

PROLOGUE

"Architecture is a science, arising out of many other sciences, and adorned with much and varied learning: by the help of which a judgement is formed of those works which are a result of other arts." (Vitruvius)

The word *architecture* is derived from both the Latin and Greek word "*architectura*" and "*arkhietecton*" respectively. From this the word architect was derived which means 'master builder'.

Architecture is a science and the art of designing and constructing not only buildings but of a whole environment. An architect designs from a micro level of the building construction details and space, to the macro level where the building integrates itself with its surroundings.

The architect constantly strives to create or design by the taking into account mass, space, volume, texture, light, shadow, materials, program, cost, construction and technology. Thus, the final product of design can be experienced through the senses, by time sequences where spaces are subject change.

+Introduction-Global Urban Growth

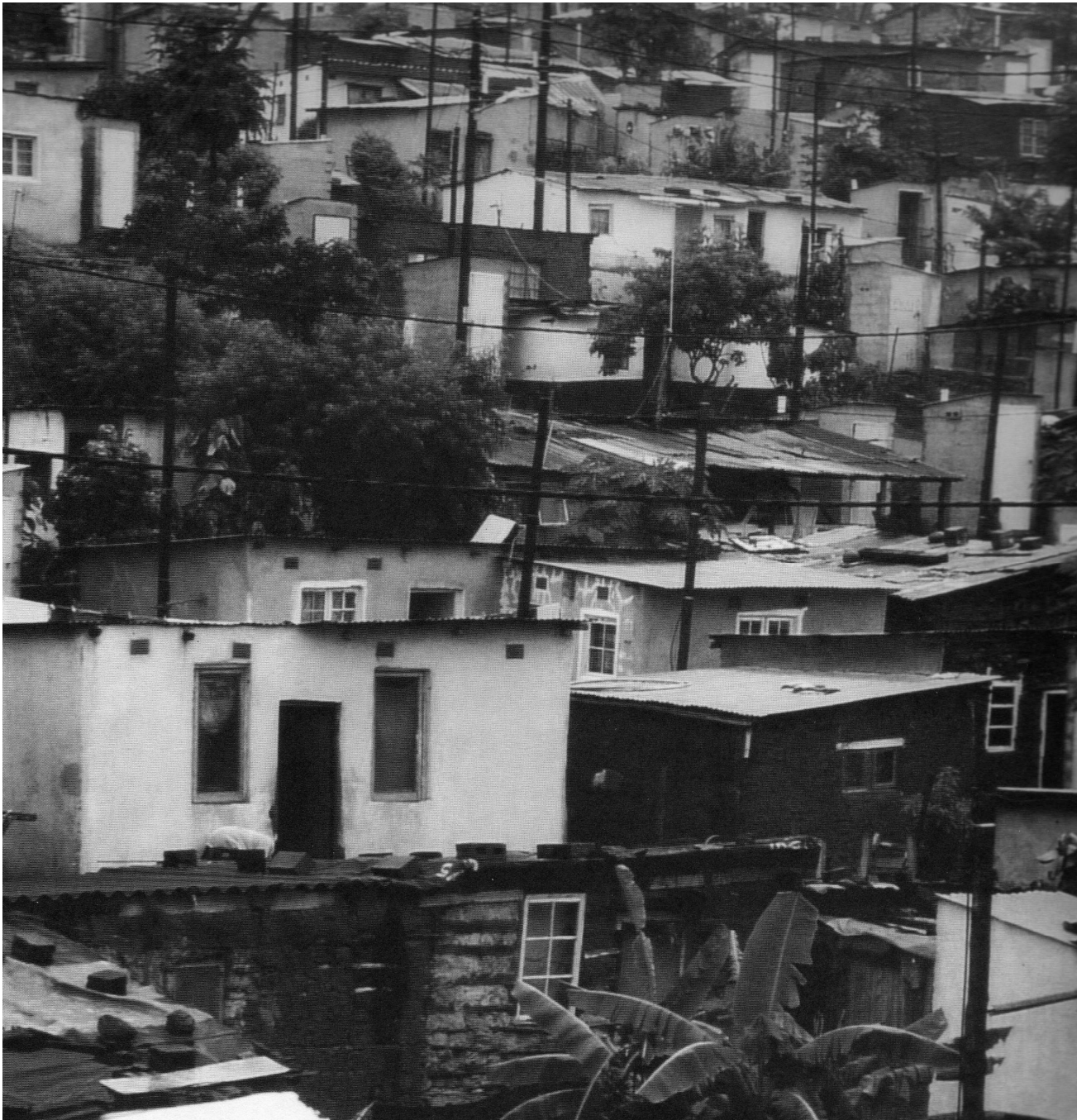
+ Proposition

+ Motivation

+ Johannesburg

PERMACUL[TEC]TURE growing for the future

Creating an intervention for the rapid new urban migration of the inner city of Johannesburg



South African Informal Housing
Photograph: Tilman *et al.*, (1997:2)

Introduction – Global Urban Growth

Cities around the world are expanding vertically as well as horizontally. With more and more people coming into the city everyday, we see the increasing value of land space as well as living spaces.

“In 2010 about 50% of the Chinese population will reside in cities. This huge migration from rural regions to megalopolises will create a dramatic cultural and social crisis, with a loss of existing traditions and significant unemployment. Massive urbanizations will form random communities, severely deplete natural resources, exhaust urban infrastructures and transportation systems, and will increase air and soil pollution.”

(<http://www.knafoklimor.co.il/living-steel/text.html>)

Thus, urban migrations is a current global trend which is beginning to have an enormous impact worldwide.

“The condition of the urban environment and how it is managed and used by its inhabitants are fundamental to human health and wellbeing. Many of the problems in cities today relate to poor residential and other environment, poverty, inequity, pollution, unemployment, lack of access to jobs, goods and services.” (Barton, 2000:1)

Many migrants who come into the city find it difficult to live in the city, since finding economical accommodation is often hard. Those that do find a place to stay are places of illegal housing and even squatting, which frequently implies poor living conditions with poor unmanaged facilities.

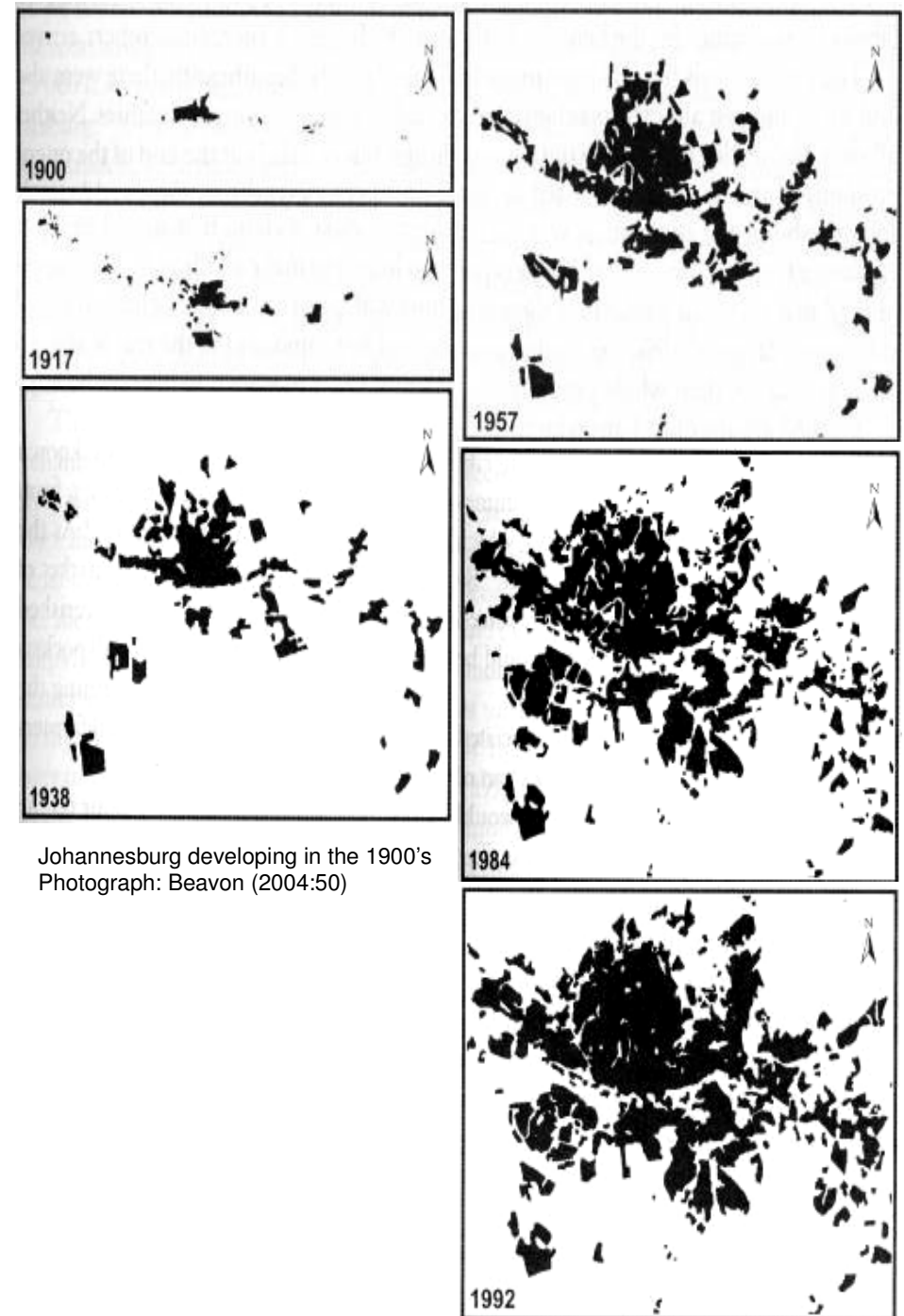
In addition, these migrants find it hard to find jobs and as a result there is also the concern of malnutrition. By reviewing the possibility of optimising land use for agriculture, multiple level farming, and low cost accommodations, this will hopefully alleviate rising food costs and hunger, poor living conditions and unemployment.

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Though there are a number of Non Government Organisations (NGO) which aim to help alleviate these migrants by providing more habitable spaces, these housing schemes still require rental costs. Since these migrants are unable to find work, they are also unable to pay for rent and therefore cannot afford to live in decent living quarters.

“The prevalence of the medical model of health, which focuses on the individual and the treatment of illness and dominated the latter part of the twentieth century, is beginning to shift to the social model, in which health is the result of a series of socioeconomic, cultural and environmental factors, housing condition, employment and community.”
(Barton, 2000:10)

In the past year food and petrol prices have increased, and the rand has depreciated, thus the plight of rising food costs and the need to provide for work has become the motivating force for this thesis. This thesis, therefore, will aim to combine these two issues for **job creation, food production, accommodation** and **skills training** the lack thereof.



Johannesburg developing in the 1900's
Photograph: Beavon (2004:50)

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Chapter 1 illustrates the reality of city growth on a global scale as well as at a local scale. It highlights the plight of increasing urban populations in the city as well as the exhaustion of natural resources. With Johannesburg being the location for such a project, the economic context along with population ratio of those coming into the city on a monthly basis should be reason enough to warrant such an exploration of incorporating agriculture intrinsically with architecture.

Chapter 2 looks at the main concept of space more thoroughly and the extent with which it has an impact on architecture. Taking the idea further, the author will find the relation between space and the urban concept of Network Societies which may inform the functions of a community. By utilising this in a synergetic manner by means of permaculture where one looks at integrating agriculture into the city both on a social as well as architectural level. The two main types of agriculture which will be explored further is hydroponics and aeroponics.

Chapter 3 takes into account precedent case studies of various housing and sustainable developments, and will analyse their solutions and shortcomings. This will better inform the design of the thesis. The aim is to ascertain the functional success of various schemes in dealing with quality of life and the spaces utilised. Other case studies aim to look at examples of urban agriculture projects by analysis the technology involved at production agriculture in an urban environment and the various types of agriculture which would make the project more feasible.

Chapter 4 is a site analysis of various sites around Johannesburg which would make this thesis appropriate in the given urban landscape. One particular site is located in Marshaltown. In it, the author looks at the existing urban form and usage with the architecture found there and how that language may be carried across; the everyday lives of the people in and around the site; as well as the spaces and how they are utilised. In addition, the movement of people and cars which may inform the accessibility of the site within close proximity to other facilities.

Chapter 5 is the design brief, programme and concept of the intervention. The breakdown of the project by way of a schedule gives a better understanding of the building usage and operation. A design development of the thesis project will show the progression of the design from its first inception to the final product along with a critique of the various decisions taken along the way.

Chapter 6 is a reference of sources which has made this research project possible.

Chapter 7 is the appendix which contains presentation posters of the thesis as well as an article for the Star newspaper about the regeneration of Johannesburg.

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Proposition

“Quality of life” and “urban regeneration” is the crux of this thesis. An interest in the way in which space and people interact and how they relate inspired an investigation of urban agriculture. The aim is to give rural people who are migrating into the city, a place, (through the proposal) of a communal farming and a housing model.

Agriculture, more specifically the various types of agriculture along with permaculture and how is it integrated with architecture will be the driving force with which to explore the idea of urban regeneration and improved quality of life. The use of spaces and how these spaces become spaces of production in terms of maximising areas for local vegetative farming will become important to the program.

This thesis began with an interest in equality for all, whereby many of the less fortunate who were ‘promised’ RDP housing for over a decade now, are still waiting for their subsidised homes.

“Quality of life” is a concept which began in the late 1960’s according to Proshansky (Frick *et al.*, 1986). Although “quality of urban life” has different connotations to researchers of different fields but more importantly, it has a common general meaning that underlies all the more precise or specific uses of the term. “Quality of urban life is always concerned with whether people live well or poorly. Is life easy or hard? Are people satisfied or dissatisfied? Does the city help them realize their purposes and desires, or does it thwart them?” (Frick *et al.*, 1986:20)

It has emphasis on adequate services for those who live in the city, to concerns with economic matters including employment, income, and future economic development, to concerns with the level of satisfaction, or family life and other social interactions.

We see the effect the urban environment plays on one’s health and ultimately how it may affect the quality of life for city residents.

The quality of urban life has an objective and a subjective aspect.

Objectively, it can be measured by the level of physical and mental health enjoyed by the inhabitants of an area. The absence of it, or the fact that it is threatened, can be measured by the extent of the social disintegration connected with long-term residence in a city or a neighbourhood.

Subjectively, the quality of urban life, its presence or its absence, is measured by the sum of the perceptions and experiences of those who live in, work in and visit a city or a neighbourhood and the judgements resulting from these perceptions and experiences.

The objective and subjective perspectives can, but not necessarily, accord with one another. The subjective opinions of the inhabitants may be systematically wrong. Apart from this, the quality of urban life in its social, physical, and ecological dimension is experienced in different environments and is displayed on varying social and spatial levels. (Frick *et al.*, 1986: 2)

As stated before, the main themes of “Quality of life” and “space” are the driving motivation for this thesis. Quality of life relies on the close co-operation between the social and engineering sciences. Spaces, more specifically, productive spaces - that are used productively to ensure that such a project is feasible.

This thesis will explore this concept through a number of ways, namely: interviews with various people in order to establish a client; case studies which illustrate various approaches and thought behind designs; and exploration of relevant issues.

To make the transition toward a sustainable society, it is imperative that we take responsibility for our own lives and meet our basic needs for food, shelter, energy, gainful employment, and supportive community.

The architectural intervention is to be an urban agriculture centre which comprises of 2 main components:

- Training or skills development facility** for educating on agriculture,
- Living typology-** apartments which addresses the need for accommodation.

This with much needed land makes for a urban agriculture farming model which will address the need for locally grown foods with costs of living increasing.

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Motivation :City migration - a global effect

"Modern metropolises are born from the combination between material power and cultural creativity. By definition, a modern metropolis is a cosmopolitan entity. It is mainly characterised by its hospitality towards foreigners and its opening to the world in general. It is the place where all differences mix together, whether ethnic, racial or religious" (Bremner, 2004:13)

Bremner speaks of cities which take shape from the a variety of factors which allows it to be moulded to what it is today. These factors, both of human nature and the urban environment gives a place an identity which is unique to itself. Today, as cities grow, we begin to see a language of identity which takes place and a manner in which spaces are used.

Cities and society have developed and flourished in an almost symbiotic manner. They often physically dominate their surroundings and exert immense influence over all spheres of human endeavour. They provide diverse functions i.e.: market places, theatrical stage, place of executions... in fact, cities have been the backdrop for much human activity.

"At present, more than half the world's people live in cities, town or villages. This is a remarkable change from the 1900 when 90% of the worlds population lived in rural areas. This shift shows that economic activity is changing, fewer and fewer people make their living from the land. It also signals a need to rethink the way urban settlements are managed." (Habitat 2, 1996: 9)

The report by the united nation in 2004 on City growth and development has shown some alarming statistics. 1950, 30% of people were living in urban areas, in 2003, that number had increase to 50%, and it is predicted that by 2030, 60% of population will be living in urban areas.

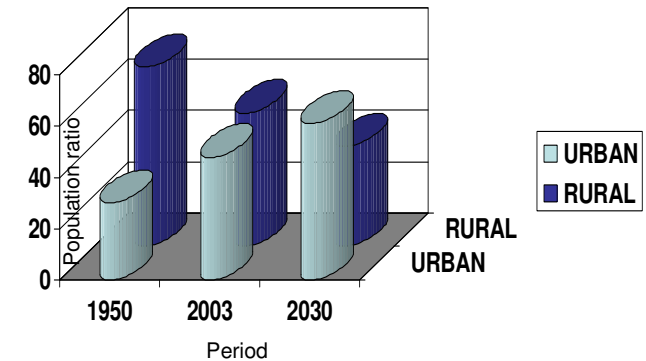
"It is expected that 60% of the worlds population will be living in cities by 2030, and more than 80% by 2050" (SA Hunter July, 2008:77). Similarly, according to city planners held recently in Johannesburg at the Planning Africa Conference, worldwide populations are expected to double within ten to fifteen years. (www.news24.com)

In the past few decades, environmental and social consequences of concentrated patterns of human activity in an environment have suggested that present living arrangements in western cities are unsustainable.

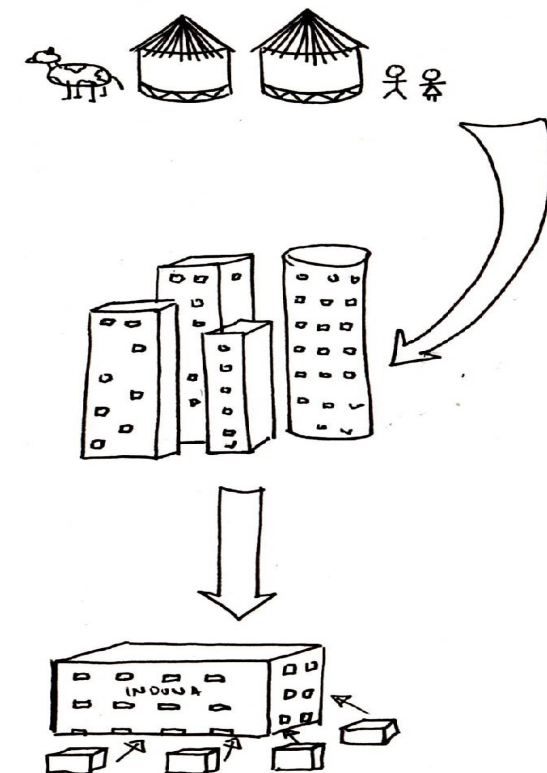
A fragile eco-system

We see more people, particularly those who are rely on transportation to get to work having to buy, rent spaces within close proximity to their workplace.

This increase in more people seeking to find accommodation in the city along with the constant increase on food costs and transportation costs (due to rising oil costs).



Urban population growth versus rural.
Adapted from United Nations report



Migration of people from rural to cities
(Author's own)

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“A city is a accumulation of a diversity of social capital. The accumulation is important. It is a matter of scale effect, i.e. of size. No city is a real city unless it can support an opera house, a honky-tonk amusement area, an East Village of Haight Ashbury, factories, collages, a spectrum of churches and temples, folk dancing in style of Greece, Spain and Israel, adult courses in pottery, baking and Sanskrit. I don't want all of these things for myself, no one does. Not all of them for an individual. But unless they are available, unless you can find a place to get a meal at four in the morning or buy an out of print book, then it is not a city; it is only a huddling place for a lot of people.”
-Frederik Pohl (Poplak, 1982:1)

The above extract highlights the need of facilities in a city to provide for choice for the individual. It represents an individuals wants and not just needs and allows for personal choice. This should be a way in which the programme is thought out. Not to provide for what is required immediately but to allow for future choice of the individual.

It is estimated that, because of human population growth alone, and therefore discounting the shortages of food because of biofuel production, by 2050 the equivalent of an additional 10 billion ha of land (as large as Brazil will be required to produce enough food for the world with conventional farming methods.



Johannesburg CBD
Photograph: Preston (2006:75)

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“As urban areas grow in population, they expand outward, often overwhelming the natural environment, destroying ecosystems, and drawing resources from well beyond their defined limits. Cities' dependence on massive and relentless imports of food, energy, and other resources from distant areas, and often on exports of their wastes to those areas, can also be destructive.” (Growing better cities: 2008:5)

Thus, as cities are increasing in size across the globe, they are faced with a number of challenges as a result of more people coming from rural areas to the city.

These include:-

- Insufficient job creation
- Basic services i.e. drinking water
- Sanitation.
- Health services.
- Education.
- Planning and maintaining of green spaces.
- Managing urban waste

It is because of this, that cities are the main territories for interventions and planning strategies aimed at getting rid of hunger, poverty and improve livelihoods.

One such a strategy is Urban Agriculture.

Advantages:

- Provide food security and income: it plays a significant role in providing a measure of food security and income for a rapidly increasing urban population.
- Create stronger local economies by creating jobs: localized food production in urban areas create stronger local communities by creating jobs. Researchers indicate that unemployed populations in large cities and suburban towns would decrease if put to work by local food movements.

• Meagre income:→ Food grown

• Energy efficiency: the current industrial agriculture system is accountable for high energy costs for the transportation of foods. The energy used to transport food would be greatly decreased if urban agriculture could provide cities with locally grown food.

• Quality of food: urban agriculture supports a more sustainable production of the food that tries to decrease the use of pesticides. This also eliminates the need for preservatives, as their products do not need to travel long distances.

Urban agriculture alone will not solve the ecological problems of growing cities, but it does help to protect the environment in a variety of ways. For example, in many cities urban farmers make productive use of many organic waste products, turning them into soil-enhancing mulch, and also using greywater to irrigate crops.

By cultivating every available piece of open space — even rooftops — urban farmers contribute to the greening of the city, helping to reduce pollution and improve air quality. Even the fact that less food has to be trucked in to the city contributes to sustainability and has a positive environmental impact. Urban agriculture helps to reduce a city's ecological footprint even as the city continues to grow (Nelson, 1996).

Coupled with an improved environment, is an overall improvement in the health of the urban population. A more liveable city is a healthier city. For the urban poor in particular, the availability of fresh vegetables and other foods coupled with increased opportunities for income means improved overall health, and perhaps the opportunity to break out of the cycle of poverty. (Growing better cities : 2008:5)



Agriculture along hillside
(www.lostgreens.com)

Urban agriculture is increasingly on the international agenda, recognized as a key part of a comprehensive solution to the problems of the runaway growth of cities in developing countries. International donor agencies are now more willing to fund research to better understand the phenomenon and find ways to make urban agriculture more effective, safer, and more responsive to the needs of the urban population. (Growing better cities: 2008:6)

Urban Agriculture, thus contributes to a wide variety of urban issues, by providing multiple benefits for urban inhabitants with many different functions.

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Johannesburg

“Johannesburg is the largest and most populated city in South Africa. It is situated in the Gauteng province, of which it is the wealthiest province in South Africa, having the largest economy of any metropolitan region in Sub-Saharan Africa” ([Http://wikipedia.org/wiki/Johannesburg](http://wikipedia.org/wiki/Johannesburg))

With a population of more than 2000 inhabitants per square kilometre and Johannesburg land area size approximately 1644 square kilometres. The population of the Greater Johannesburg Metropolitan Area is almost nine million and still increasing every month.

The Johannesburg Development Agency (JDA) was formed in 2001 by the City of Johannesburg in order to stimulate and assist the economic development throughout the Johannesburg Metropolitan area. This was in the hopes to realise Johannesburg as a world city by 2030.

The vision of Johannesburg:

“In 2030, Johannesburg will be a world-class city with service deliverables and efficiencies that meet world best practice. Its economy and labour force will specialise in the service sector and will be strongly outward oriented such that the city economy operates on a global scale. The result of this competitiveness economic behaviour will drive up city revenues, private sector profits and individual disposable income levels such that the standard of living and quality of life of all the city inhabitants will increase in a sustainable manner” (JDA Degrees of growth report 2004).

Johannesburg has recently undergone many changes in the manner in which it operates and how the many different infrastructures within it has helped shape the city. During the early 90's, many large companies relocated out of the central inner city CBD towards the outskirts of Johannesburg particularly to the north areas such as Midrand and

Sandton. Until recently, there has been a change in Johannesburg where companies are now beginning to relocate back into the city. This urban resprawl has been a slow process and the result is a new African city. (Foster, 2004)

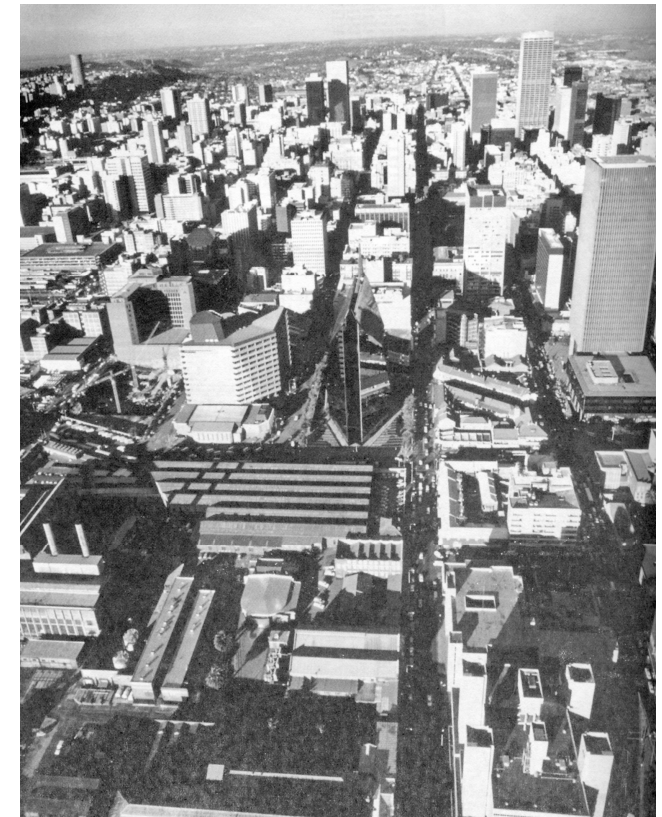
The author while speaking to various people from outside Johannesburg, had noticed that they all shared a common opinion:-

Johannesburg is a large city which is rapidly developing and expanding. But what is it that draws people to the city? Is it the work or the diversity of mixed cultures? And how does one get around Johannesburg especially since everything is spaced so far apart.

These questions brought out an interest which the author would like to explore.

“Many South African cities are presently characterized by random expansion, inefficiency and low density sprawl. The cities are still segregated into zones as a result of former apartheid policies with related problems of socio-economic and living conditions for the urban poor. There is an absence of models for integrated sustainable development that provide affordable housing for the poor and the new government is faced with great resource and capacity constraints.” (Tilman *et al.*, :1997:5)

The dilemma that South African cities experience is the problem of post-apartheid urbanisation where areas in which were allocated to various population groups along with inadequate services being put into place has resulted in poor living conditions for the less fortunate. The rapid exodus of businesses and people from the city CBD to the outskirts of Johannesburg particularly Sandton and Midrand during the early 90's has led to the decay of the inner city life and urban quality. The rapid urban sprawl has resulted in property dropping in value. In the last five years, more businesses have



The Old Johannesburg CBD
Photograph: Beavon (2004:196)

begun to return back to the city. The density in the city has increased significantly as more social housing schemes being developed in order to accommodate the massive influx of people.

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“Clearly, the kind of business conducted in the Inner City is changing. However, the Inner city remains a significant business location, and its importance to the economic growth and development of Johannesburg as a whole can therefore not be overstated.”

(Inner City Regeneration Report, 2006).

Work is an essential aspect of South Africans and the providing jobs and empowering South Africans to allow them to be self-supportive is of the utmost importance to Johannesburg to become a world city with more and more people coming into the city everyday.

Since the main idea is to improve the quality of life, by giving people their own spaces to grow their own food, people will have a sense of ownership and allows them to sustain themselves. People have the skills, they just need the space.

The cost of living and the need to work in order to live is a reality. Food and fossil fuel prices are going up. It is for these reasons I decided to relate these two issues for providing job creation, food production, accommodation and transport of the lack thereof, into the thesis.

Accommodation should be closely related to transport interchange to have close ties to various modes of transport in and around the city to provide easy accessibility. Johannesburg, much like Los Angeles, is a young and sprawling city geared towards private motorists and lacks a convenient public transportation system. A significant number of the city's residents are dependent on the city's informal minibus taxis.

Since the main theme of this dissertation is the regeneration of the city and providing accommodation as well as keeping the idea of sustainability. The investigation will require the author so delve deeper into the lives of the inhabitants of Johannesburg and ascertain the driving force behind their wanting to live within the city. The study of the everyday person on the street and so as to see what they require so as to try to accommodate for them.

Other issues which may present challenges and opportunities are the issues of transportation which raises the question of accessibility to the site.



Urban farms through community interaction



Johannesburg Under transformation with over 129 ongoing projects and more than 5000 individual units.

Photograph: Preston (2006:241)