Africa is highly depending on the garbage collectors of Mokattam, although it is still not legalized by the government.



1978
2010

fig 8





1972
2010

fig 9





fig 10



„The people employed by the city just pick up rubbish because they are paid to. For us it is different. It is in our blood.“

Mounir, Zabal, 2010



IMAGE OF THE GARBAGE PEOPLE

The majority of the Zabaleen in Cairo and in Mokattam are Coptic Christians. Coptic Christians represent twelve percent of the total population in Egypt. According to information of NGOs are 80 percent of the Christians living in Egypt living below the poverty line.

THE COPTIC CHURCH

The Coptic Orthodox Church has its roots in Alexandria and was established by Saint Mark the apostle and evangelist in the middle of the first century. Head of church is the Pope of Alexandria, currently Pope Shenouda III. About 20 million Christians are living around the globe, between 12 to 15 million of them are living in Egypt. Many of them have a little tattoo in the shape of a Coptic cross at the right wrist. Some religious persons have even more pictures with Christian signs on their arms and shoulders.

The Zabaleen have a deep connection to religion. All over the settlement religious signs such as posters, building decoration, street decoration or Coptic crosses can be found. Due to their being of a religious minority, the Zabaleen have a strong coherence between each other. Some of the important people of NGOs working in Mokattam belong to the Coptic church as well.

Through their deep bond to the church, the Zabaleen somehow accept their living and working conditions. Asking the people living in the settlement about their

job, they answer, that it is their destiny to work in the garbage business. Although they, as an individual would like to leave Mokattam and to work in another sector, their consciousness tells them to stay with the community, as it is their destiny to do so.





„Can i say ‘NO‘ to God?
Do not make me a Zabaleen?
Like the saying goes:
everyone gets what is written!“

Zabal in the movie „Garbage dreams“, Mai Iskander, 2010

THE COPTIC CHRISTIANS

SF [swiss television] Rundschau 10.11.2010
Documentary about the christian minority in Egypt



„According to a Coptic priest, Christians are oppressed in everyday life. They even do not find jobs, even though jobs would be available.“



„The Chistians live nearly without any contact to the Muslim population. In some areas they are scared.“





„The Coptic experienced the killing of the pigs, because of the swine flu in 2009, as a massive attack against them. Some of them claim for five million egyptian pounds as compensation.“



„As a symbol of affiliation Zabaleen have a tattoo, showing Christian symbols and images.“

„A life in trash without any future perspective.“









SAMAAN MONASTERY

A large monastery complex was established in the 1960s up against the high Mokattam cliffs at the eastern limits of the area. It covers an area of about 7.9 feddans and is separated from the residential areas of the settlement by a secondary cliff. The monastery complex has been developed over the last thirty years and has a wide reputation as a cultural and pilgrimage site. Administratively it belongs to the Church of Saint Samaan which is also located in the settlement. The monastery complex employs 43 persons.

FATHER SAMAAN

Head of the monastery is Father Samaan. He is not only the spiritual leader of the church in Mokattam, he is also the head of the Zabaleen community living in Mokattam. Helping to built up Mokattam, Father Samaan got the confidence of the people living in the settlement. Recently all decisions made, every NGO and all other important issues concerning the settlement have to go through his hands. According to the Zabaleen he is the person they contact whenever they have problems. Every saturday hundreds of Copts, even from outside the settlement come, to see his mess.



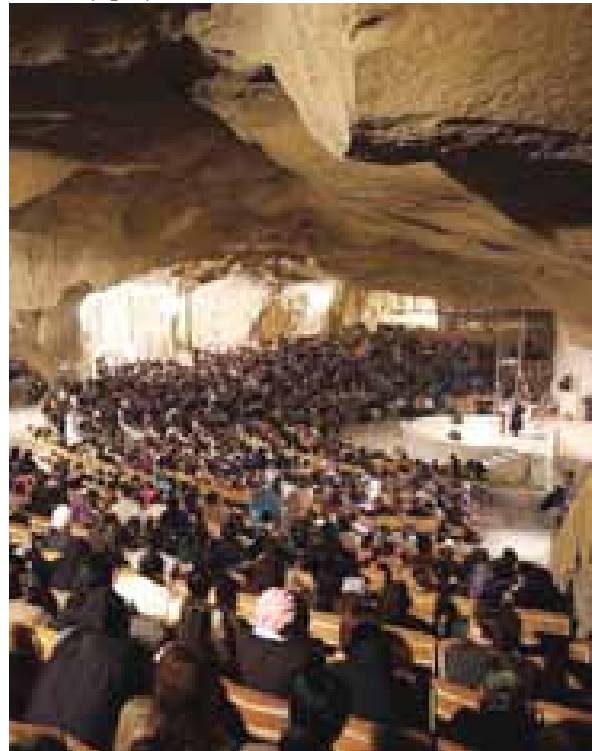
Father Samaan

fig 11



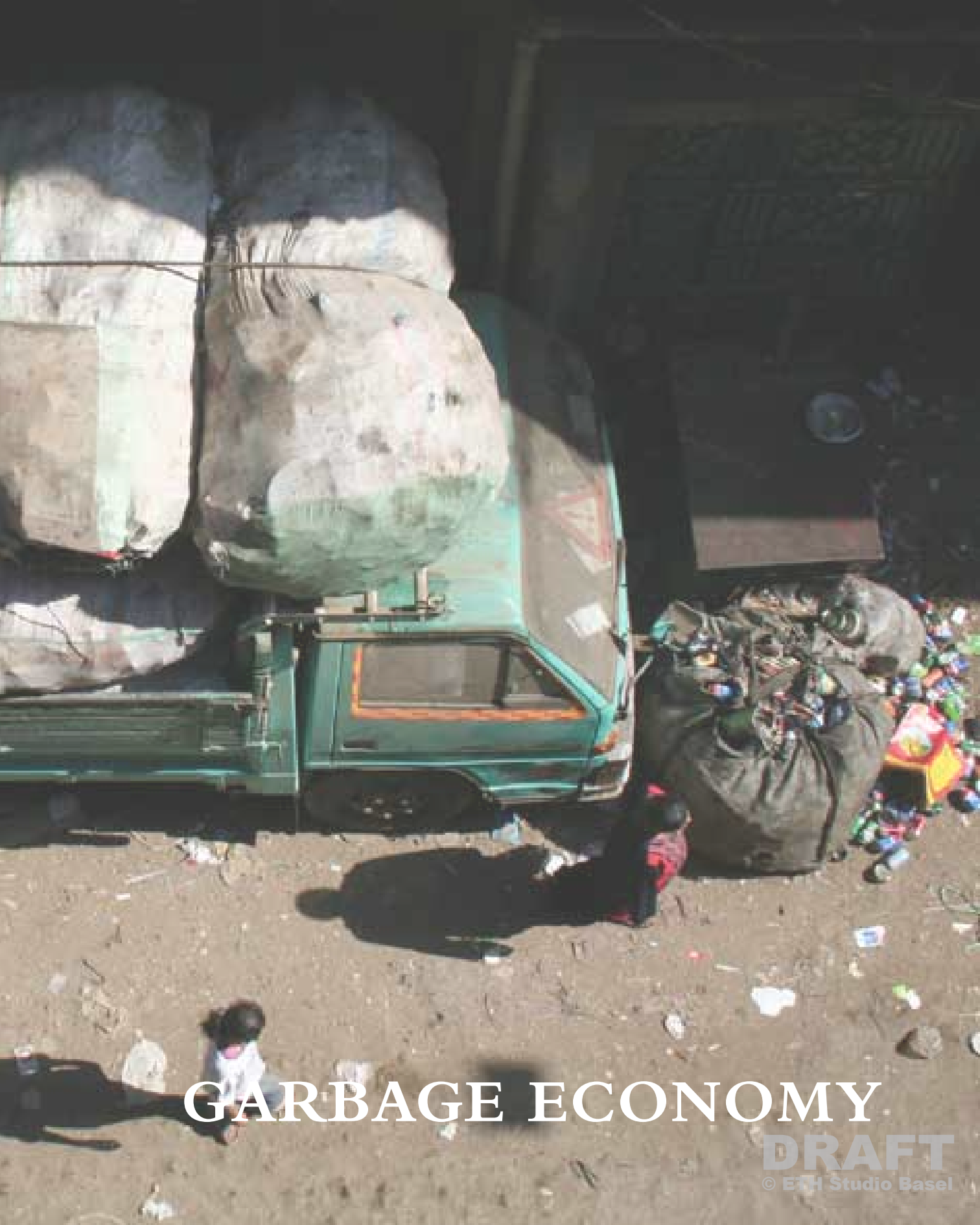
Saturday prayer in one of the rock churches

fig 12









GARBAGE ECONOMY

DRAFT
© ETH Studio Basel



GARBAGE ECONOMY

Garbage system of Cairo 114

Actors in the garbage business 122

Collection 124

Sorting 134

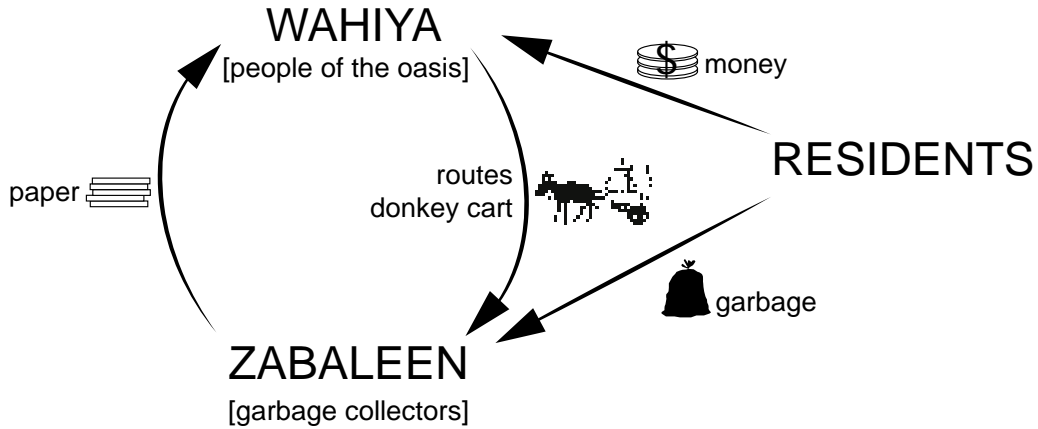
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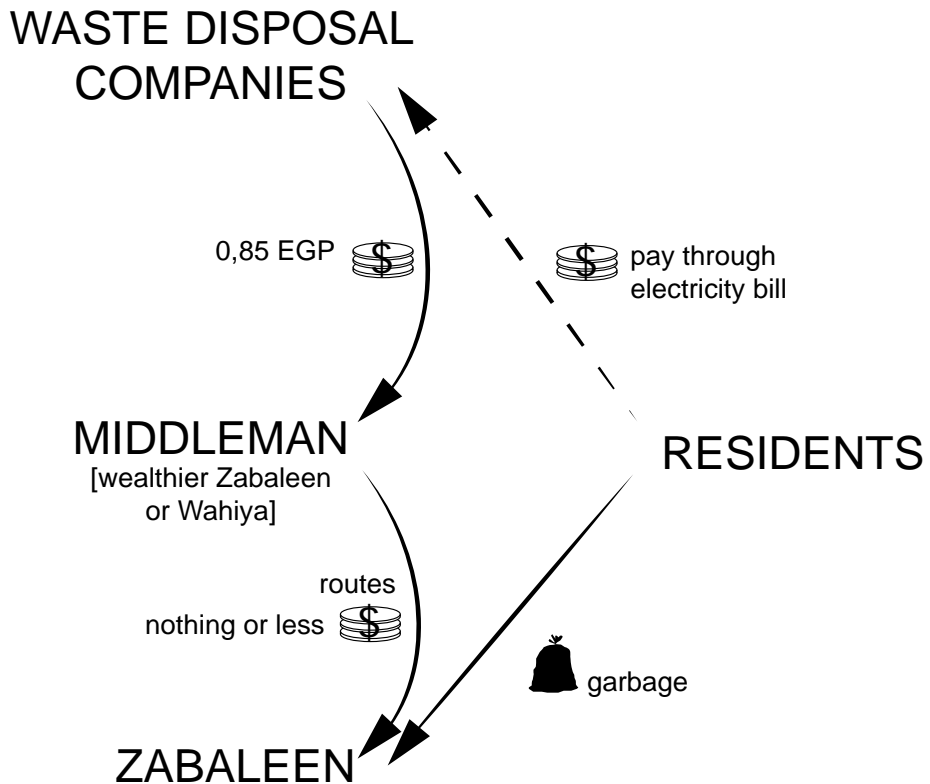
GARBAGE SYSTEM OF CAIRO

2008

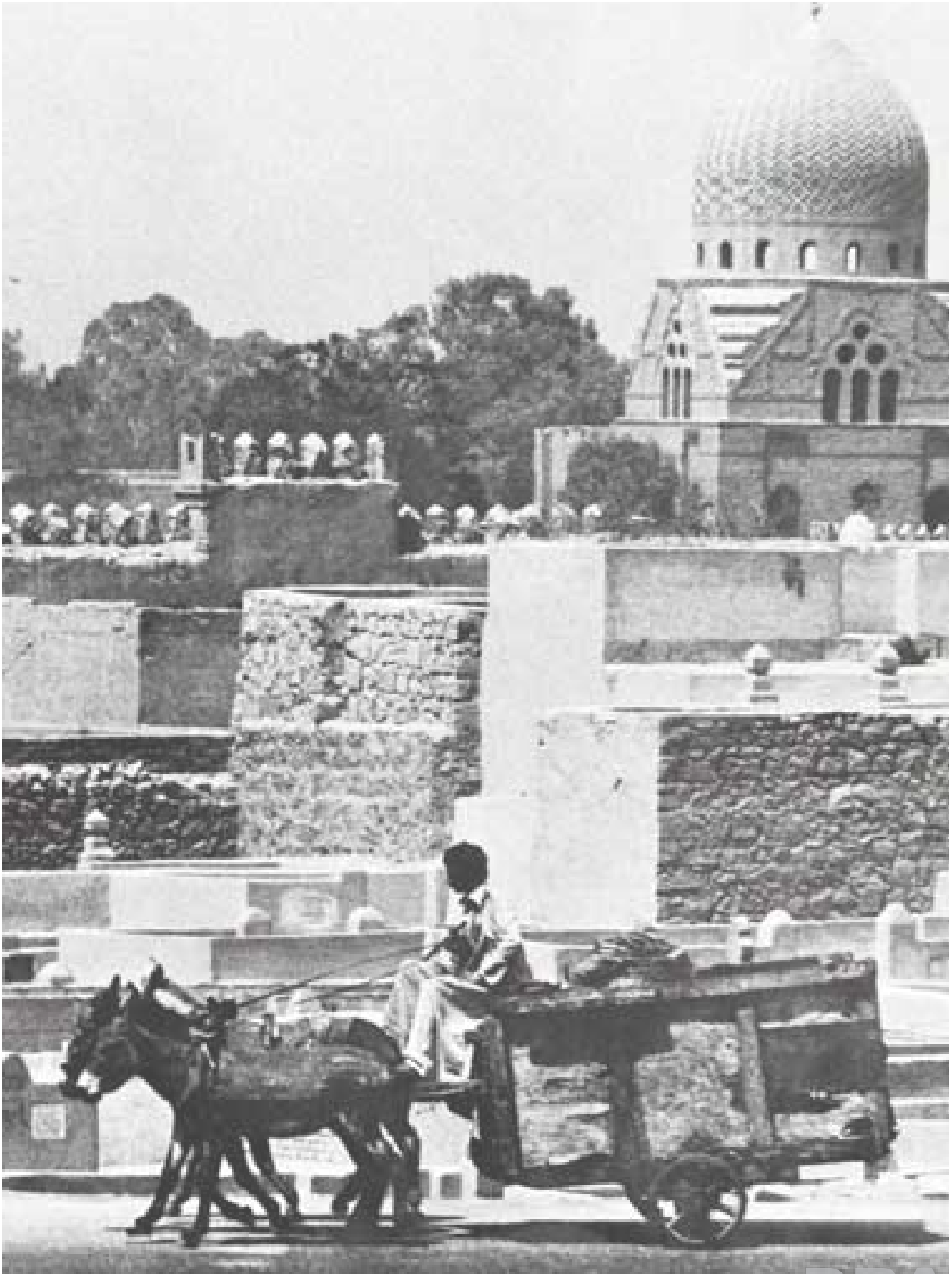


graph 4

2010



left page fig 13.



„The entire community absorbs a stunning amount of materials and processes them in a manner which generates income, value and sends the processed materials off to industry. It is like the biggest bee hive of recycling in the world. It processes 3000 tons of materials per day, no recycling plant or composting plant or municipal recovery facility or landfill could do that. It is the largest such center in the world and is a non stop recycling hub for mega cities like Cairo.“

Leila Iskander, CEO of C.I.D. consulting, 2010

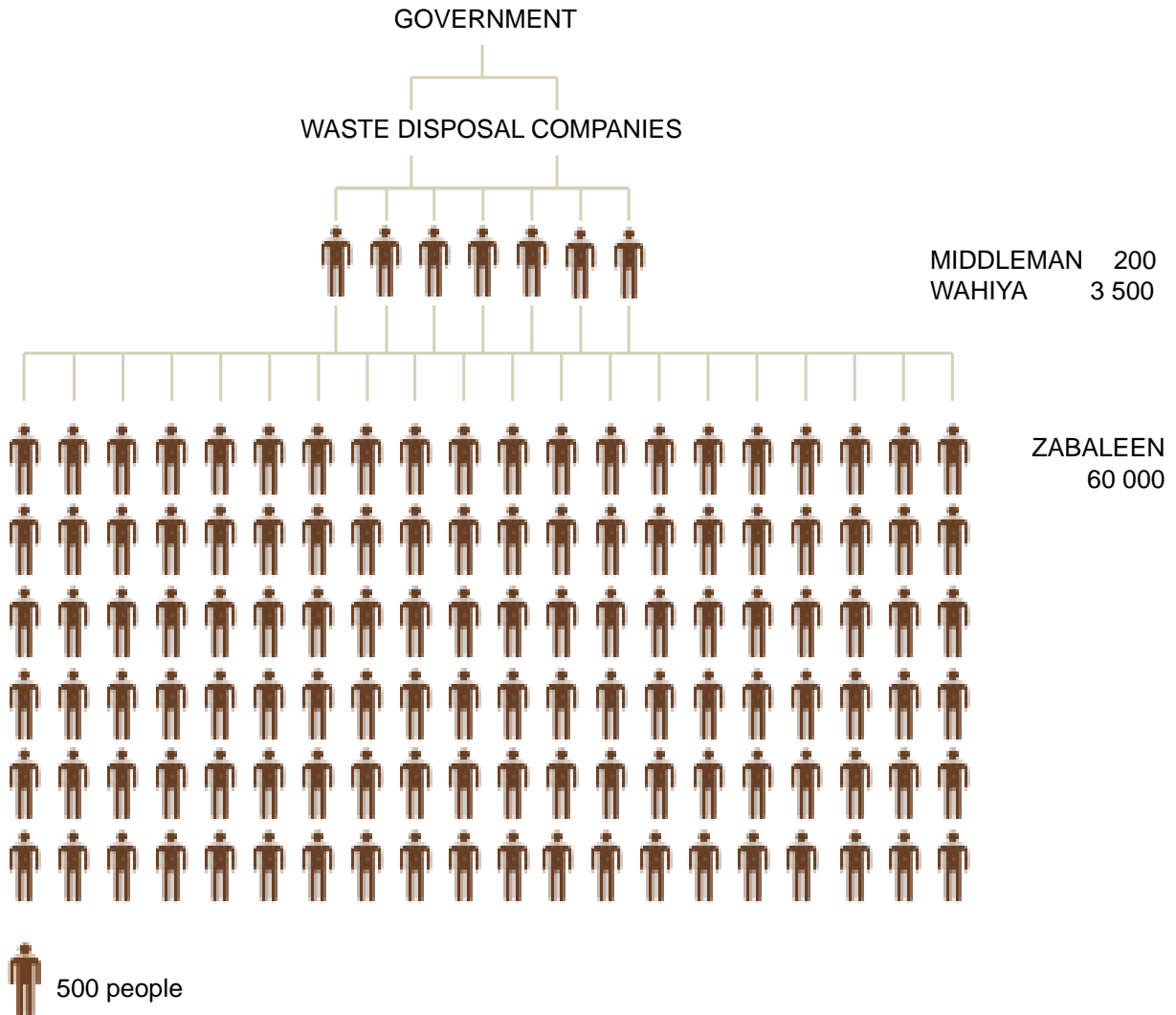






HIERARCHY OF PEOPLE WORKING IN THE GARBAGE BUSINESS

People involved in the garbage business are apart from the Zabaleen, the Wahiya and middlemen who have contacts with the waste disposal companies. The Zabaleen are the lowest and largest group in size in the pyramid of people working in the garbage economy.

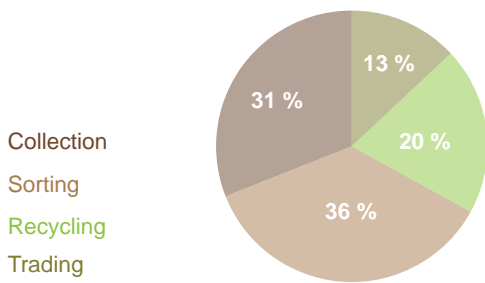




ACTORS IN THE GARBAGE BUSINESS

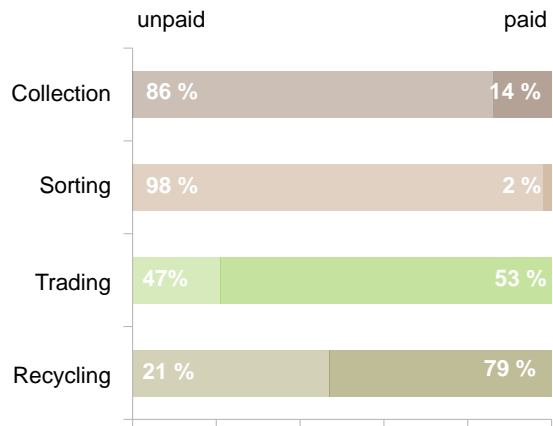
Inside the Zabaleen community the jobs are strictly separated. Everybody involved into the process has his own tasks and liabilities. It also depends on the age and the gender of a person in which part they are involved in. The garbage therefore is processed by at least four actors during its recycling or disposal. The majority of the small and medium enterprises found in Mokattam are family businesses, where the whole household is depending on the income of the family.

DISTRIBUTION OF LABOUR IN MOKATTAM



graph 6

DISTRIBUTION OF PAID AN UNPAID LABOUR IN MOKATTAM



graph 7

The first actor inside the system is the collector. He picks up the waste at the doorstep of Cairo's residents. From there he transports it through the city back into the Mokattam settlement. When the garbage bags arrive in the settlement, the sorters, mainly women, start to go through it manually without using gloves or separation machinery. The separated material is then sold and brought to the recycler who is living and working in Mokattam as well. Each recycler is specialized in a certain good or material. For the processing of the material the recyclers need expensive machinery. As soon as the material is fragmented into its basic, it will be sold to the industry. A trader picks up the recycled items and sells them to factories outside Cairo.

The majority of people living and working in Mokattam are involved into the collecting and sorting part of the activity. Most of their work is unpaid because they are working inside a family business, where everybody is depending on the money gained from selling the material to the recycler. The trader is the final person in the chain of the system and simultaneously the highest in the garbage hierarchy earning the biggest amount of money.



COLLECTING

The Zabaleen, working in collecting, pick up the garbage at the doorstep of the residents in Cairo. Each Zabal has his own routes of buildings where his is responsible for the collection. Most of the routes were taken over from the Wahiya and benefit from of a long lasting relationship between the residents and the collectors.

At night and in the early morning the Zabaleen can be found in their donkey carts and truck loaded with garbage bags all around Cairo. Exclusively men are involved in collecting garbage, accompanied by their young sons and daughters. The children are supposed to take care of the truck while the father picks up the garbage. The smaller bags from each household are bond together for transporting in one of the typical huge white garbage bags of the Zabaleen.


People wander in the streets of Cairo searching for something valuable in the garbage are not the Zabaleen, like many people think. These people are scavengers, poor people searching for stuff to sell.


Unlike the Zabaleen they are working indiviually and are not organized in a large community. The Zabaleen collectors receive a small payment of the residents. Within the new garbage management system in Cairo they were supposed to get an income by their middlemen but only seldom this is paid.


Once the garbage is picked up, it is brought back to their homes in Mokattam, where at sunrise a new working process starts.



 men
small children

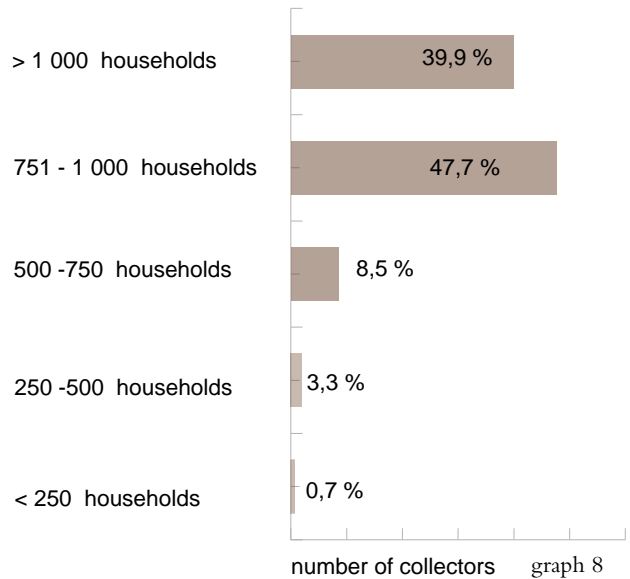
 night
early morning
6 h / day

 9 EGP [1,5 CHF]

 working area:
Cairo

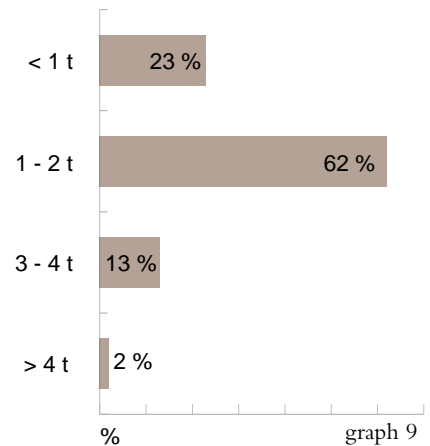
HOUSEHOLDS SERVED PER DAY PER COLLECTOR

Depending on their routes and areas served, one collector is able to cover more than one thousand households per day. Around fifty percent of the collectors serve between 751 and 1000 households a day.



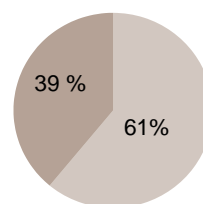
QUANTITY OF WASTE COLLECTED PER DAY PER COLLECTOR

Two percent of the collectors manage to collect up to four tons of garbage per day. The average lies between one and two tons a day.



TYPE OF HOUSEHOLDS SERVED

The high income areas are more attractive to the Zabaleen because of the waste composite, but still around sixty percent serve low-middle income areas in Cairo.



high-middle income area
low-middle income area



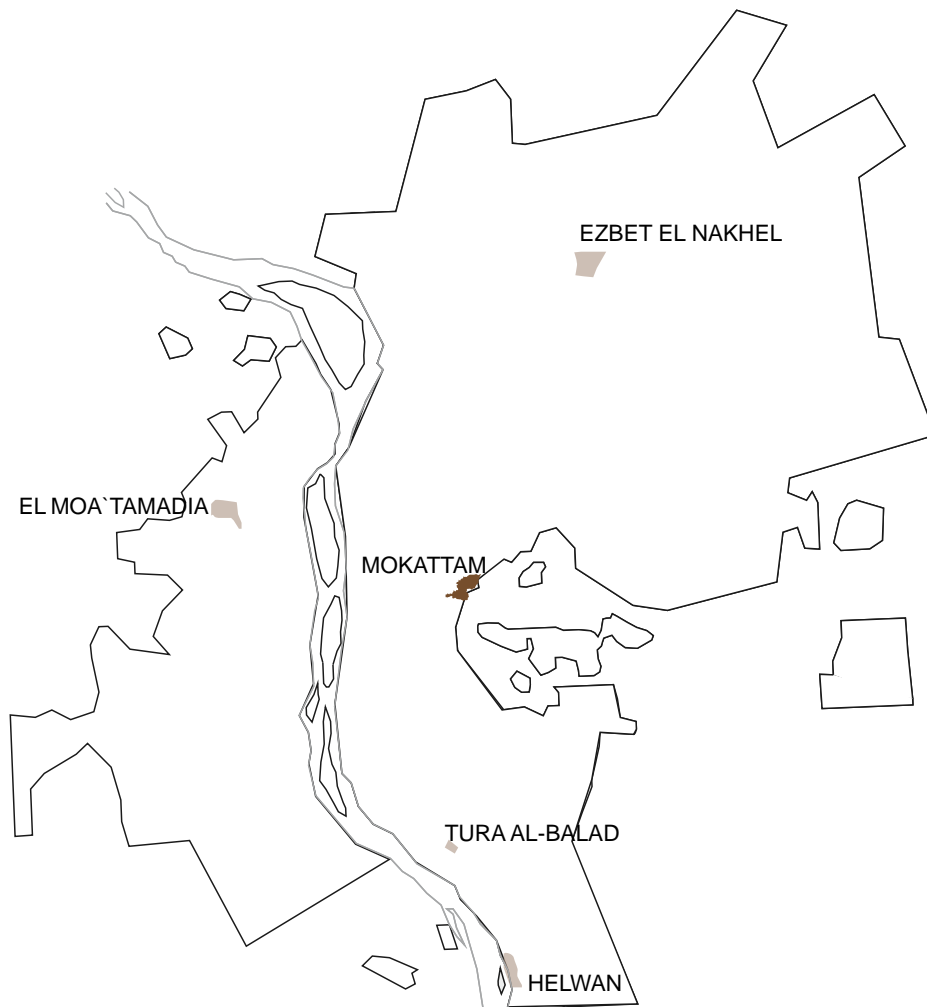




THE ZABALEEN IN CAIRO

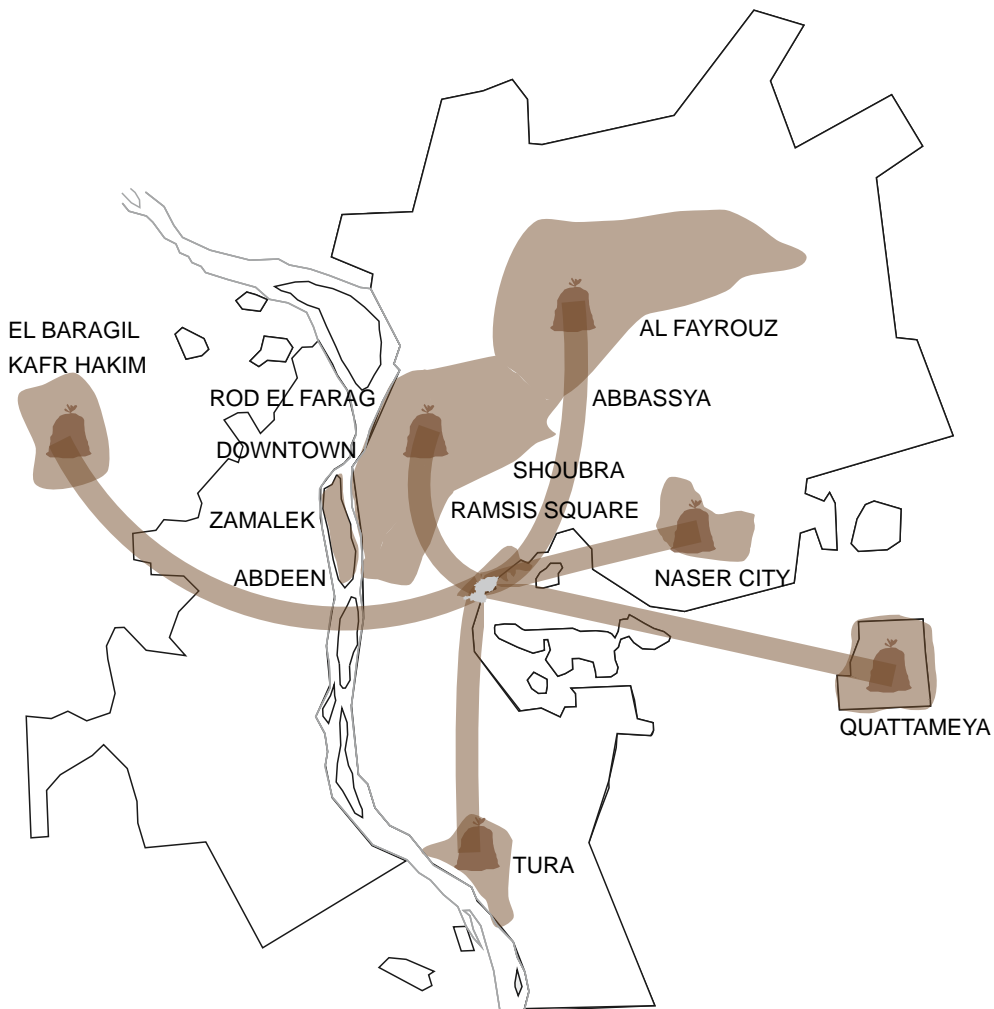
Within greater Cairo there exists five garbage collector settlements. Mokattam is the largest in size and the most established concerning the recycling business. In the beginning the settlements were located outside the city, but with its growth they became part of the city. The inhabitants of the different settlements are mainly Coptic Christians. Apart from this social segregation between Cairo and the settlements, there is also low interaction between the different settlements themselves and the people living there.

GARBAGE COLLECTOR SETTLEMENTS IN CAIRO



The areas where the garbage is collected, which is brought to Mokattam are spread over the whole city. Each collector family has its own route and households to serve. Since the waste disposal companies were involved in the garbage system the Zabaleen have difficulties to maintain their personal routes on which they are highly depending.

COLLECTING AREAS OF THE ZABALEEN FROM MOKATTAM











SORTING

The garbage bags brought to Mokattam are sorted by the women and girls of the garbage collectors, it is a exclusively female task. About six hours a day women are busy sorting the garbage by hand into sixteen different categories. The majority of the sorting enterprises is integrated into a garbage collector family.

By hand the women look through the garbage in order to separate it into 16 categories. This action is the first part of the work, as the women also have to keep the house clean, cook and take care of the children. The children often accompany their mothers, playing between the bags of garbage. The sorting areas are situated in the ground floor of the garbage collectors house and in front of the houses on the street.

In the past due to working conditions, health situation of women and children was very bad. Since all the children grew up in Mokattam are getting immunised through a programme by APE, the child death rate

lowered rapidly. The sorting by hand is still a disussed issue by NGO's. There was an approach to introduce gloves but according to the women, sorting with gloves need much more time. Which means women are still in contact with dangerous garbage pieces like sharp pieces, medicines or chemicals remains each day they sort. A pilot project was started where inhabitants of a certain area in Cairo where asked to separate their garbage in advance into organic and non-organic waste. To sort the previously seperated garbage the women needed four hours a day instead of six which would means a time and energy saving improvement.

fig 14



women



morning / afternoon
6 h / day



9 EGP [1,5 CHF]



working area:
Mokattam / collectors house

TYPE	VOLUME PER WEEK [l] %	
iron	1,2	0,05
nylon Bags	3,3	0,13
copper	3	0,13
soft Plastic	6,6	0,3
animal Bones	6,6	0,3
aluminium	8,8	0,4
transparent Plastic	16,5	0,7
cloth	23	1,0
broken Glass	27	1,1
whole glass	753	31,3
paper	36	1,5
tin	95	3,9
cardboard	99	4,1
organic Waste	478	20,0
nakdah ¹	477	20,0
rabbish ²	366	15,3

PRIMARY RECOVERED MATERIAL

About 2400 liter of garbage is sorted weekly by the women. The main material is whole glass followed by organic waste which can only be used for composting and to feed the few animals they have.

Concerning the further treatment and prices of the materials on the market, plastic and metals are the most interesting items to recycle.

¹wide variety of items that do not have a specific uses for recycling, e.g. toys, vases, spoons, forks

²residual waste which has to be transported to the dump for final disposal





PROCESS OF WASTE DISPOSAL

As a first step of recycling the material is separated into organic and non-organic waste. The organic waste is brought to a composting plant in Quattameya. Non-organic waste is in a next step sorted into primary materials, such as paper, plastic and metal. Afterwards these materials are again sorted according to their colour and type, in up to 16 categories. The process of waste disposal takes about a week until the raw material can be sold to the factory.

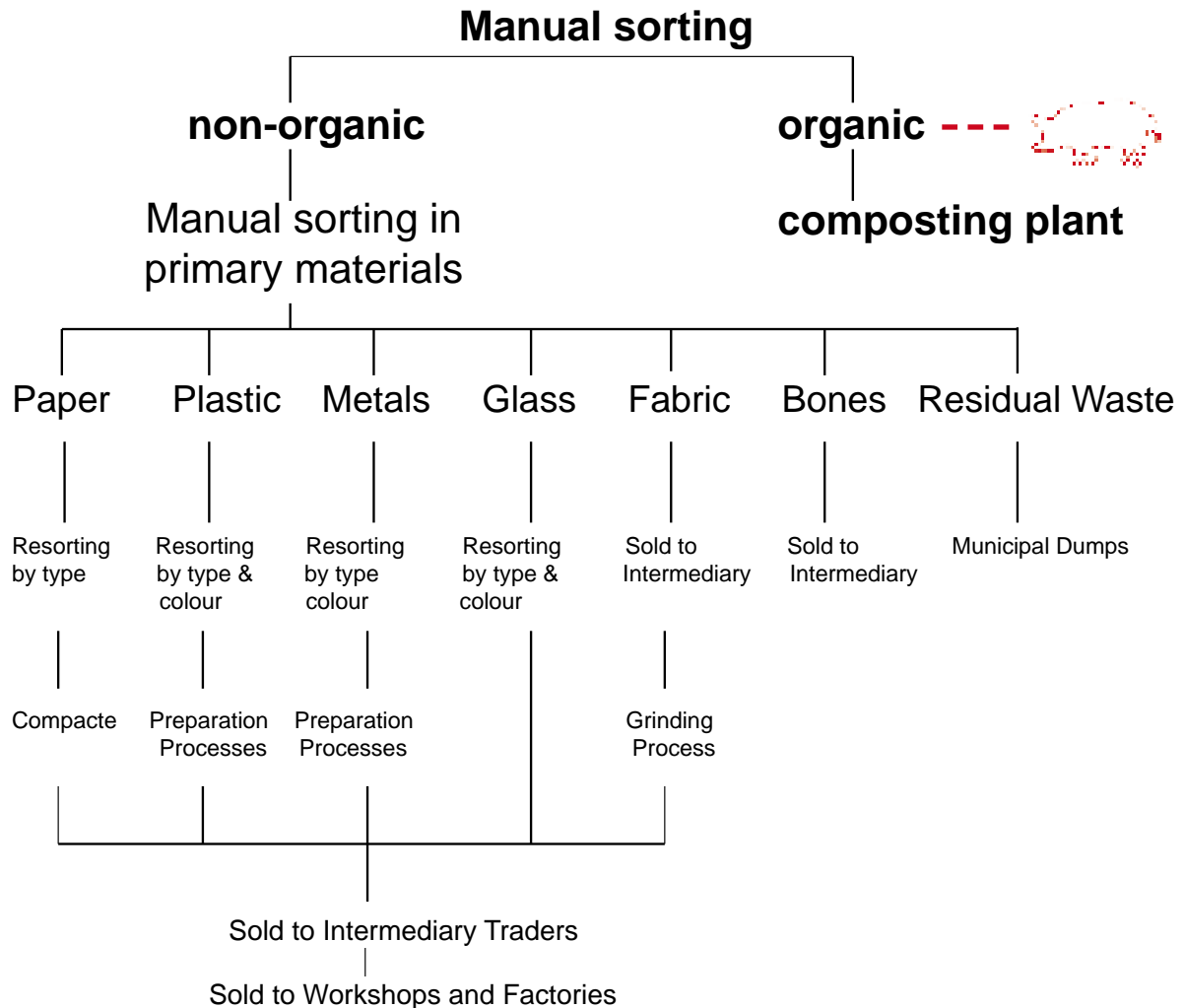




fig 15

fig 16





„The Zabaleen lost fifty percent of their income due to the killing of the pigs. They have to compensate this now through more recycling.“

Magda Gad, Mokattam general director A.P.E., 2010

THE SWINE FLU

ZEIT online [german newspaper]

Articels about the swine flu and the connected killing of the pigs in Cairo

ZEIT ONLINE AUSLAND

SCHWEINEGRIPPE

Kairos eigentümlicher Kampf gegen Schweine

In Ägypten läuft eine Massenschlachtung gigantischen Ausmaßes. Offizieller Grund: die "Schweinegrippe". Tatsächlich aber verfolgt die Regierung in Kairo ein anderes Ziel

von Martin Gehlen | 22. Mai 2009 - 17:10 Uhr

Wer dieser Tage auf dem Internationalen Flughafen von Kairo landet, sieht sich schon nach wenigen Schritten auf ägyptischem Boden einer dicht gestaffelten Phalanx von Weißkitteln mit Mundschutz gegenüber. Jeder muss auf einem Zettel Name, Wohnort und Mailadresse hinterlassen und dann vor einer der drei neu angeschafften Infrarotkameras Aufstellung nehmen. Ist der Kopf kühl und hat man kein Fieber, dann darf man weiter.

Kühlen Kopf – den lässt dieser Tage vor allem die ägyptische Regierung vermissen. Seit Mexiko vor vier Wochen die ersten Krankheitsfälle der neuen Amerikagrippe meldete, holte man am Nil zum ganz großen Schlag aus. 300.000 Schweine sollen getötet werden, praktisch der gesamte Tierbestand des Landes. Zehn Prozent sind bereits gekeult. In sechs Monaten will man am Nil mit dem blutigen Geschäft durch sein. Die Weltgesundheitsorganisation WHO erklärt inzwischen geradezu flehentlich, diese ganze Aktion sei völlig sinnlos, weil sich das Virus von Mensch zu Mensch und nicht von Schwein zu Mensch übertrage.

Doch die ägyptischen Machthaber stört das nicht. Sie haben anderes im Sinn. Kairo will die weltweite Angst vor der Amerikagrippe nutzen, um die chaotische Aufzucht dieser Tiere durch die christlichen Müllsammler in den Slums von Kairo und Alexandria ein für allemal zu beenden. "Die Menschen leben mit Hunden, Ratten, Katzen, Hühnern und Schweinen zusammen, alle unter einem Dach und alle inmitten von Müll und Abfall", erklärte ein Sprecher des Gesundheitsministeriums.

Bereits vor drei Jahren hatte das Parlament ein härteres Vorgehen gegen diese Missstände verlangt, doch die Behörden wagten aus Angst vor religiösen Spannungen nicht, das Problem anzupacken. Denn der jetzt ausgerufene Feldzug gegen die Schweine trifft allein die christlich-koptischen Müllsammler, die die Tiere mit Essensresten füttern und sich inzwischen mehrere Straßenschlachten mit der Polizei lieferten. Die Ärmsten der Armen kämpfen um ihre Existenzgrundlage. Und niemand weiß, was in der Riesenmetropole Kairo künftig mit dem organischen Abfall geschehen soll.

Ägyptens Muslime, die 90 Prozent der Bevölkerung stellen, haben gegen die Massenkeulung nichts einzuwenden. Nach islamischem Glauben gelten Schweine als unrein und dürfen nicht gegessen werden. Mit muslimischen Gläubigen hat die Regierung allerdings ein anderes Problem: Gesundheitsminister Hatem al-Gabali legte ihnen dieser Tage nahe, vorsorglich auf die kleine Wallfahrt nach Mekka ("Umrah") zu verzichten. Notfalls werde er zurückkehrende Pilger in Quarantäne nehmen, drohte er. Die Regierung könne zwar in religiösen Fragen nichts anordnen, "aber niemand wird aus Saudi-Arabien direkt nach Hause zurückkehren können".

Muslimische Tierschützer in Ägypten reagierten in den vergangenen Tagen empört, als auf der Videoplattform YouTube heimlich gedrehte Videos auftauchten. Schweine wurden mit Eisenstangen erschlagen, ohne Betäubung abgestochen oder noch lebend durch Bulldozer mit Sand zugeschüttet. Andere wurden mit Chemikalien bestreut, an denen sie langsam und qualvoll verendeten.





RECYCLING

From the collector and sorter house, the sorted garbage is transported to the different recycling workshops inside Mokattam, according to the type of materials. Recycler families are normally specialized into one material, e.g PET, plastic, paper or cotton. Not all of them are able to treat the materials to the final product, some of them do only one step in the complex chain of recycling procedure.

According to the type of material the recycling procedure is different. Plastic as an example, is granulated into tiny plastic pieces. Afterwards it is laid into an acid for some time, is washed and then packed in order to be sold to traders. As it is typical for the Zabaleen network, most of the enterprises are family run businesses. It is possible that a whole family is involved into plastic recycling and every brother is responsible for a certain step. The machinery which are used for recycling are rather old-fashioned. All lot of people working in the metal workshops suffer from infections of the respiratory ducts. They are encounter the heat and toxic gases of melting aluminium for

hours. Without any medical treatment and inhalation protection the workers will not grew old. But still a few of the people involved in the recycling business managed to upgrade their business and belong today to a minor group of wealthier Zabaleen.



men



morning / afternoon
8 h / day



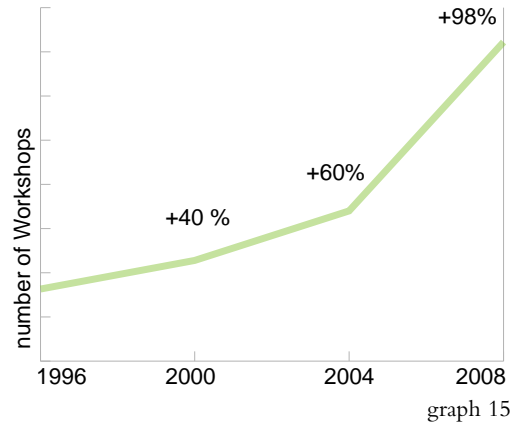
15 EGP [2,6 CHF]



working area:
Mokattam / recycling workshop

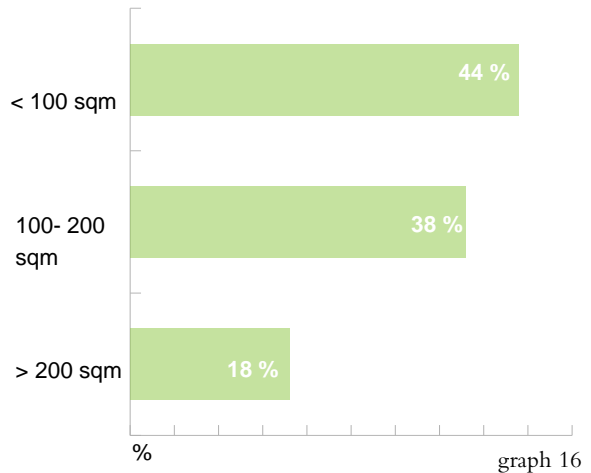
GROWTH OF WORKSHOPS

Over the last ten to fifteen years the number of workshops increased rapidly. From 1996 to 2008 the growth rate was almost 200 percent. This immense growth was happened before the consequences of the swine flu. Still a increase of income was possible, so more and more people were able to buy machinery and start up a recycling business.



SIZE OF WORKSHOP FOR RECYCLING

The majority of the workshops are smaller than one hundred square metres. More than half though is exceeding this size. Due to the fact that the workshops need storage space for the raw material, the recycled one as well as for the machinery, the majority of has an size of one hundred to two hundred square metres.





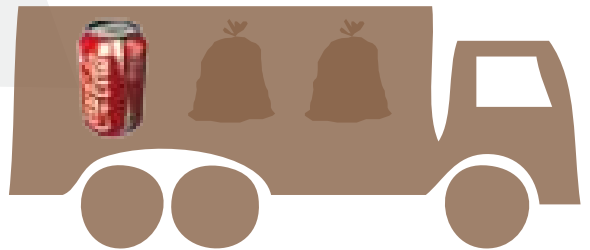


„We are in a transitional phase. We have huge quantities of tins that are brought up here every day. Every time an Egyptian has a soft drink from a can, he is creating work for us.“

Layla Zabal, 2010



RECYCLING PROCESS



DAY 1

a can is thrown away

DAY 2

garbage is collected in Zamalek by the Zabaleen

CAIRO

MOKATTAM

DRAFT

© ETH Studio Basel



SORTING WORKSHOP

DAY 3

DAY 4

garbage arrives in Mokattam and is sorted manually

all cans are accumulated until the amount is high enough to sell them further





the recycler buys a huge amount of can from several sorting areas in Mokattam

each can is separated by a manual cutting machine, due to their value in aluminium (lid) and tin (body)

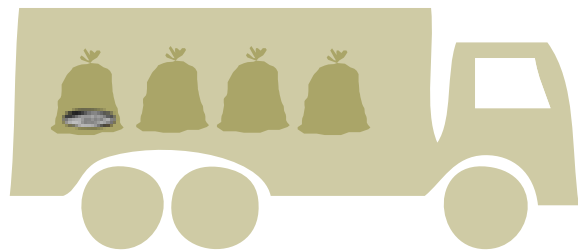
MOKATTAM

DRAFT

© ETH Studio Basel



DAY 7



DAY 8

aluminium and tin are packaged separately and stored until the amount is big enough to sell them to a trader

the materials are sold to a trader who stores them first or distributes them out of Cairo into recycling factories

EGYPT







RECYCLING BUSINESS

A complex system of various recycling workshops is found in Mokattam. A clear distinction of workshops can not be found. Only the groundfloor of the houses are used for activities around sorting and recycling, the upper floors are used for living of the family working in the groundfloor.

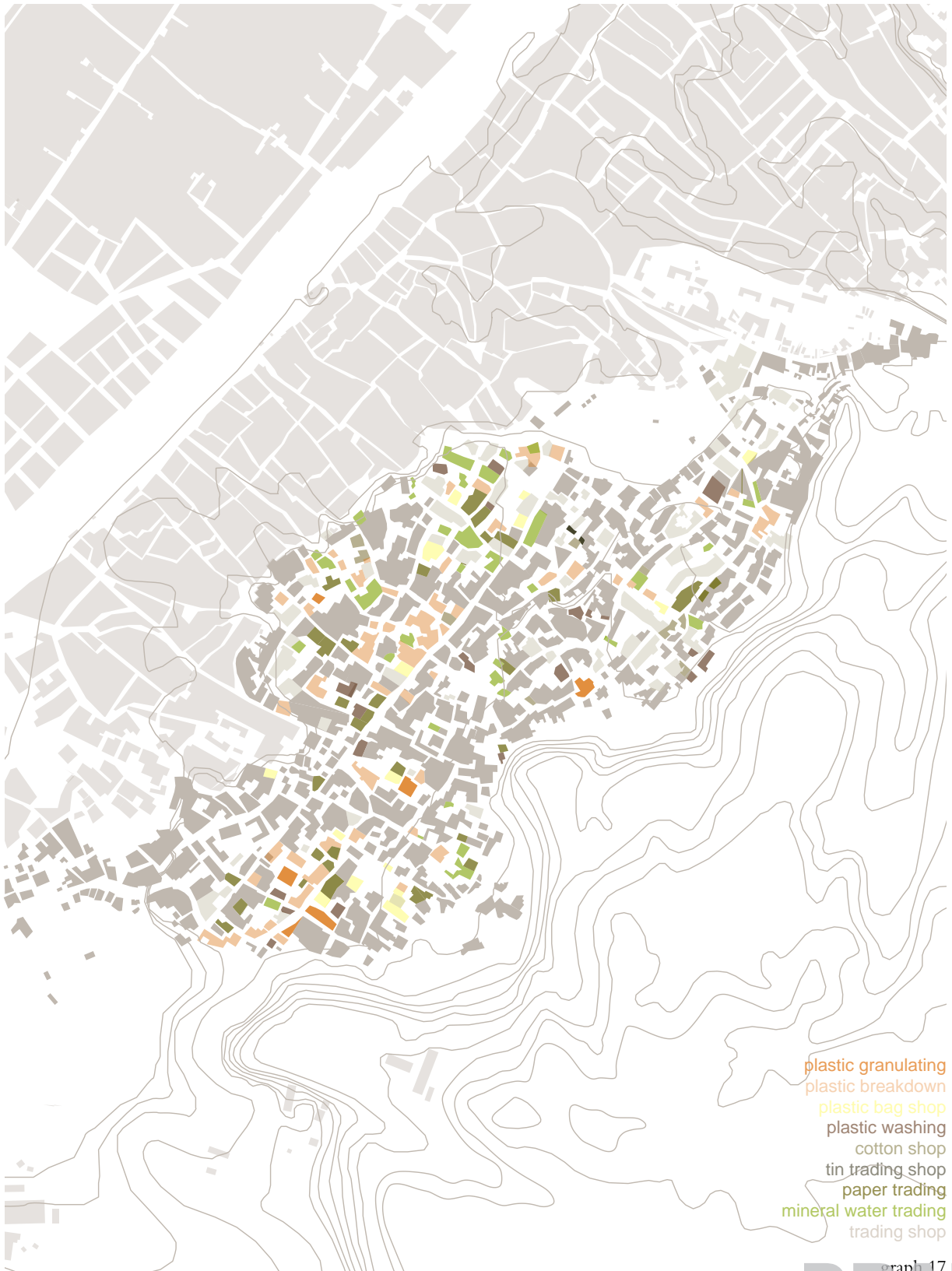
RECYCLING WORKSHOPS

As the workshops are distributed over the area by coincidence, it is possible that they are organized around the collectors and sorters from whom they obtain the materials. Asking local people they said that there is no certain system behind the locations of the workshops. Still it seems there are some stronger connections between neighbourhoods and families, where one another helps if shortage of labour or material is happening.

A social distinction can be seen concerning what type of material families are working with. Families involved in the metal and plastic economy are the

better situated ones, who have the highest profit from recycling.

In the past plastic and PET bottles were the most profitable enterprises because the recycled material was sold to China. With Egypt recently raising the customs charges for exporting goods, the commercial transaction was not profitable for the Chinese anymore.



graph 17



TRADING

The traders are the people in Mokattam who own apart from the collectors in charge of big trucks. They link the recycling economy of the settlement with the Egyptian industry. All goods leaving the area, as recycled material or residual waste are transported by traders.

The traders are the people who earn the most among the actors involved in to the waste business. They do not need machinery and do not deal with the problems of unhealthy working conditions. The only thing the need is a truck and a small storage space. The same way the recyclers are bound to the market price of their special material, the trader is depending of the leads and lags of the market. Supply and demand defines the price and the trader is the one handing over the money on to the other actors of the garbage business in Mokattam.

resell them in higher amounts and with more profit to a big recycling factory. In an ideal process they would not even need storage space, they would sell their goods right away. But depending on the market price and the amount of merchandise the traders use their storage space to wait for the selling prices to augment. Most of the traders owns their cars, but the ones involved in the transportation of residual waste rely on association trucks.

Traders buy final or intermediate products in order to



men



morning / afternoon
8 h / day



12 EGP [2 CHF]

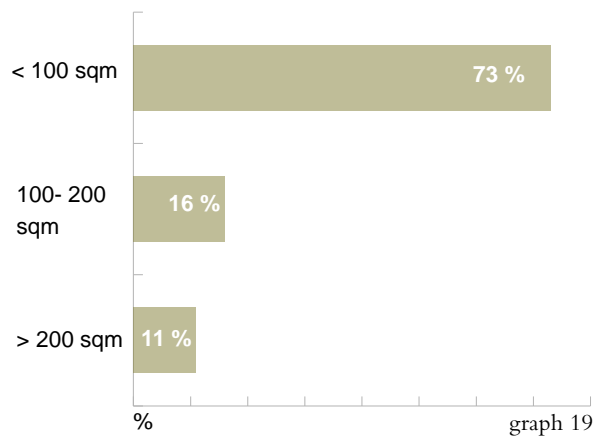


working area:
Mokattam, Cairo, Egypt



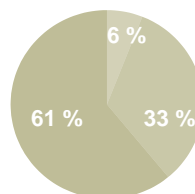
SIZE OF WORKSHOP FOR TRADING

The majority of trading workshops in Mokattam are smaller than one hundred squaremeters.



TRANSPORTATION OF RESIDUAL WASTE

Residual waste brought to the dumpsite in Quattameya is transported by traders. Most of them use an association truck, only one third actually owns the car themselves.



association truck 61 %
private truck 33 %
rental truck 6 %





fig 18







„From pig breeders they became machine operators. From oppressed garbage collectors they became empowered entrepreneurs.“

Leila Iskander, CEO of C.I.D. consulting, 1994





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GARBAGE IN THE URBAN PATTERN

DRAFT
© BVH Studio Basel



GARBAGE IN THE URBAN PATTERN

Urban morphology	172
The neighbourhood	178
Building block	194
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URBAN MORPHOLOGY

Two figure ground planes of the Zabaleen settlement and Manshiyat Naser are compared in the following. It is visible that the Zabaleen settlement has an organic structure with wide streets and a lot of unbuilt space in between the blocks, whereas Manshiyat Naser is a dense residential area with huge building blocks. The wide street space which is found in the Zabaleen area is one the one hand side based on the importance of truck accessibility linked to their business. On the other hand a lot of space is occupied and needed for the different activities around garbage recycling.



ZABALEEN SETTLEMENT

small grain, a lot of open space, low density

Garbage is stored in any foundable corner of the area and trucks fully loaded with garbage bags make their way through the settlement. The street is transformed into a working area, used to unload and load trucks, to store garbage, to sort it and to recycle it. Whenever the interior space is not big enough, the street will be used to compensate the lack of working area. This is the reason why there is so much unbuilt space needed. This unbuilt it not necessarily empty space, it is often crammed with garbage. The waste occupies urban space in a unique way and we assume the area to be less dense than Manshiyat Naser.



grain



grain

MANSHIYAT NASER

high density, huge blocks, small footpaths

The urban structure in Manshiyat Naser shows a high density. Only a few main roads give access to cars, the majority of the streets are narrow leading into the back of the settlement. Based on the fact that the first settlement developed along the Autostrad and later grew towards the Mokattam mountain explains the long roads leading from Southwest to Northeast. The crossing lanes through the blocks are smaller and more narrow. Unlike Mokattam settlement public space is not used for working activities, there are mostly workshops which are situated in the groundfloor of the houses.

AERIAL VIEW 2010

Zooming in into the settlement, the open space where the garbage recycling activities take place can be seen more clearly. Also visible is the garbage which is stored on the roof and in the backyards.





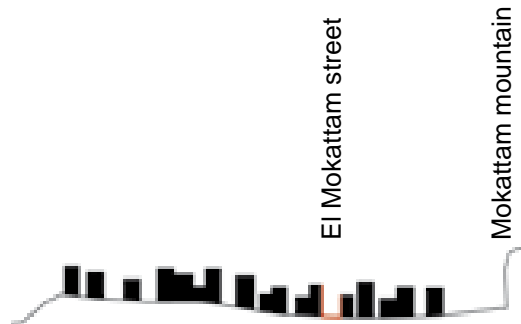
fig-19





THE NEIGHBOURHOOD

The shown street section approve once more the fact, that in the Zabaleen area the space between two housing blocks is wider than in the neighbouring Manshiyat Naser. In detail the housing height and their appearance are not distinguish between the two areas. It is the use and employment of public and private space which is differing.



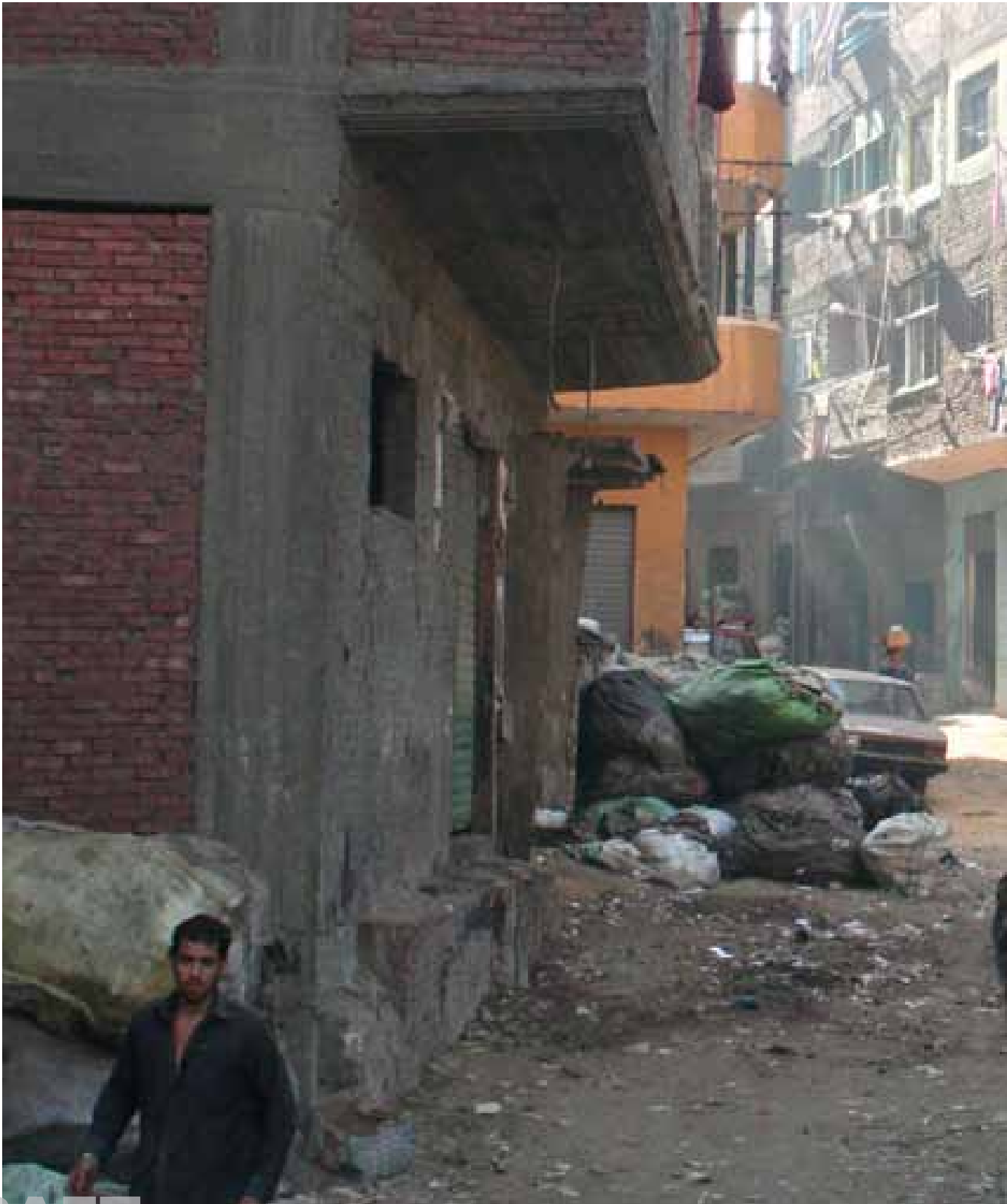


Autostrad
Al Kabari street











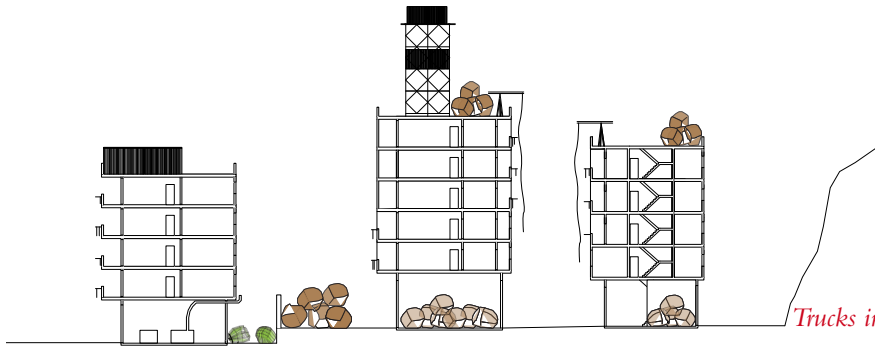
STREET ACTIVITY

from 3:00 am to 12:00 am

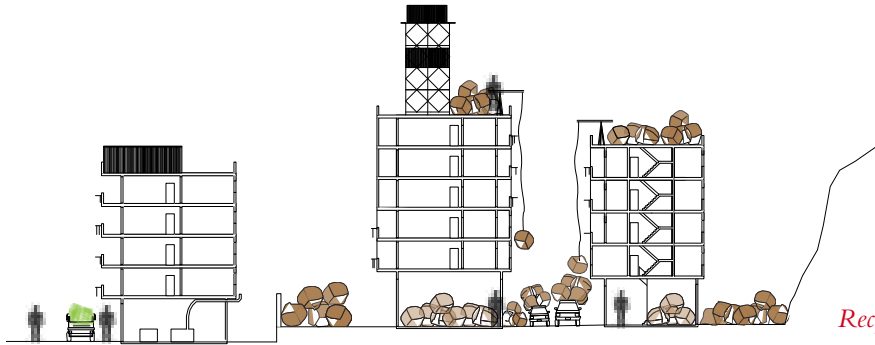
Recyclershouse

Collectors, Sortershouse

unsorted garbage
sorted garbage
redycled material

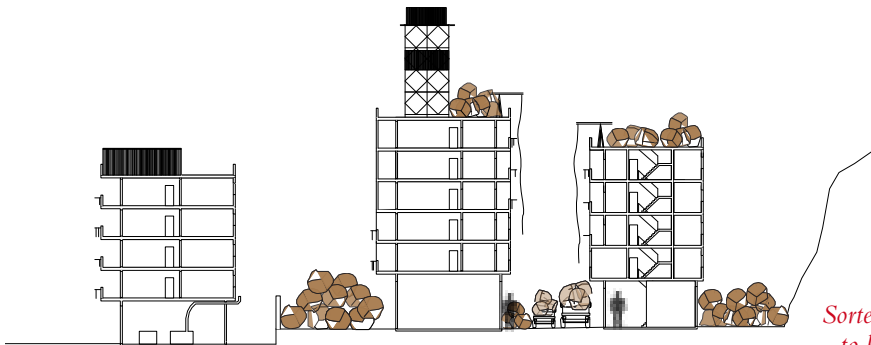


3:00 AM
Trucks in Cairo City to collect the garbage

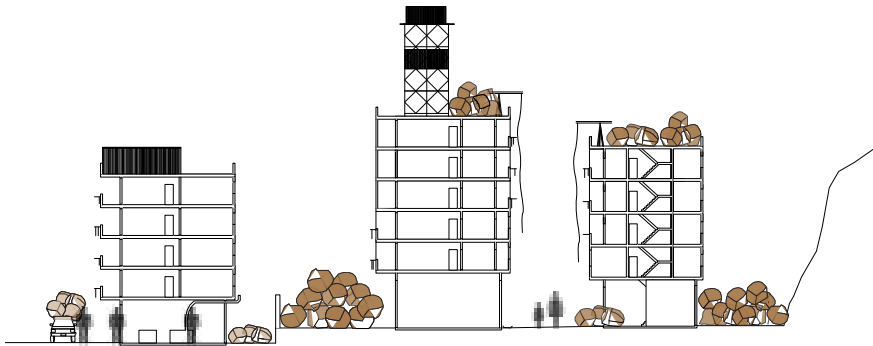


4:00 AM to 6:00 AM
Recycler sells recycled material to trader

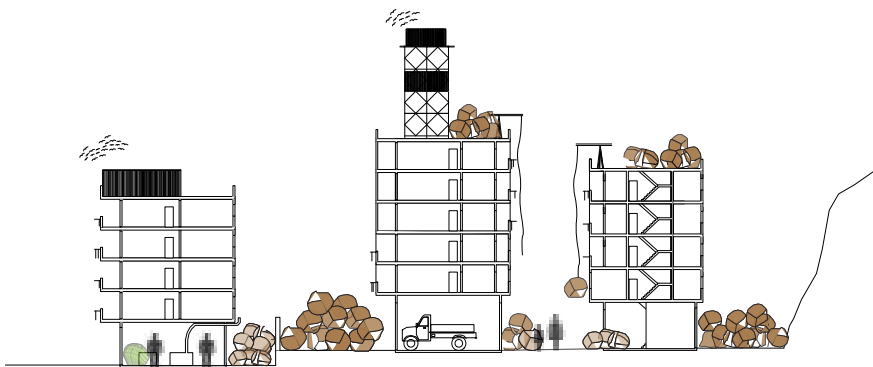
Truck arriving with garbage from Cairo City, bags with garbage is stored on the roof and in the backyard



7:00 AM
Sorted garbage bags are loaded to truck to bring and sell them to the recyclers

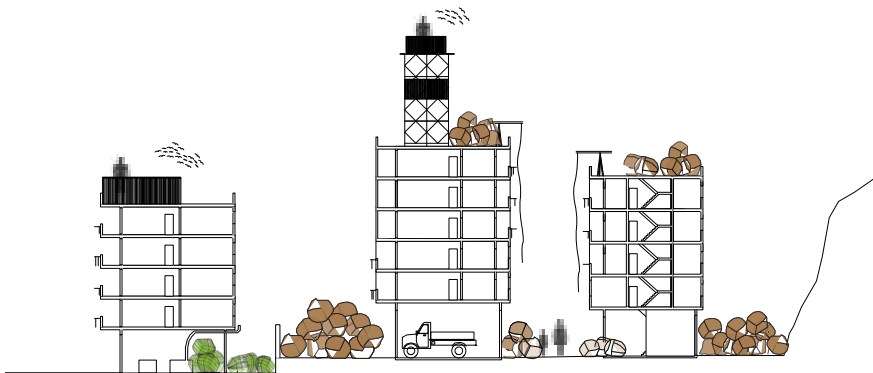


8:00 AM
Recycler receives the sorted garbage
and starts the recycling process



10:00 AM
Continuing with recycling
process during the day

Women and girls start to sort the garbage which arrived



11:00 AM to 6:00 PM
Birds cage to catch pigeons

Continuing with sorting during the whole day

















BUILDING BLOCK

As an example four building blocks are compared, two of them inside the Mokattam settlement and the other two in Manshiyat Naser. As a conclusion it can be said, that flats in Manshiyat Naser have more rooms and less people living in it. Still blocks in Manshiyat Naser consists of more flats on less residential density.



net. residential area	3429 m ²	5200 m ²	2263 m ²	2590m ²
no. of inhabited plots	21	23	18	22
no. of inhabited rooms	12	19	15	30
no. of inhabited flats	29	44	95	65
total of persons in the block	148	269	409	321
person per	3.00	4.79	3.07	3.00
persons per	5.10	6.11	4.31	4.94
<hr/>				
net.res density	0.04 per/m ²	0.05 per/m ²	0.15 per/m ²	0.12 per/m ²

The Zabaleen settlement has comparatively a low density, which is consistent with the pattern of development in this zone, where courtyard areas and ground floors are devoted to refuse recycling activities. An average flat consists of two rooms which is inhabited by five to six person.

Manshiyat Naser is among the densest and mature zones in the district. It was investigated that blocks along the Autostrad showed not more density than interior blocks, even though average building heights were much higher. An average flat consists of three to six rooms which are inhabited by four to five person.





„You don‘t [necessarily] see their money. Their money is their houses, cars, oven or refrigerator.“

Magda Gad, Mokattam General director A.P.E., 2010



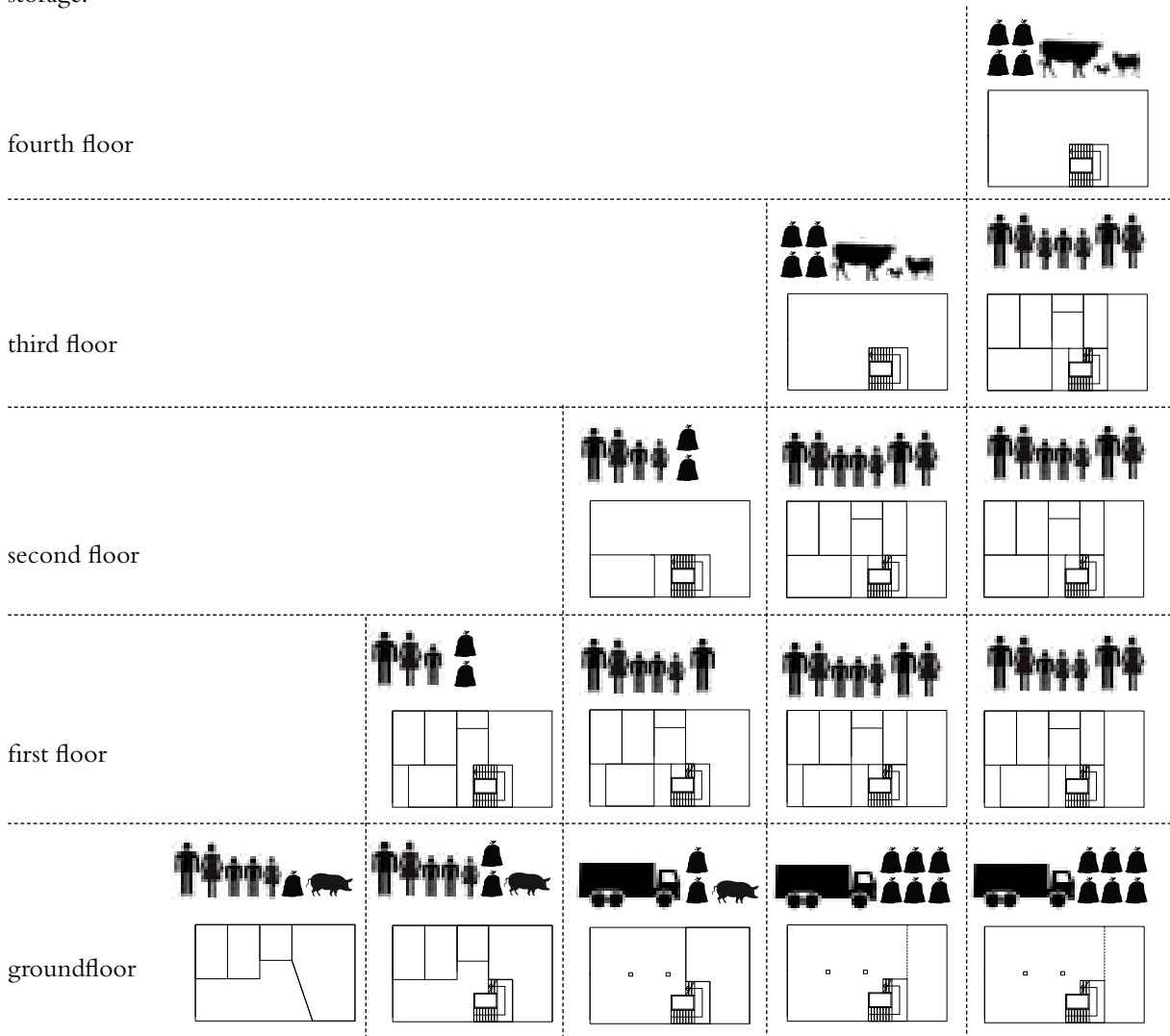






ARCHITECTURAL DEVELOPMENT

Over the years the floor plans were adapting to political, social and economic changes of settlement and decisions made by Cairo's government. This overview shows the evolution of the floor plans, from 1972 very basic structure with living and working on the same level, until 2010 strict separation of working, living and storage.



1972

Tin barrels nailed to irregular timber frame, very bad living conditions.

1985

World Bank, 1st upgrading programme to improve the living conditions. Adding a staircase to separate living.

1986

World Bank, 2nd upgrading program. Strict separation from living and working.

2009

Drama of swineflu, former pigsty are garbage storage. With every son rooms are added on the top.

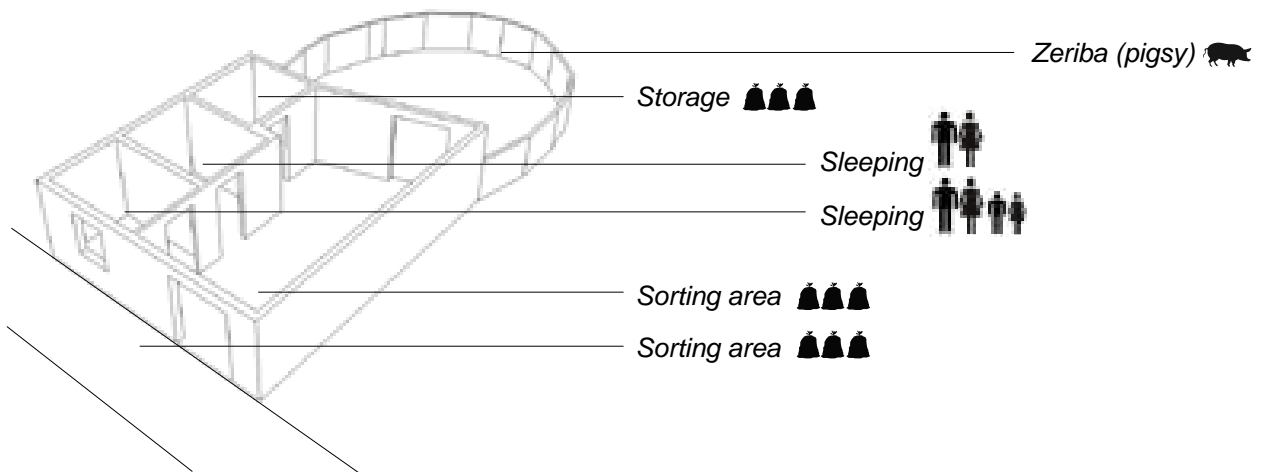
2010

Buildings increased to 4-7 stories, cattle are located on the roof. In every flats is a nuclear family.



HOUSING CONDITIONS 1972

All houses in the Zabaleen settlements are side to side, with no space in between. The entrance is from the street and animals, carts and people all pass through it into a courtyard. Part of the street in front of the house is used as an extension it as a working space. The entry passage leads to a courtyard which is used for cooking, laundry, storing of recycled materials, eating and guests. The rooms are to the front of the house, while the zeriba is at the back and occupies about 40 to 50 percent of the site.



Groundfloor



fig 20

fig 21



HOUSING CONDITIONS 1989

The World Bank's upgrading programme in 1989 implemented some changes to improve the living conditions. Due to shortage of space the living quarters were removed to the first floor and the work area stayed at the ground floor with a common entrance. This segregation was welcomed concerning the nature of work done by the Zabaleen. Staircases in the houses were inevitable to increase density vertically. In most cases, sewerage connections were not available so the toilet drained out into the zeriba. Balconies were established and with it the provision for a second floor.

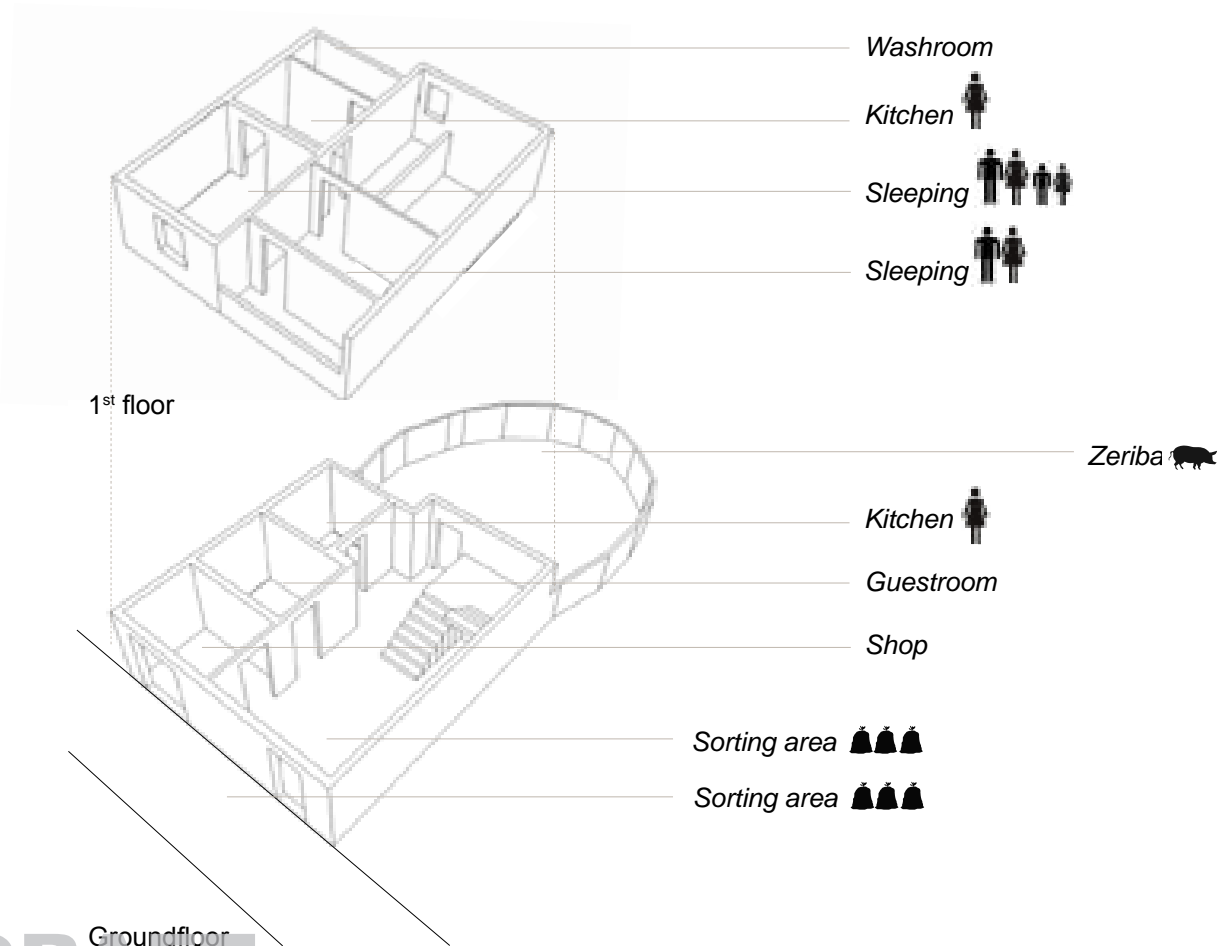




fig 22

fig 23



HOUSING CONDITIONS 2010

Today the separation of working and living is strictly performed. Business is taking place in the groundfloor, whereas living is spread over the upper floors. The groundfloor is an over height space of about 5 to 6 metres, used to park the truck and store some garbage. The former pigsty is now acting as a backyard and used for storage of garbage and recycled material. The house is inhabited by an expanded family, with each married son one floor or room is added on top. The roof serves as a storage for garbage or building for livestock.

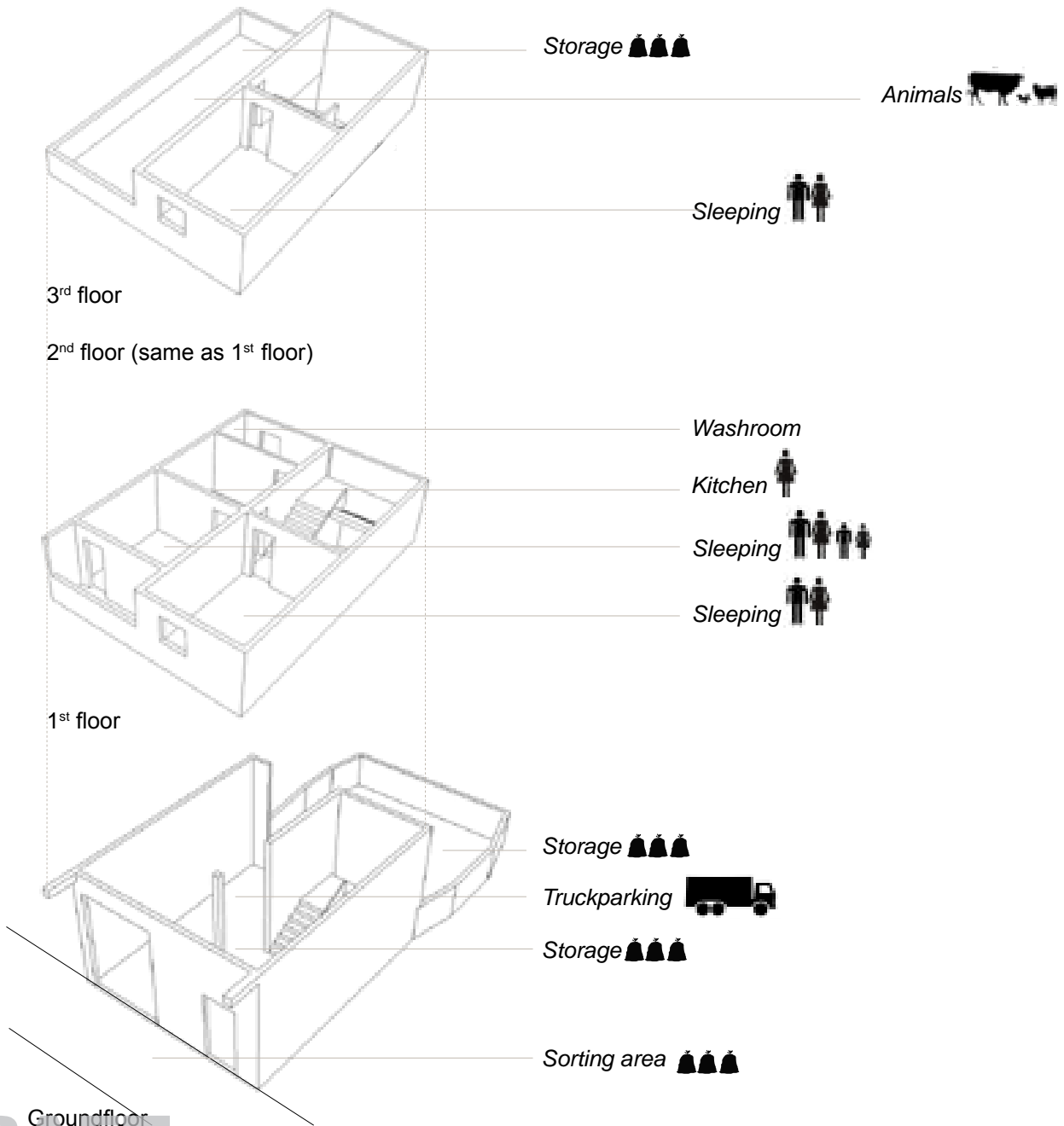




fig 24









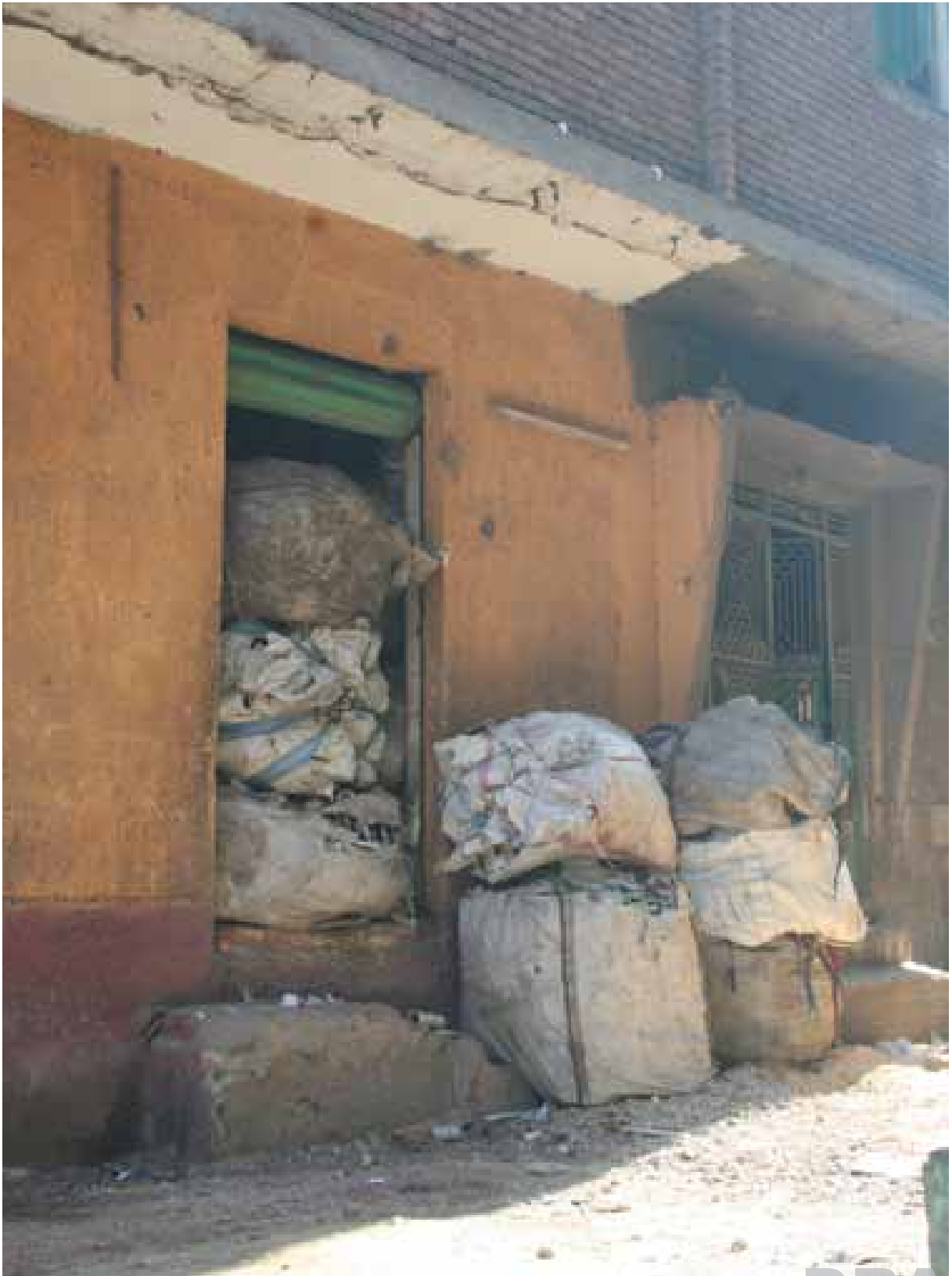




fig 25

fig 26



„We don‘t like attention. Rubbish is never attractive and we are quite happy carrying on quietly... but our work supports a whole industry that is virtually invisible to most people.”

Layla, Zabal, 2010

GARBAGE DREAMS 2009

A film by Mai Iskander who was the producer and director of Garbage Dreams. The movie follows three teenage boys born into trash trade and growing up in Mokattam settlement. Each of the boys is forced to make choices that will impact his future and the survival of his community.



It's my fate.

I had to start working in trash...

I feel inferior in people's eyes...





Can I really say „No‘, to God?...

...like the saying goes...

...,each one gets what is written.‘,



...when I was seven

...I've been thinking of leaving.

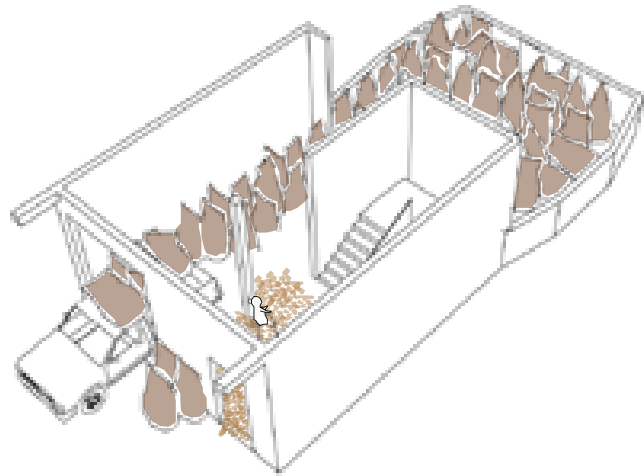
...GARBAGE DREAMS...



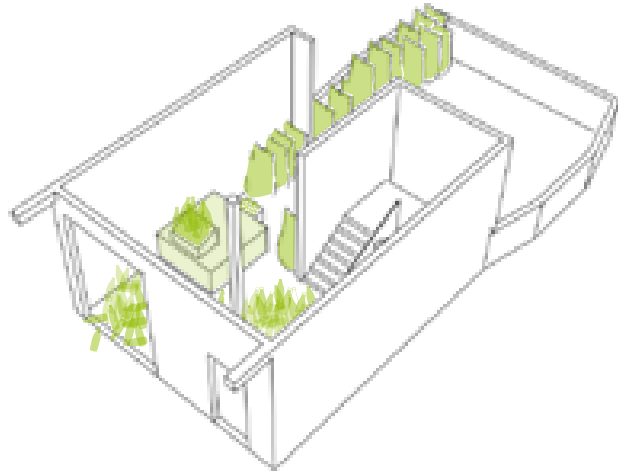


HOUSING TYPES

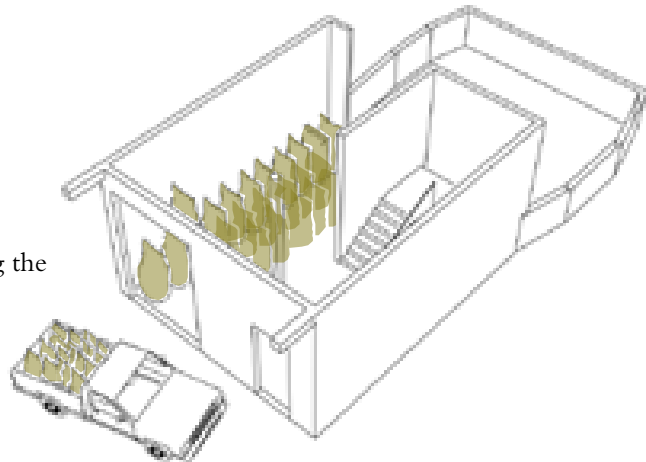
COLLECTORS / SORTERS HOUSE
ground floor as storage and sorting area

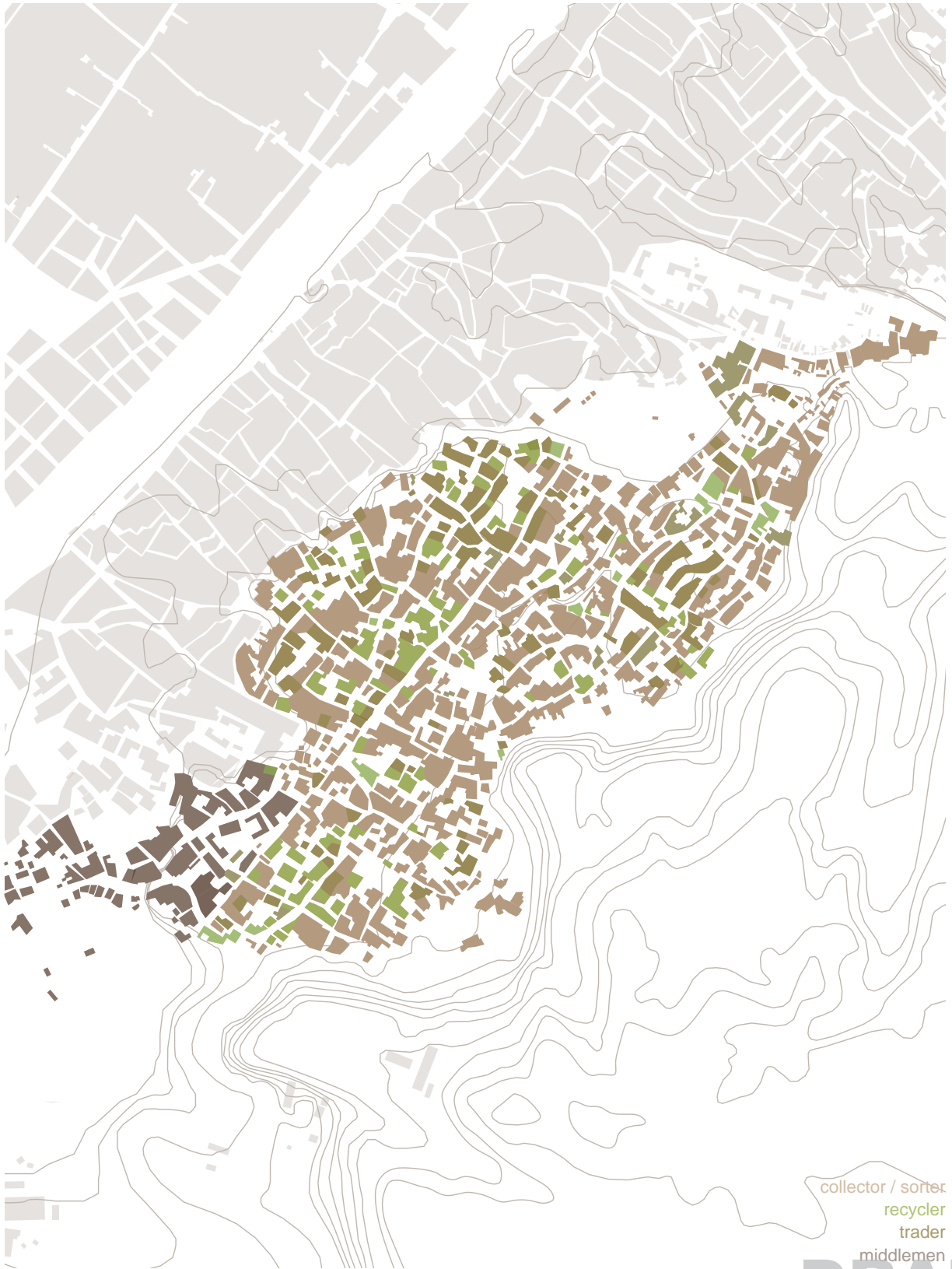


RECYCLERS HOUSE
ground floor as workshop for washing, cutting
or granulating the material



TRADERS HOUSE
ground floor as storage space before transporting the
material to the factory





collector / sorter
recycler
trader
middlemen

DRAFT
© ETH Studio Basel

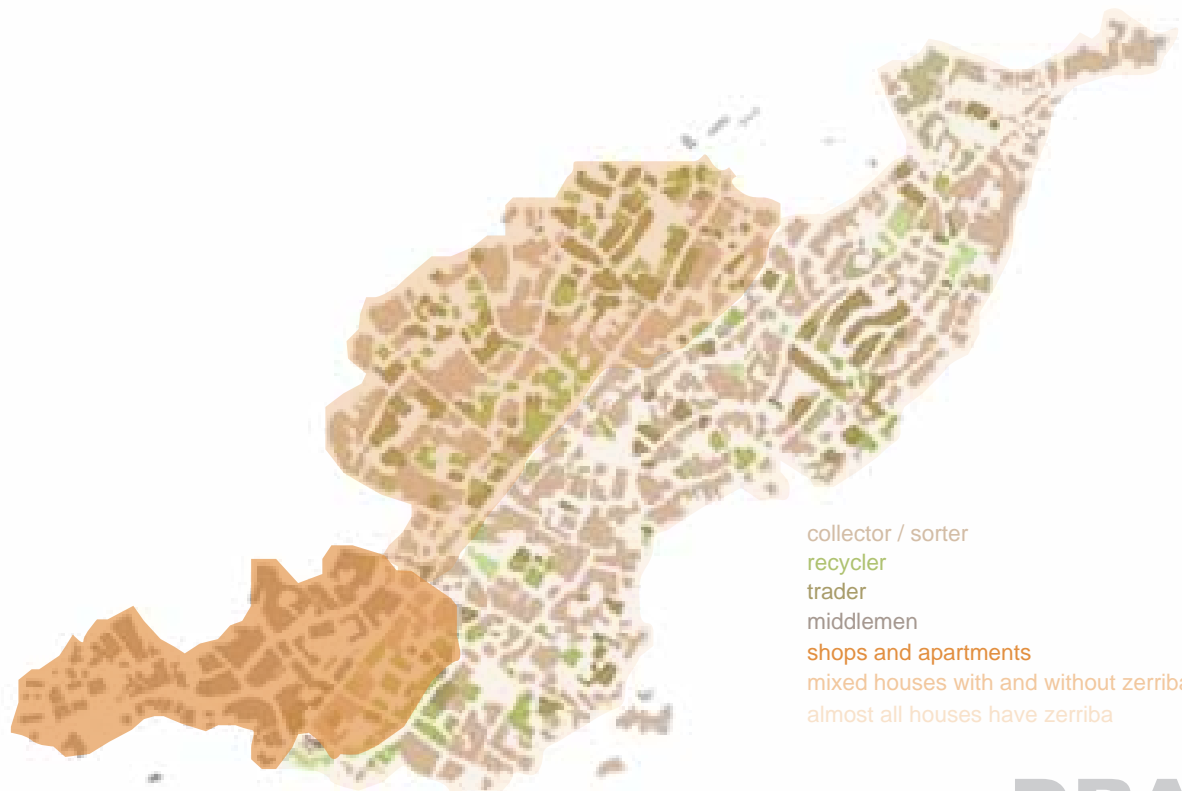
BUILDING CONDITIONS

BUILDING CONDITIONS IN MOKATTAM

Comparing the different building conditions of Mokattam it is obvious, that the closer the houses are situated to the mountain the poorer the building conditions are. A connection between the job of the people and their houses concerning the condition is not visible. Overlapping the different layers it is visible that people living on the el Mokattam street and in the southeast of the settlement are mainly involved in the recycling and trading business or are working as middlemen. At the border of the plateau towards the cliffs of Mokattam mountain people are predominantly living from collecting and sorting.

ZONING BY WORLD BANK 1981 OVERLAID WITH THE FUNCTIONS OF THE HOUSES

Putting the world bank zoning from 1981 on top of the building distribution of collectors, recyclers and trader, it is showed that the mentioned separation already existed in 1981. At that time the differentiation was done in having a zeriba [arab. pigsty] or not. As there were no zeriba existing in the southeast, it is clear that the people living there already had better jobs in the garbage business. Over the last 30 years they managed to improve their living conditions, as some of them drive a mercedes-benz today and own pretty nice houses.









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FUTURE DEVELOPMENT

DRAFT
© ETH Studio Basel

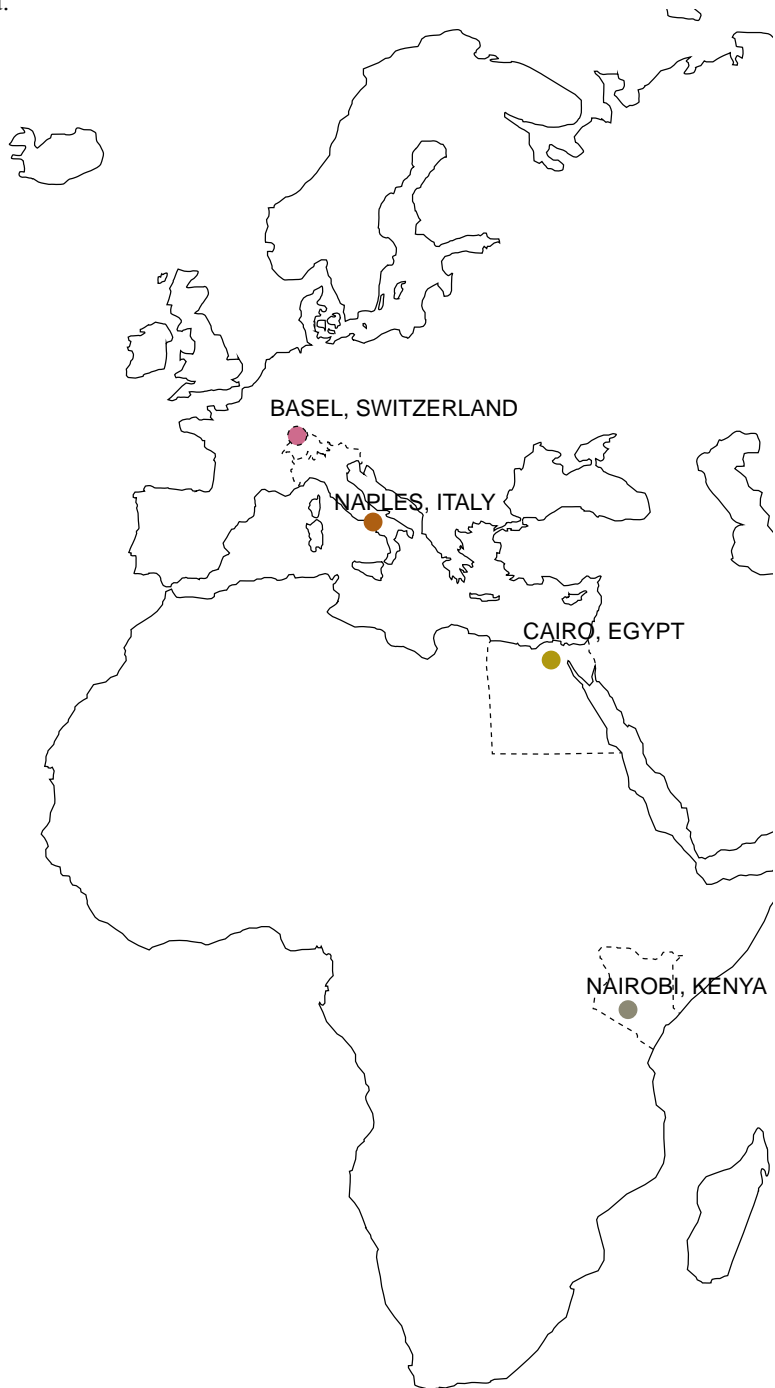


FUTURE DEVELOPMENT

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CASE STUDIES

Mokattam and its system of waste management looked at from a global point of view shows a clear uniqueness. In the following case studies Mokattam is compared with the waste management systems of Nairobi in Kenya, Naples in Italy and Basel in Switzerland.





CASE STUDIES

The four cities' waste management systems differ in many ways, from the position of the government to the way they recycle. They were chosen because of their uniqueness of dealing with the garbage disposal. From east Africa to the desert, from the Mediterranean over the Alps, each system reacts on a special local context and conditions.

CAIRO

The garbage disposal system in Cairo is predominantly managed by the Zabaleen community. Two disposal companies from Europe were introduced in the 2008 to deal with Cairo's waste. Obviously they can not handle the immense mass of waste in the city due to structural reasons, but also because they don't find people working for them. In reality most of the inhabitants of Cairo like the convenient system of Zabaleen picking up their household garbage at the door of their apartment. Apparently some of the Zabaleen are employed by the waste disposal companies, but the corporation is not working out.

NAIROBI

In Nairobi a municipal waste disposal system is working mainly in the high income neighbourhoods. The lower or middle income areas are not covered by the system. The garbage from Nairobi is brought to the only official dump site of Dandora. Around 2000 people live on this dump site and nearly 3000 people are working on it and living from it. There are several recycling businesses close to the dump site, but the urban poor living on the dump site are not involved into the recycling. They are searching for valuable things inside the garbage in order to sell them. The living and working conditions are among the worst worldwide.



fig 27



NAPLES

For years people and the public did not know what was going on in Naples waste management system. The mafia, called ‚Camorra‘ was in charge of the waste disposal. They transported toxic waste from companies in the north of the country to landfill in the region of Naples for good money. To depolluting the contaminated waste the mafia mixed it with Naples household waste. After a while the landfills were filled and due to demonstrations of the public it was impossible to build new composting plants. Partly the garbage is now exported to Germany, where it is burned.

fig 28



BASEL

Since long the system of household garbage bags is introduced in Europe. They were implemented to have a tax on garbage disposal. Empty bags are bought in the shop, e.g in Basel the ‚Bebbi sagg‘ and put to the street on days when garbage companies are collecting. The sorting process has to be done by the inhabitants before the waste is collected. Every household has to separate cans, PET, paper and cardboard. The sorted material is cumulated in collecting points and transported directly to a recycling factory. The household garbage is transported to a power plant, where it is burned .

fig 29

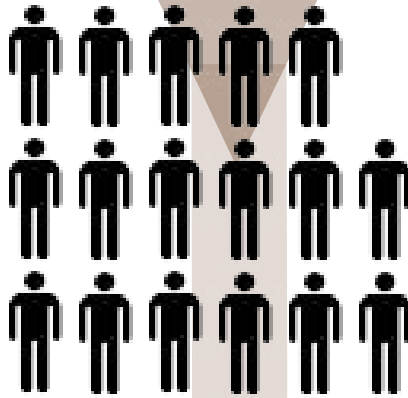


WASTE PRODUCTION

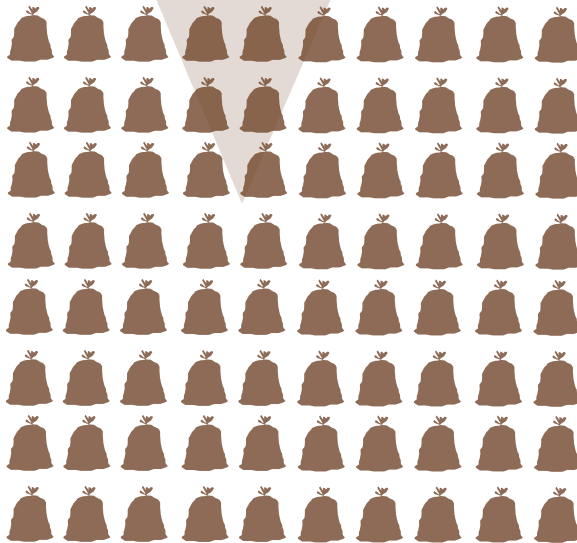
Cairo
greater region



17 000 000
inhabitants



0,80 kg / person / day



8 000 t household garbage / day

Nairobi



2 750 000
inhabitants

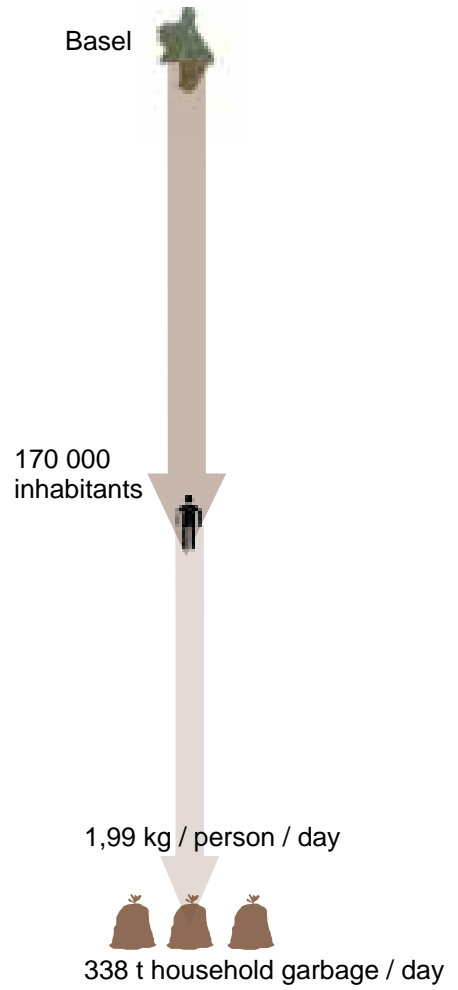
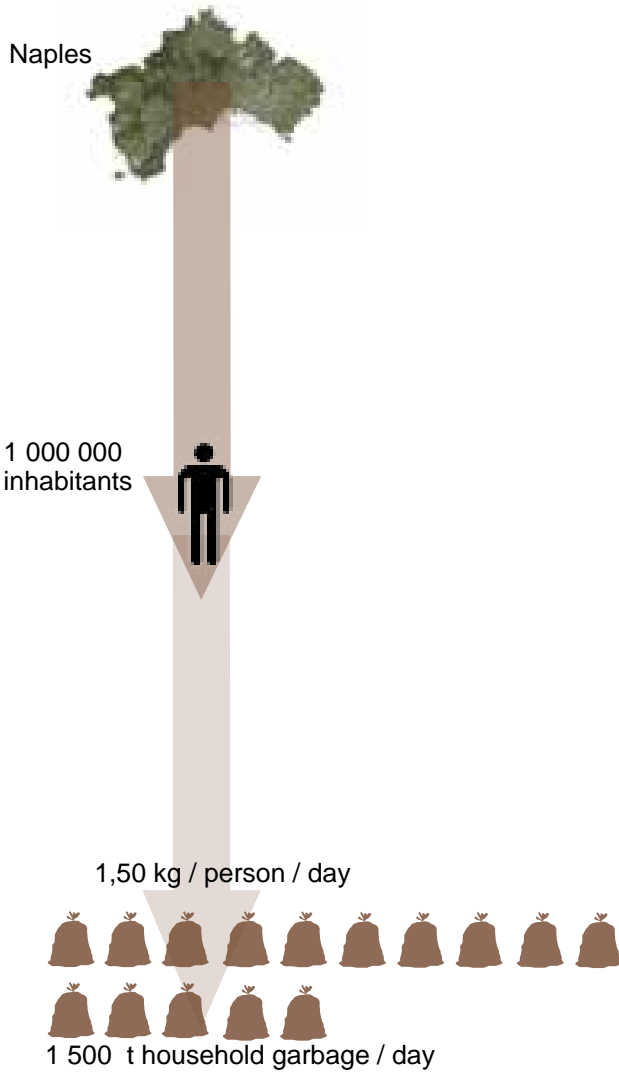


0,57 kg / person / day

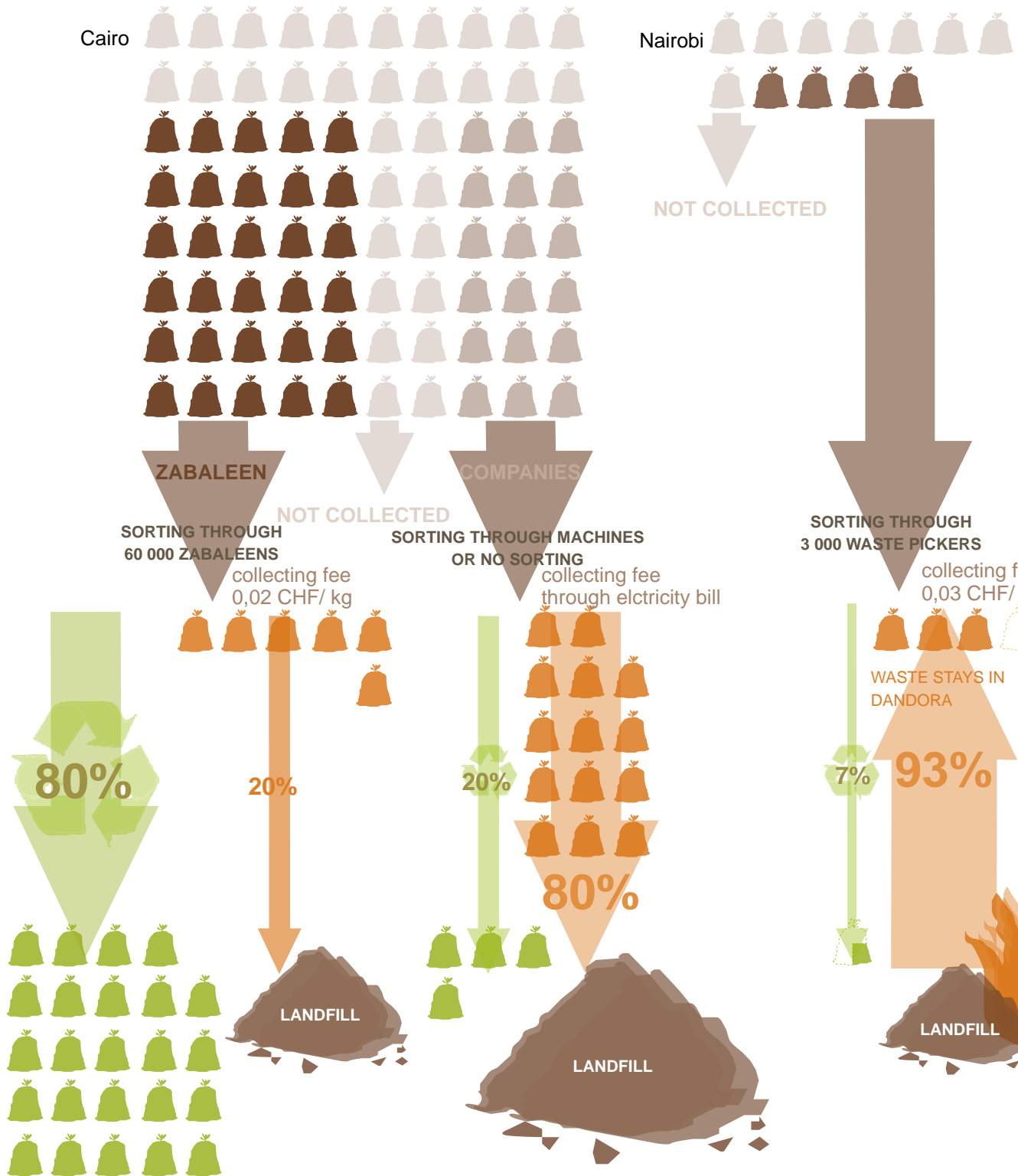


1 530 t household garbage / day

graph 23



WASTE DISPOSAL



graph 24



NO SORTING

SORTING THROUGH HOUSEHOLDS

collecting fee
0,24 CHF/ kg

260 PEOPLE WORKING
FOR THE CITY CLEANING

collecting fee
0,18 CHF/ kg



MIXED WITH
TOXIC WASTE

+ 100%



45%



DUE TO THE FACT THAT THERE ARE FULL NOW,
WASTE IS BROUGHT TO GERMANY

BURNING DOWN
THE WASTE TO
GET ENERGY FOR
HEATING, POWER,
ETC.



DRAFT

© ETH Studio Basel

„German courts have been dealing with an unusual problem. More than 100,000 tons of Italian trash were shipped to eastern Germany, saving a waste treatment plant from bankruptcy. But what could have been a solution to Naples notorious garbage crisis ran afoul of the law.“

„Der Spiegel“ (German magazine), 03.04.2010

NAPLES WASTE ISSUE

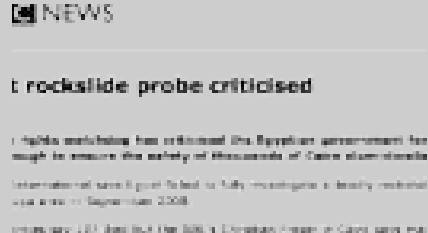
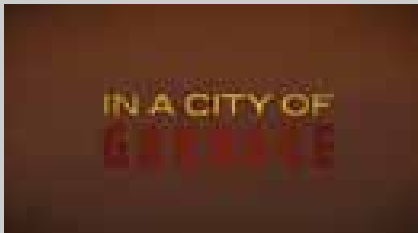
SPIEGEL TV [german TV documentary] 20.09.2008

Documentary and interview with the author of „Gomorrha“, Roberto Saviano



Naples waste problem is getting more and more international attention.

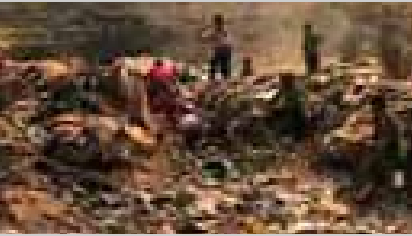
Italian Premier Romano Prodi has called in the Italian Army to help clearing of the streets.



Mafia control of waste disposal in the region has plagued efforts to resolve the crisis.

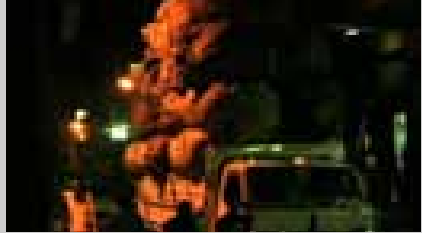
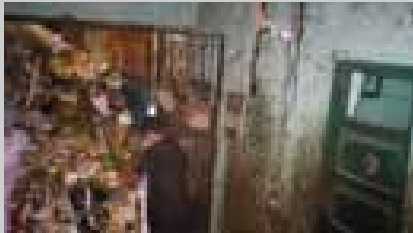
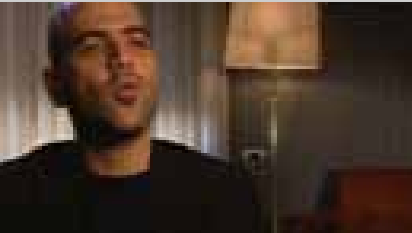
„...Police in riot gear confront a line of burning trash on a street in Naples...“





Calling in the army was only enough to clear the way for students to return to school.

Roberto Saviano talks about the connection between the Mafia and the waste management in Naples.



„...The crisis is not only confined to the city. Many of the towns in the Campania region have been affected..“

One clan earns around 600 million euros a year within the waste economy.

Since 1994 the EU paid 251 million € to Naples waste disposal companies in order to solve the lack of disposal.

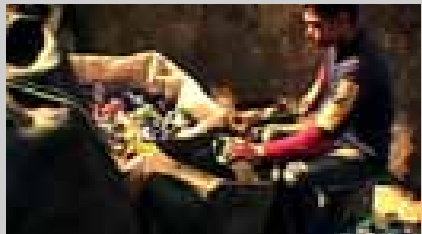




fig 31

COMPARING MOKATTAM - DANDORA

Comparing the inflows and outflows of garbage in the two settlements, Mokattam and Dandora, one might wonder where the waste disposed in Dandora stays. In fact most of the solid waste brought to the Dandora dump site is not going to be recycled, instead it is decomposed on site.

MOKATTAM- DANDORA

The similarity between the two settlements lies in the fact that the people working in Dandora, as well as people working in Mokattam belong to a social minority group as the Mungiki in Kenya or the Christians in Egypt. The social fabric found in Dandora shows that this social group of Mungiki people are controlling the whole waste economy.

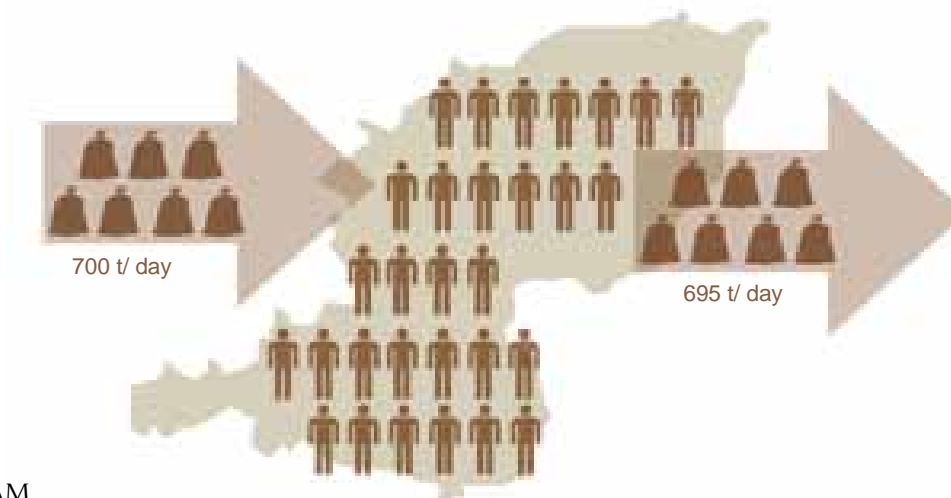
In Mokattam nothing of the garbage is left on site, even the residual waste is brought out of the area onto a dump site. Things are not as developed in Dandora, people do not recycle the garbage, the majority of it stays on site, which means the dump site is growing from day to day.

People of Mokattam have best ways to efficient recycling, which can not be found in Dandora. Connected recycling businesses are only found outside the dump site in Dandora. After sorting the garbage the waste pickers sell their gains to a complex network of recyclers outside the dump site. As the recycling economy is the only big money making economy within the solid waste management, its

impact on the area is huge. Due to the fact that the single waste business industries are separated in Dandora, the conditions on the dump site are very bad. What is shocking is that people living in Dandora actually are living on the same level as they work. They live surrounded by garbage. A water, electricity or sewage system does not exist. As the amount of garbage is increasing every day, their living conditions are getting worse.

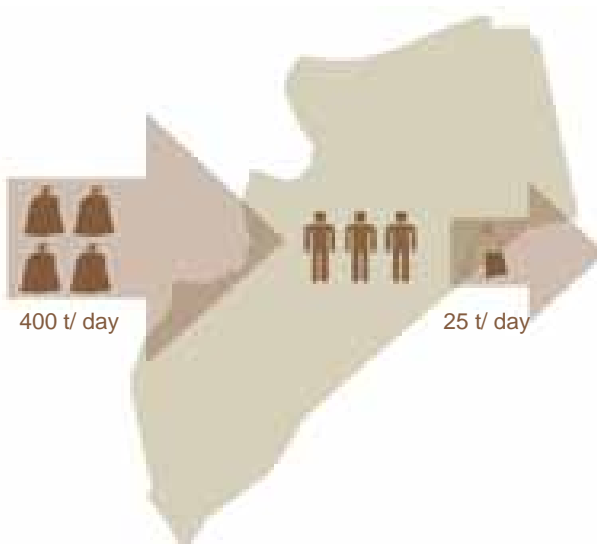
In comparison people in Mokattam work on the ground floor and live on the top floor. Within the last decades they managed to separate working and living areas and get rid of the residual waste, which is transported to the outside of the settlement.

The two systems were launched approximately at the same time. Whereas in Cairo people managed to transfer their settlement from a dump site into the biggest recycling hub of Africa, the dump site in Nairobi is steadily growing, causing serious problems for its inhabitants.



MOKATTAM

area: 0,26 sqkm
population: 3 000 people
density: 11 500 p/sqkm



DANDORA

area: 0,25 sqkm
population: 30 000 people
density: 120 000 p/sqkm

100 t 

1000 people 

COMPARING MOKATTAM - BASEL

By analysing the different waste management systems, it is interesting to see that the garbage collectors in a mega city of a north African country work more efficient than a waste disposal company in Basel. People from Europe, especially Switzerland, Austria or Germany often think they are leaders in recycling, but apparently they are wrong.

MOKATTAM- BASEL

Basel, a city in a country where green energy, recycling and a lot of other ecological aspects are getting more and more important in the daily life, lies far behind the system of the Zabaleen when it comes to the recycling rates of the municipal household waste. The Swiss waste management companies succeed in recycle up to 55% of the household waste, whereas the Zabaleen reach 80%.

The reason of the different recycling numbers is the motivation behind it. In European countries and cities like Basel waste is recycled in order to save resources and to keep the environment clean. The employees of the waste disposal companies, the government and other persons involved in the garbage business do get their monthly salary whether they managed to recycle 40 percent or 80 percent. The motivation of people might be one reason together with the capability of the machinery, why the recycling is not that efficient.

Naples is also different in the European context. Here the money is made by disposing as much garbage as possible with a low price for doing so and charging a

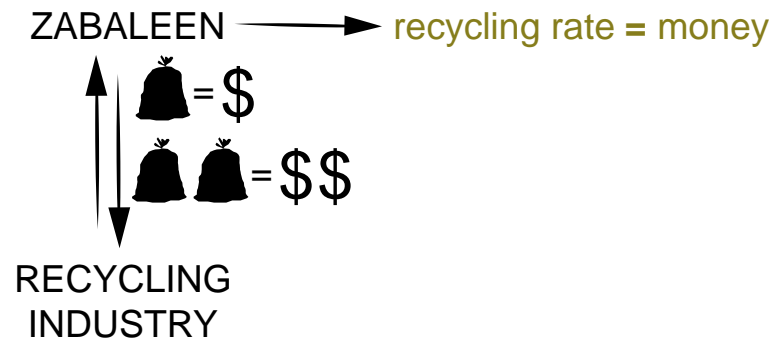
high price to the customer. The people involved into that kind of system only care about money, not about any ecological or environmental issue.

In Cairo the idea is recycling for a living. The Zabaleen do not have any other income despite to sell sorted or recycled garbage. The more amount of garbage they are able to recycle, the higher their monthly income is. This is their main motivation to collect and to recycle the waste of a whole city.

People in third world countries are profiting from the lack of a governmental waste management system. The informal overtakes the garbage business and it is today a job generating industry in many countries around the world.

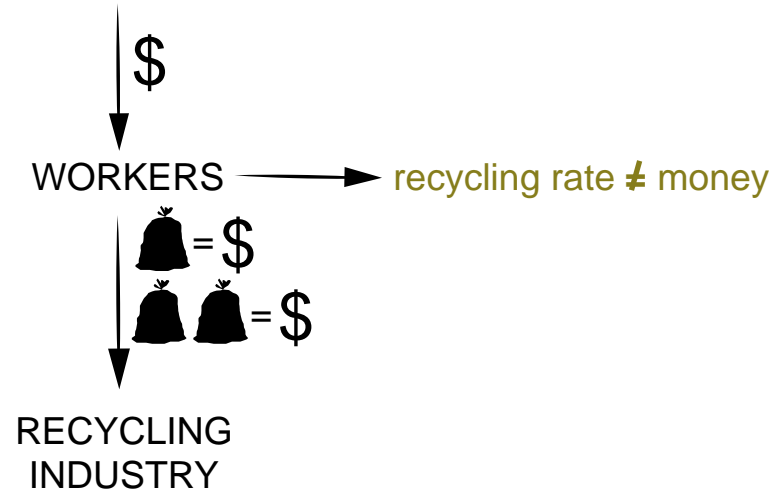
PAYMENT SYSTEM
IN CAIRO

COMPANIES



PAYMENT SYSTEM
IN BASEL

COMPANIES



INTEGRATING THE ZABALEEN

Over the last decades it was the government who steadily implemented new rules or restrictions. It was the Zabaleen community who had to react onto these regulations. The diagram shows the action, reaction from 1940 until 2010.

Cairo

Cairo generates garbage

The city grew to a population of 6'000'000.

The government changed rules demanding mechanized transport of garbage

The city grew to 14'000'000 inhabitants, more garbage was produced. Cairo introduced private sector companies to collect.

Due to swine flu the government instructed to kill 30'000 pigs

The city operated a mixed solid waste management system with four to five institutionalize set-ups.

HOW WILL THE CITY RESPOND TO THE ZABALEEN?

Zabaleen

They collect garbage on donkey-pulled carts, sort, recover, trade the garbage and raised animals.

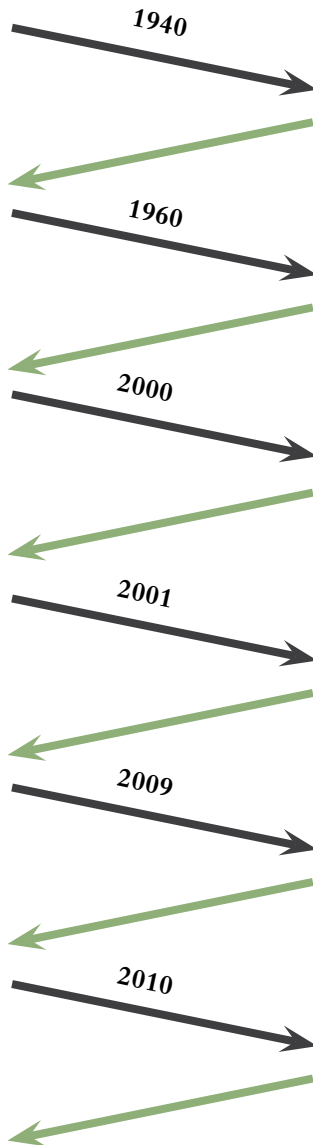
Expanded their service, organized and instituationalized through NGO's.

They adapted their transportation strategies to comply with the new rules, they made the driver license and bought association trucks.

They implemented institutualize waste management practices and upgraded technologies with help of NGO's.

Zabaleens lost their main income source. They consequently refused to collect organic waste.

Non-organic waste is transported to Qattameya for composting, by small and medium enterprises.



The analysis of the action-reaction diagram makes clear, its about time Cairo and the governments starts to react. There is a mutual dependency of the Zabaleen and Cairo, which was neglected over the last decades by the government.

There are several reasons why the preservation and supporting of the Zabaleen garbage system is necessary. Their recycling efficiency is exemplary and unique in a global term of view. It is a favourable way of waste disposal and reusing of recycled material. The system is a job generating industry and when expanding it would allow to engage even more people. The Zabaleen's waste management system is well seen by Cairo's inhabitants and therefore exonerates the government with providing this service.

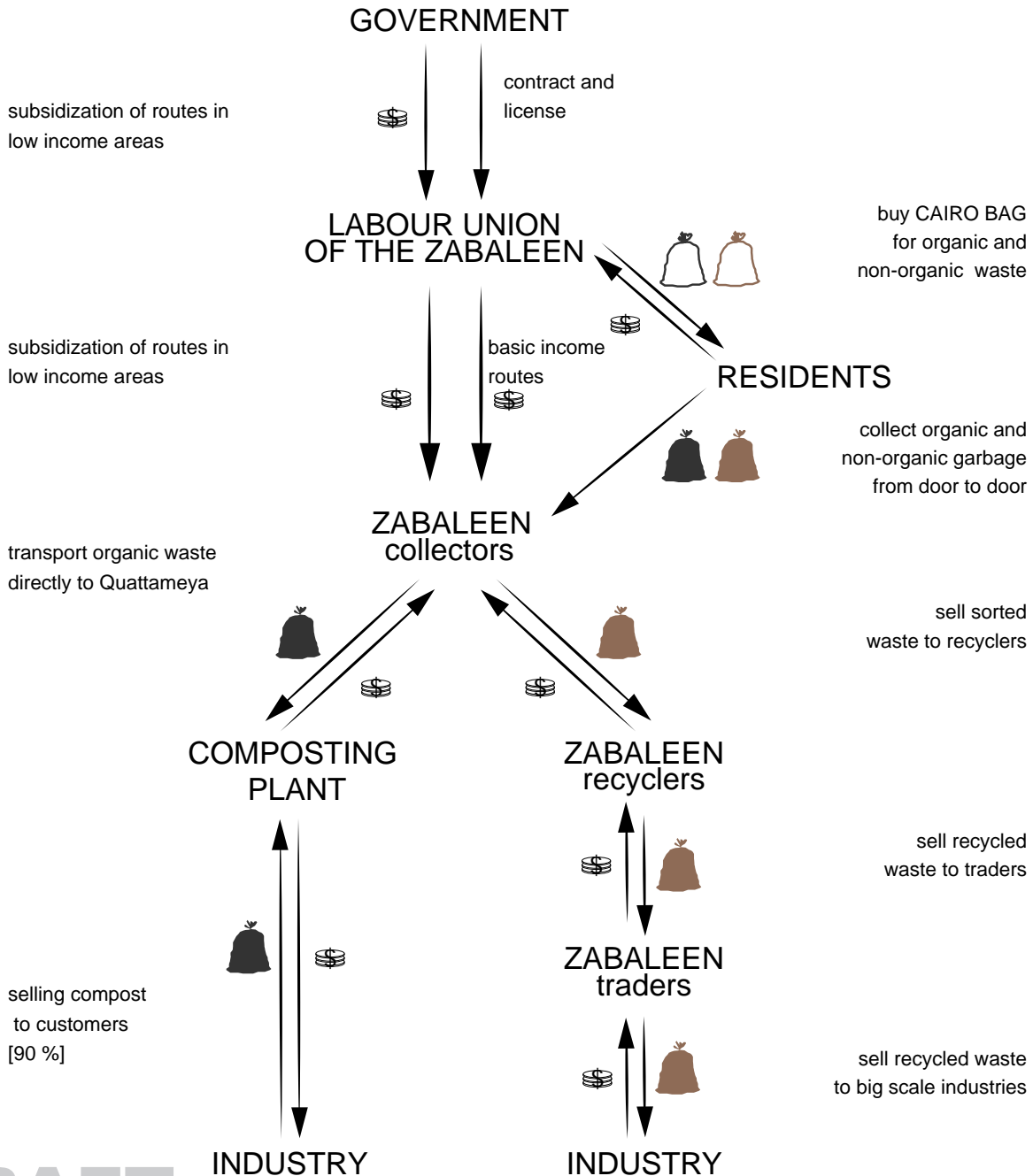
Still the Zabaleen garbage system has to be modernized and first of all legalized. The form of a privatized garbage system in the hand of the Zabaleen works very well but has to be officially approved by the authorities. The system has to become reasonable for the actors, situations of unhealthy working conditions have to vanish. Simultaneously the system

has to be expanded to cover all areas of Cairo. The coordination of the distribution of the routes has to be managed by a Zabaleen labour union. It is them who are in charge of debating with the government about licenses and contracts. The income system, of making more money out of more recycling, has to be maintained at all costs. Because this is the clue of the high recycling rates of the community. They have to make a living from selling garbage and not earning directly through collecting. To avoid competition the government should pay compensation for routes in low income areas, where garbage is of lower quality to be reused. In the future it will be inevitable to have the residents sort organic from non-organic waste. This means saving energy and time for the sorters to improve their working conditions and have them be even more efficient.

As a solution from the stated points, a new garbage system is proposed which integrates the Zabaleen into an official system without destroying the hierarchy and tradition of their long lasting waste recycling management.

PROPOSAL FOR A NEW SYSTEM

With the enormous growth of the city, the garbage rate will increase rapidly and adequate system is needed. The following diagram tries to integrate the Zabaleen into an official and legal waste management system. It is necessary to establish a labour union for the Zabaleen who debates with the government about contracts and licenses. The idea of earning money with selling recycled material should be maintained to preserve the high recycling rates. But residents should presort the waste into organic and non-organic to save time and energy of the Zabaleen





„I realized they work long into the night to clean up after us - the modern, industrialized world. Beyond that, by creating the world’s most effective resource recovery system they are actually saving our earth. From out of trash, they lifted themselves out of poverty and have a solution to the world’s most pressing crisis.“

Mia Iskander, director and producer of „Garbage Dreams“, 2010



APPENDIX

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