

THE HEALTHY NEIGHBORHOODS AS AN APPROACH TOWARDS ACHIEVING ITS SUSTAINABILITY

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ABSTRACT

Due to the urgent need for neighborhoods and community to be rethought and reconfigured in order to be sustained for the posterity, and through the common definition of sustainable development, the research tackles the subject matter of the relationships between the human body and the urban region and extends those comparisons to develop some mutual characteristics to promote health in both of them.

Biologically; it's known that the health of the contents composing the cell depends on the degree of their self-sufficiency, self-correction, regeneration and their dynamic adaptation to the environments. The research adopts those characteristics from the human cell and examines their existence in the neighborhoods

This research attempts to make one step forward in the sustainable neighborhoods issue through providing:

- 1- A better understanding of the sustainability issue in general and specially the sustainable urban neighborhoods.
- 2- Proposing a tentative approach to help achieve sustainable urban neighborhoods.

The research discusses and evaluate the principles that turns the resources in the neighborhood into sustainable development and then analyzes the relationships between them and the healthy cell characteristics

This is done by the testing the applicability of the proposed approach provided on some selected urban neighborhoods in Egypt as a verification of the validity of the proposed approached

INTRODUCTION

The research highlights relationships between characteristics of the Healthy cells in human body and those which realize sustainability of neighborhood. The later is seen as an indicator of its health and a tool to diagnosis of illness. One of those comparisons is that of the James Taylor states that the general similarity between the human cell and the landscape region could be seen as follows:

Just as the health of the human body is dependent on the health of the individual cells in it, so too is the urban region dependent on the health of the individual sites that comprise it. (Condon et al., 1999 : 9)

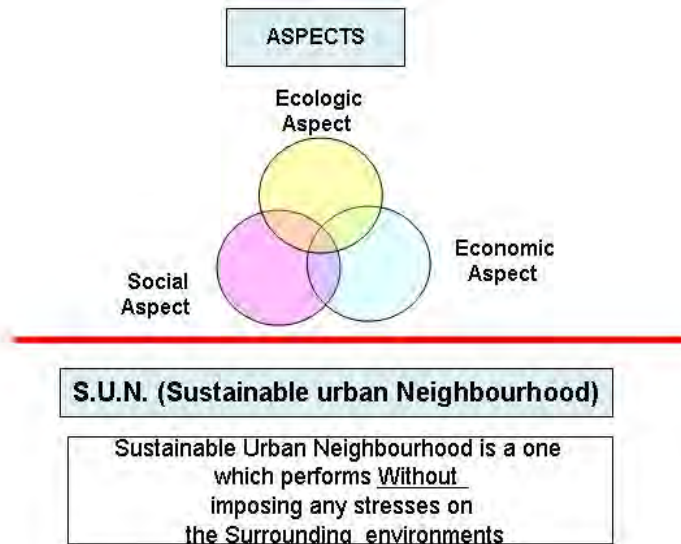


Fig. 1 definition of sustainable urban neighborhoods

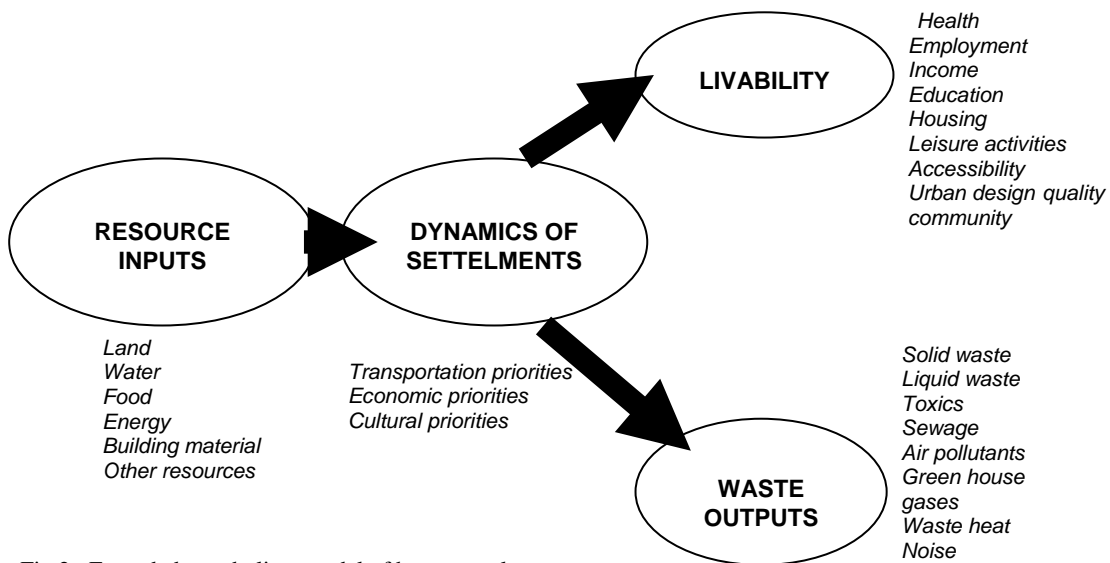
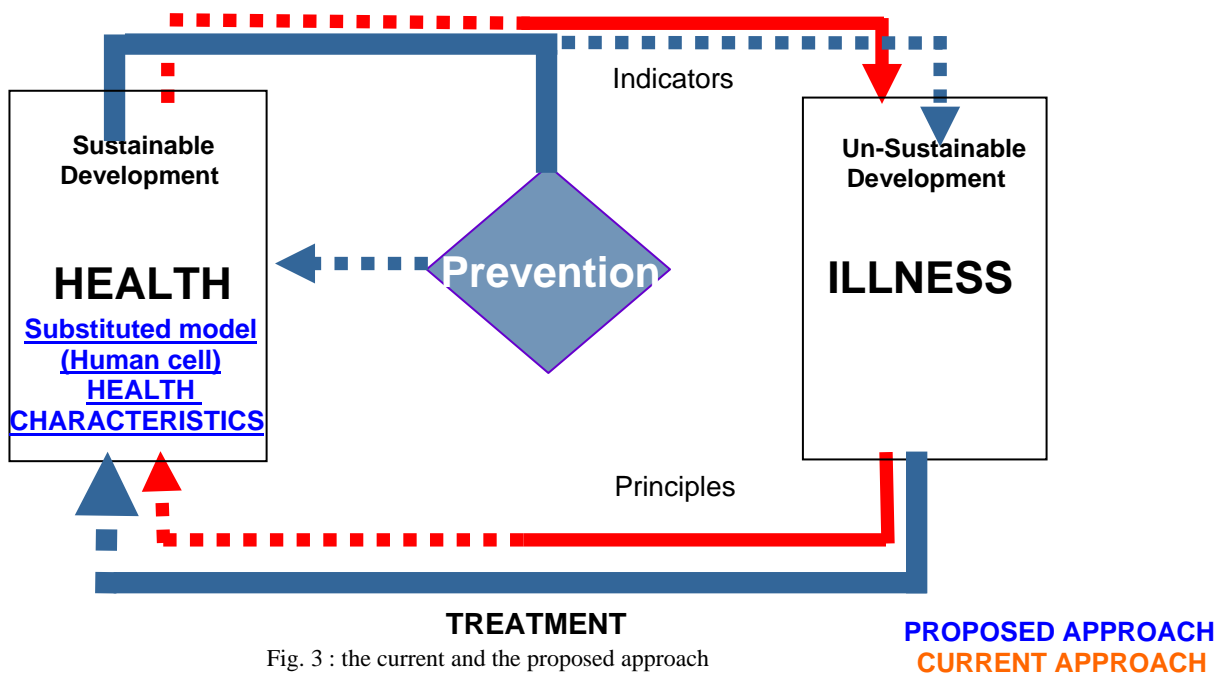


Fig.2: Extended metabolism model of human settlements
Source: Adopted from Newman, et al. (1999)

The similarity stated above was further extended by Newman et al., (1999) as they discussed how both settlements and human body function, stating how they both undergo metabolism to deal with their resources and wastes and viewing metabolism as a biological way of looking at the resource inputs and waste outputs of settlements.

It is then possible to specify the physical and biological basis of the neighborhood as well as its human basis. The physical and biological processes of converting resources into useful products and wastes are like the human body's metabolic processes or those of an ecosystem (Moody W. (2000).

The approach this paper proposes attempts to help the prevention of deterioration of the sustainable development and increase channeling the principles of sustainability to move the neighborhood more efficiently to the "HEALTH". . This is done by the substitution of the missing model of a healthy sustainable urban neighborhood by the human cell and analyzing the characteristics that help it to maintain its health on regular basis.



1- CHARACTERISTICS OF HEALTHY HUMAN CELL AND THEIR INTERPRETATIONS ON THE NEIGHBORHOOD

This section highlights the common factors that results in the health of cells and can be then used to define the health neighborhoods and ultimately its sustainability. Although there is a similarity between the cell as the biological unit of the human body and the neighborhood as the planning unit of the region, the four healthy characteristics adopted from the human cell have different reflections and interpretations in the urban context. Below is an explanation of how those four characteristics are going to be used in the diagnosis a neighborhood.

1-1 The Regenerative Neighborhood

A regenerative community is one in which the concept of waste is eliminated. The inhabitants are consciously aware of their inter-relationship with natural systems. Moody W. (2000), highlights the following characteristics for a regenerative neighborhood:

- Uses existing resources for mutual benefit: Every development, design and implementation strategy serves multiple functions
- Adds resources without depleting others: A place becomes more than it was before it was touched by Man
- Eliminates the concept of waste: All waste in one system is used as food (resource) in another system.

To restore balance to the world, the concept of waste must be eliminated. What is considered to be “waste” in one system must be considered as resource in another.

The community needs to consider the development of locally appropriate means of reducing the total amount of household waste, for instance, through encouraging the voluntary implementation of home composting of the biodegradable component of household waste.

While the regeneration process in the cells of the human body regenerates all the dead and ill-functioning parts in it, the regeneration process in the healthy neighborhood concentrates on:

- diminishing the idea of source to waste and considers waste as a source in itself
- uses existing resources for mutual benefit
- adds resources without depleting others.

Regeneration parameters measured by self-correction:

For every parameter of the regeneration process, many measures could be deduced to monitor and evaluate the efficiency of the regeneration process in the neighborhood. The table below illustrates an example of some measures deduced from the three main parameters of the regeneration process:

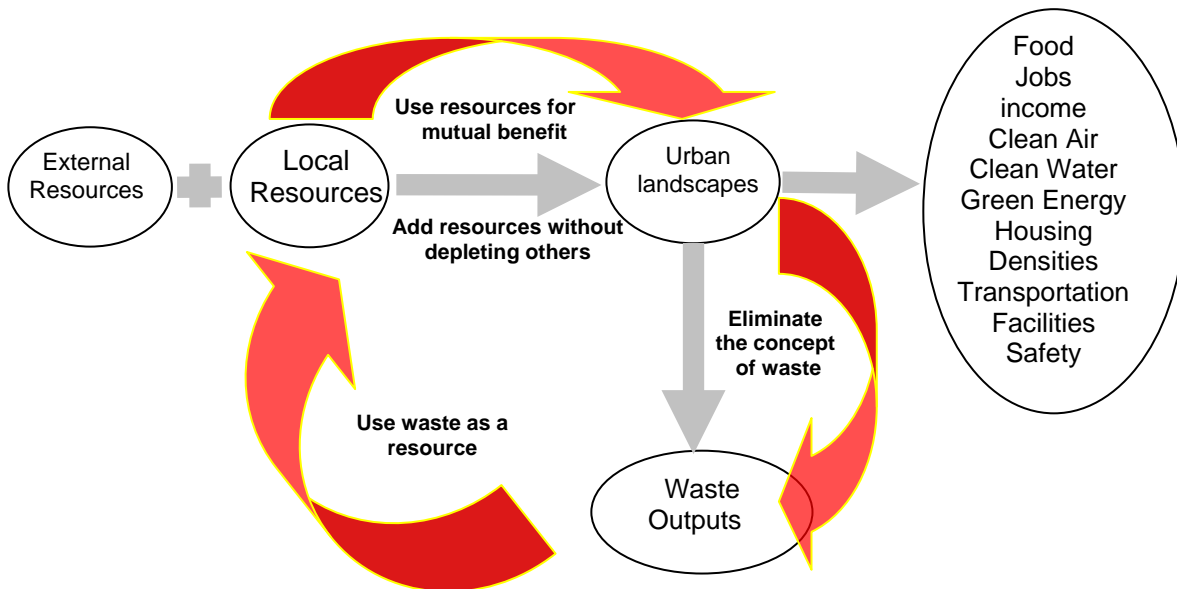


Fig-4 : the regeneration process in the neighborhood as the planning unit.
Source: Shalaby, N.W. 2004.

Parameters	Measures
Eliminating the concept of waste	Percent of recycled waste
Using resources for mutual benefit	Number of resources used for more than one purpose, without negative effects on other resources.
Adding resources without depleting others	Added value for each resource

Table 1 : Regeneration parameters measured by self-correction

1-2 the Self-Sufficient Neighborhood

A self-sufficient neighborhood could never be achieved 100%, but relatively it could be evaluated that this neighborhood is more self-sufficient than another is. A self-sufficient neighborhood is a one, which satisfies the needs of the residents, socially, economically and ecologically. From the above goals, the self-sufficient neighborhood seems to be too perfect to be true, but the closer a neighborhood is to those points, the closer it is to self-sufficiency.

As much as the self-sufficiency in the human body has solid limitations- where the cell depends on other parts of the body to provide it with proteins and oxygen, etc, so is the healthy neighborhood- where it could never be cut-off from its district and its surrounding region. The Self-sufficiency of the neighborhood helps to make the best use of the neighborhoods local resources for the benefit of its residents. For example, self-sufficiency of neighborhoods helps the increase of the range of local recreational opportunity, reduces the need for car usage in leisure time, creates educational opportunities for children, allows the development of efficient local water management schemes and grows biomass for use locally.

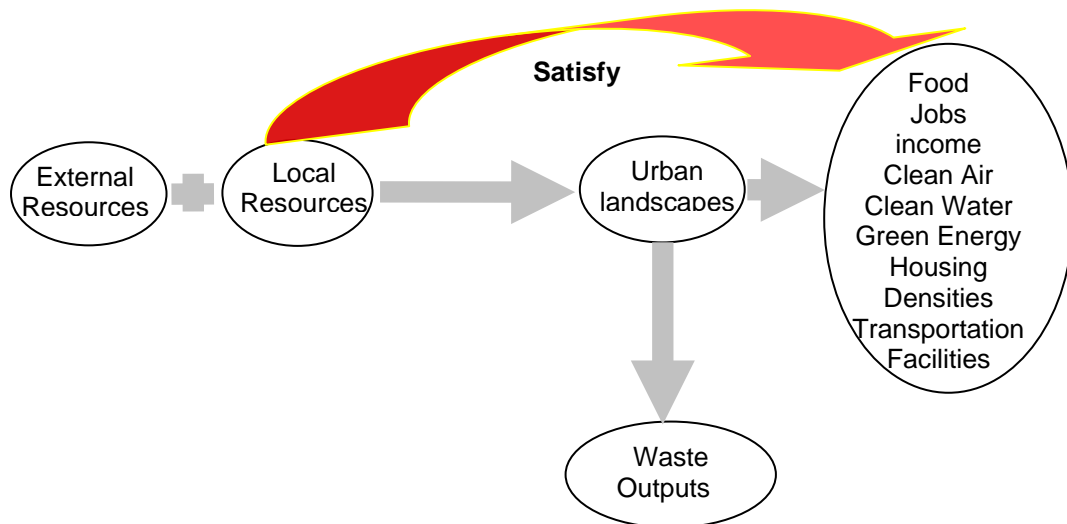


Fig 5.: the self-sufficiency process in the neighborhood
 Source: Shalaby, N.W. 2004.

Self-Sufficiency parameters measured by self-correction:

Depending on the analysis of the sustainability principles and the healthy cell characteristics, some parameters could be detected by which the self-sufficiency of the neighborhood might be assessed. The following table illustrates some of those parameters and the extracted measures for each of them:

Parameters	Parameters
jobs : number of jobs available to the number of people in the working age in the neighborhood	Densities :ratio between net and gross densities. Net densities should relatively increase with a steady or low gross density
Air: Air pollution emitted in the neighborhood to the maximum bearing capacity of the local environment.	Transportation: percentage of non-motorized trips (pedestrian, cyclists, buses and light electric rail (to the motorized trips in the neighborhood
Water: Percent of consumed water to the recycled grey water	Facilities: the ratio of the availability of each facility in the neighborhood to the demand on it, meaning, recreational, educational, health care, ...etc
Green Energy: percent of the clean and renewable energy produced to the non-renewable energy consumed in the neighborhood	Safety: number of crimes detected by natives in the community" self-surveillance and good urban design" to those detected by higher authorities.
Housing :percentage of adequate housing supplied for every economic sector of the population in the neighborhood to the demand on each of them. -Varieties of supplied housing in the neighborhood	Local food production: the ratio of the locally produced food to the imported from outside the neighborhood.

Table 2: Self-Sufficiency parameters measured by self-correction

As the above parameters are not exclusive, and they present only an example of how could the self-sufficiency of an area be evaluated, every neighborhood could develop its own list, depending on the resources available in its premises, accuracy and efficiency of data available, and the local participation of its residence. In every urban neighborhood, a checklist could be made and self-sufficiency could be easily calculated if enough data is provided.

1-3 The Self-Corrective Neighborhood

Promoting human and community development needs a process that depends on community-based programs. This process is commonly known as "self-correction". Two vital self-corrective mechanisms could be used with all community-based programs.

As much as the human cell needs a system to detect the illness and propose a treatment, the self-correction system is that kind of system for the unsustainable neighborhood. it is a pre-active system. It gives a signal that the cell is infected through its monitoring system and starts evaluating the best action to respond to that illness.

As stated earlier, self-correction system is composed of two main components, monitoring and evaluation. Through the great evolution of the technology, an information system could be the base through which any disturbance could be easily monitored, evaluated and corrected in the cheapest, most appropriate way, to reach sustainability goals.

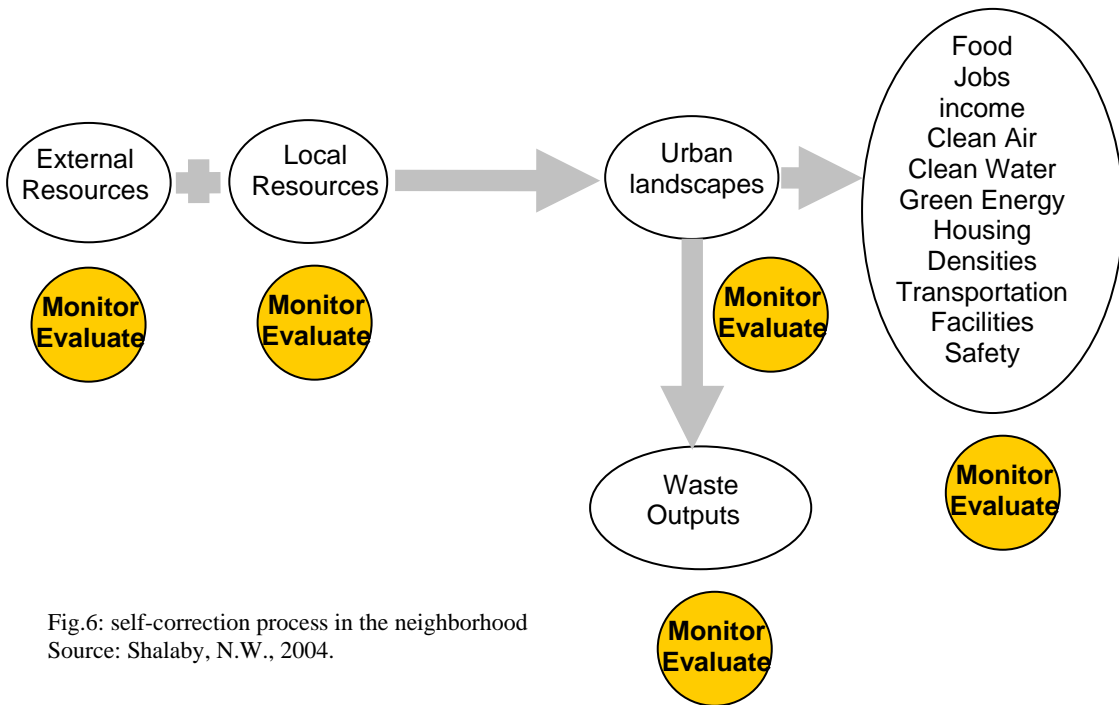


Fig.6: self-correction process in the neighborhood
Source: Shalaby, N.W., 2004.

Depending on earlier analysis of the sustainability principles and the healthy cell characteristics, the research proposes a center for **self-correction**, which monitors and evaluates the resources in the neighborhood, to determine the efficiency of their usage. The following table is an example how this center could work.

1-4 Dynamical Adaptation to the Environment

The neighborhood needs dynamic urban planning that meets the changing needs of its residents over time, and faces challenges of future generations needs as well.

Sustainability requires adaptability of the structure. To elaborate on this, housing types need to change in order to avoid the need for families to move. Sustainable communities are efficient communities where families invest long periods in their neighborhood. Jobs as well are liable to change over time, and if office buildings are not ready to adapt to these changes, it will be very uneconomic to built new ones to adapt to the new requirements. Spaces that is flexible to adapt more than one activity.

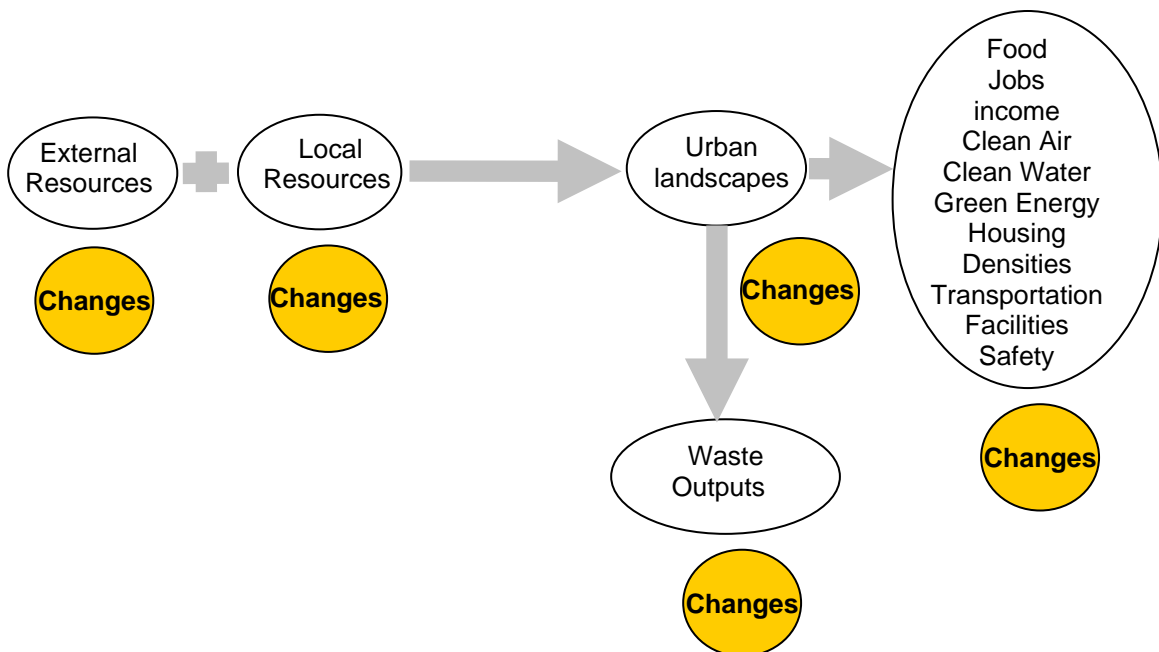


Fig 7 : the changes facing the development of the neighborhood
Source: Shalaby, N.W. , 2004.

Therefore, neighborhoods, which dynamically adapt to the environment, are those, which serve the changing needs of the residents, without imposing any stresses on the environment or compromising the needs of the future.

As much of the illness of the human beings lies in the mal functioning of the immunity system, so is the case in the neighborhood. What is meant by the immunity system of the neighborhood is a system for dynamic adaptation to the environment. This system should be in every neighborhood to detect with its sensors any deficiency or problem on its way before striking or attacking the neighborhood. It defends the neighborhood against any attacks that might face it. It is a proactive system, working before the illness occurs.

This trait of the sustainable neighborhood serves the research so much in its trial to compare the neighborhood with a living human cell. With a good and efficient management, it could in turn change to a living thing that is responding and changing to suit its community with the best it could offer.

Resulting from the above discussion, all sustainability principles are enhancing the four characteristics of the healthy cell. This would help us to find solutions for any unsustainable urban landscape appearing in the neighborhood, and at the same time protect the neighborhoods from any future unsustainable urban landscape before it appears. This could be easily done through the enhancement of the healthy characteristics in the neighborhood.

2- MODIFICATION OF THE CURRENT APPROACH TO DEAL WITH THE HEALTHY NEIGHBORHOOD

The principles of sustainability have been displayed in various urban landscapes, evaluated and illustrated in dealing with all the resources through which the common neighborhood is developed. a closer outlook at the four characteristics of the proposed approach "healthy cell approach" and how far do they comply with the sustainability principles for dealing with the resources in the neighborhood. Through the analogy undergone between the "human cell" and the "urban neighborhood", the research would export some terminologies from the biology of the human cell, in order to manifest this analogy, and to serve the research in explaining the proposed approach.

The term "*Health*" stands for "*Sustainable*"

The term "*illness*" stands for "*un-sustainable*"

The term "*observation*" stands for "*studying closely*"

The term "*symptom*" stands for "*negative results of un-sustainability*"

The whole subject of "sustainable urban landscapes in neighborhoods" could be viewed from more than one side. Most previous researches approached the way to sustainability from observing the symptoms of the illness and trying to find the treatment "principles" to cure that illness.

As the environments, natural, social, and physical are in a continuous dynamic state, the sought "health" of the urban landscapes in those environments is complicated. It is hard to ensure "health" through mere principles of managing resources, full of do-s and don't-s. Dealing with dynamic environments needs an approach that is dynamic as well, to ensure the continuity of the "health" or "sustainability" of the neighborhood. Therefore, the previous approaches do not prevent illness, and at the same time, do not ensure the cure of the illness after applying the principles of sustainability.

This research viewed the same subject –sustainable urban landscapes in neighborhoods- differently. It started from the "health" of the "human cell" and explored its characteristics, then consequently viewed the treatment of the illness by enhancing the "health characteristics". Through the analogy made between the "human cell" and the "urban neighborhood", the characteristics "regeneration, self-sufficiency, self-correction and dynamic adaptation to the environment" were viewed as an essentiality for maintaining the health of the neighborhood.

The new "Healthy Cell" approach holds two medicines for dealing with the neighborhood.. The former is represented by the "dynamic adaptation to the environment". If this Prophylactic medicine is working with full efficiency, it guaranties the continuous health of the neighborhood. The latter is represented by the "self-correction". If this therapeutic medicine is working with full efficiency, it guaranties the treatment of any illness in the neighborhood.

In other words

- the "monitoring system" would record the "*symptoms*" :
 - Increased use of car in leisure time
 - Increased energy use
 - Increased air pollution
- an evaluation would be made to spot out the "illness":
 - Insufficient recreational areas
- and propose the "*remedy*" for the illness:
 - Increase self-sufficiency of recreational areas in the neighborhood.

Through the comprehension of the proposed approach, and the concluded relationship between sustainability principles and the healthy cell characteristics, the final concluded results of the research could be stated as follows:

The health of the neighborhood is dependant on the health of the internal environment (resources composing it) and the interaction between it and the surrounding environment.

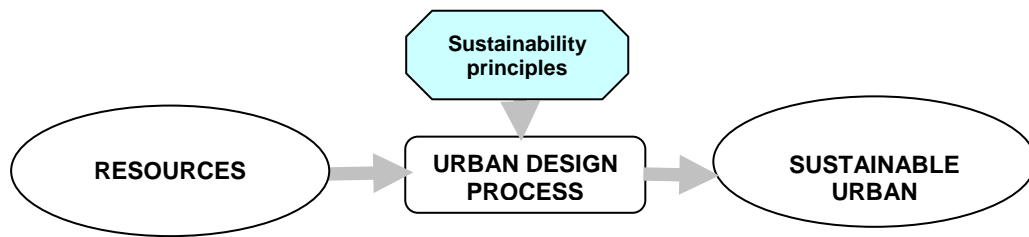


Fig 8: current approach

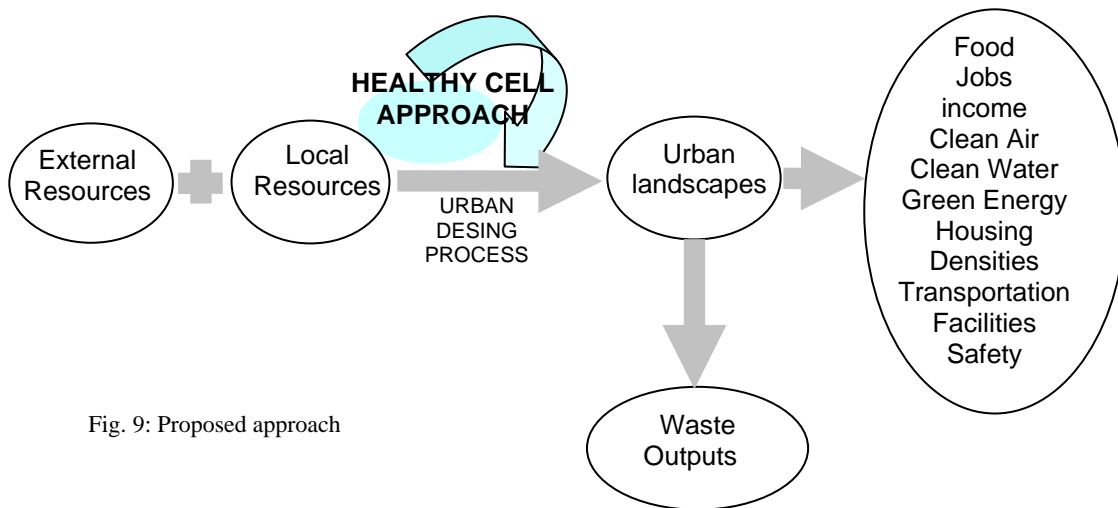


Fig. 9: Proposed approach

3- CHECKING HEALTHY NEIGHBORHOODS CHARACTERISTICS IN TWO CASE STUDIES

The research tries to apply the proposed approach as a tool to evaluate sustainability of exiting neighborhoods in Cairo. The chosen area in Heliopolis, "El-Korba". is surrounded by "El-oroba street" from the south east, "El-marghani" street from the south, "El hegas street" from the west and "Nazeah Khalifa" street form the north. "El Korba", has an area of "321 fd" with a population of "22,237".

The chosen area in "Nasr city", " El-manteka el-oula" is surrounded by "Abas EL-Akad" street form the east, "El-Tayaran street " from the west, " Aly Ameen" street from the south, and "El-Nasr road" form the north. " El-manteka el-oula" has an area of " 456 fd " with a population of "26,701".

Those areas are chosen specifically as they are in close proximity to each other, both initiated at almost the same period of time, and they are with no specific historical value. The difference in their "health state" will serve the research in the examination of the applicability of the proposed approach, were Heliopolis adopts much more sustainability principles than "Nasr city". Consequently, this will help explain the "healthy cell approach" on two samples, one of them is "healthier" than the other.

Since the "dynamic adaptation to the environment" is a proactive character or a prophylactic medicine, which works before the cell is infected or before unsustainable urban landscapes appear in the neighborhood, therefore it would be excluded in dealing with the illness in the two proposed areas.

On the other hand, the self-correction system is a pre-active character or therapeutic medicine, which works after the neighborhood is infected by unsustainable urban landscapes. It detects the illness and evaluates the best treatment for the illness. Due to the lack of information about resources in Egyptian neighborhoods (due to the previously stated problems), the "monitoring" of the self-correction system would not function well. As the research is just testing the applicability of the proposed approach, the precise measures of the monitoring system could be replaced by detecting the "symptoms" of the illness in those two areas.

As the proposed measures for the healthy cell approach are not exclusive, therefore the extracted symptoms are not exclusive as well, for they are merely examples of the health state of the contemporary urban landscapes in those Egyptian neighborhoods. Therefore, the comparative analysis would start from health as the research started, and would propose the remedy (regeneration and self-sufficiency), their measures, their symptoms if deficiency in any of them occurred, An observation of "urban landscapes" would be made for both areas.



Fig.10. Urban area within Nasr city context



Fig.11. Urban area within Heliopolis district

3-1 Transportation as parameter of the self sufficiency at the two case studies

3-1-1 Heliopolis area

The area has three main entrances.

a- The Observation :

High traffic speed at entrance of "El-thawra tunnel", fig. a - the major entrance to the studied area from the eastern side of Heliopolis - and congestion at side roads along the tunnel. Considerable traffic flow at the second and third main entrances from "El-lakany" and "El-ahram" streets respectively Calmed and steady speeds on Secondary entrances due to the narrow width and mostly one direction ways. In the past, the area used to enjoy two other main entrances, one from the northeast side, from "Bayrout" street and the second from the west side, from "Nazeah khalifa" street. Now they both serve as an exit from the area.

b- The Symptom of the first urban landscape is *high speed and pedestrian problems*.

c- The illness is the *lack of self-sufficiency of movement network*.

The high speed in the main entrance to the studied area is due to the encouraged through traffic in "El-thawra" street, to "Nazeah Khalifa" street, and then out of the studied area to the western side of Heliopolis. This forms a lot of pressure on the area especially during rush hours. The tunnel fragmented the urban fabric of the homogenous area, damaged the equilibrium and accessibility of surrounding land uses, and encouraged motorized transportation over friendly non-motorized one, forming more stress on the fuel consumption and air pollution.

Finally the tunnel encouraged high speeds forming hazardous threats to pedestrians (two schools and a mosque are situated on either side of the tunnel, where they produce strong flow of pedestrians

d- Recommendations

The remedy of the infected urban landscape lies in distributing traffic flow equally on all available entrances in the area. This means decreasing the permeability (traffic flow or speeds) at El-thawra street and increasing it at the other dead entrances (those which used to function in the past). The Reactivation of both entrances of "Bayrout" and "Nazeah khalifa" streets would eventually decrease the traffic flow by distributing it on many entrances other than only one. This remedy is expected to increase the symptom of traffic congestion on the short run, but the result on the long run is an increase in the self-sufficiency of the movement network as follows:

The frustration of congestion and high cost of private transportation would encourage other friendly types of transportation. Public transportation enhancement would have a great contribution in the movement network as well. The enhancement of pedestrian environment and creation of cyclist roads would also serve both schools on either side of the tunnel. Public transportation would be a fast mean of transport in comparison to the crawling cars

3-1-2- Nasr City

The area has two main entrances, "El-batrawy" entrance from "Abas El-Akad street" and "Ismail El-Abany" from "El-Tayaran street".

a- The observation: High traffic speeds at "El-batrawy" entrance ; high traffic speeds at "Ismail El-abany" entrance ; Traffic problems at secondary entrances from "Abas El-Akad street". ; Steady speeds at "El-Tayaran street"

b- The symptom of the above urban landscapes is traffic congestion

c- The illness is the lack of self-sufficiency of movement network.

d- Recommendations

The remedy of the infected urban landscapes lies in increasing the number of entrances to the area and decreasing the dependency on private transportation added to distributing the land uses in the area and concentrate it on high streets like "El-batrawy " and "Ismail El-Abany".

Considering the hierarchy of movement paths, (their length, width and their special features of road furniture) according to their uses and the expected traffic density. Enforcing the means of reaching every spot: through the availability of suitable means of movement. Extend traffic calmed areas and reduce overall capacity, ensuring a slow but steady pace of traffic, thus improving conditions for other road users and deter car use.

3-2 Densities as parameter of self-sufficiency at the two cases study

3-2-1 Heliopolis

a- The observation of the above urban landscapes;

Heights along the high streets " El-Ahram" and "Ibrahim El-Lakany" are, mostly, four to five stories. Heights at " Ibrahim street" are also four stories. On the other hand, heights at some secondary streets like "Batrous Ghaly" street rise up to 10 stories with shopping centers at the basement level and the first and second stories .

b- The symptom is condensed activities at minor roads and average activities at high streets.

c- The illness is unbalanced densities.

d- Recommendations

Heights at secondary and minor streets needs to get back to the way it used to be in the past, at the most 3 stories.

The Intensification of the activities on high streets is essential for making the best use of the metro lines as a good accessibility factor and metro stations as major assemblage points, especially at intersections where every corner should form an attraction in itself.

3-2-2 Nasr City

a- The observation: Heights on "El-batrawy" street ranges form 4 to 17 stories in a random distribution; Heights on secondary streets ranges from 4 to 17 stories in a random distribution

b- The symptom is neighborhood cramming and visual blight.

c- The illness is Unbalances densities especially on high streets and away from it.

d- Recommendations

Most of the chaoses of the building heights are consequences of violation of laws and corruption of administration and prosecution by the authorities. The original planning for "el-batrawy" street was 4 stories. Local community involvement in the execution and administration of the laws inside the neighborhood would probably solve many of those problems. This would increase the self-sufficiency of the area in providing mixed activities to offer good services at high streets and calm residential areas at the interior of the area.

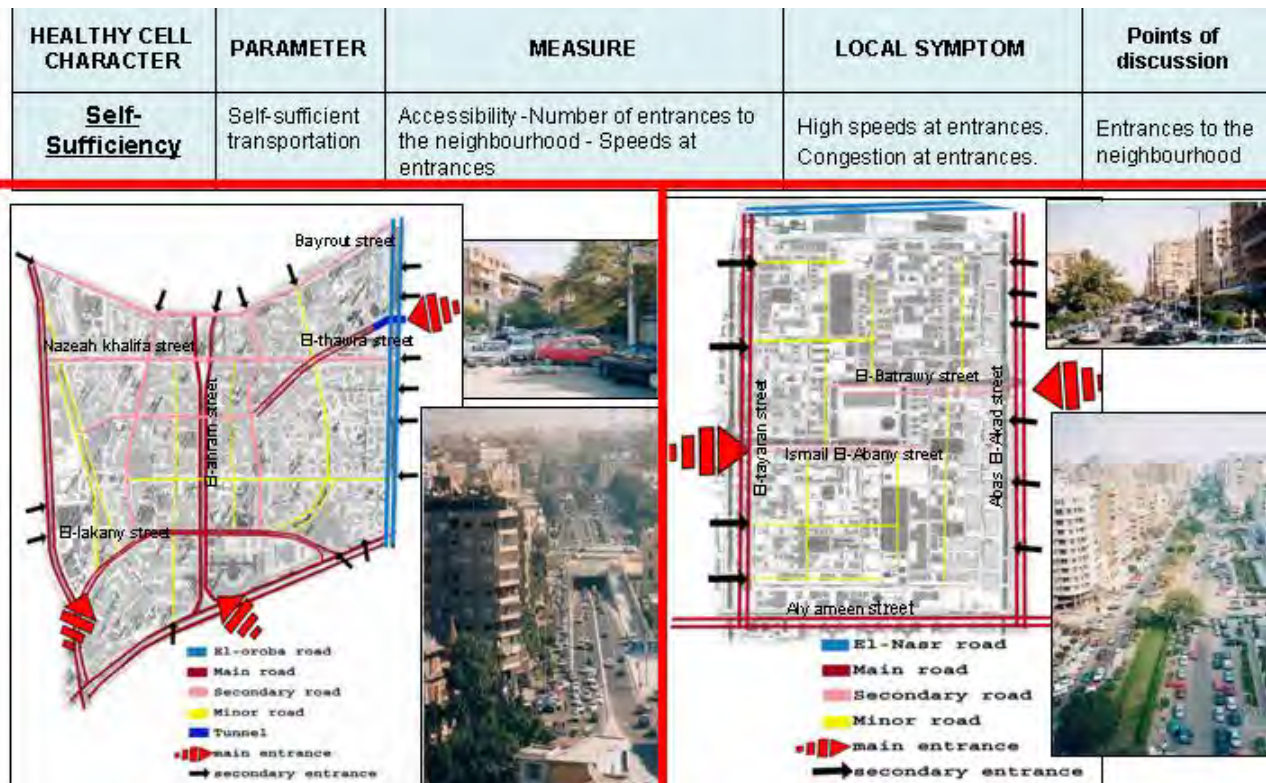


Fig 12. Testing the transportation parameter at the two cases study

Source: Shalaby, N.W., 2004.

HEALTHY CELL CHARACTER	PARAMETER	MEASURE	LOCAL SYMPTOM	Points of discussion
Self-Sufficiency	Densities	Densities distribution on high and minor streets	Cramming, visual blight, condensed minor streets	densities along high streets and internal streets



Fig. 13 Testing self sufficiency through densities at Heliopolis

Source: Shalaby, N.W., 2004.

3-3- Using of existing resources as parameter of Regeneration

3-3-1 Heliopolis

a- The observation: Deficiency of public green areas as a whole in the area as well as shared external spaces and playing areas in home patches, although the total green space presents 25% of the total area. This is because the majority of the green-spaces are private one; Scarce as they are, public Green-spaces in Heliopolis are not being used efficiently. Most public green-spaces within the neighborhoods are fenced and closed in front of the public; The main green public space in the area is located in a central place at the end of the high street of "El-Ahram", easily accessible with the metro, and bus; Most of the green-space in the area are private ones, whether front or rear gardens, none of which is used in local food production; poor and small in size, school playgrounds and religious; green-spaces are not sufficient for recreation or playing; fields, and none of them is open to the public at any time of the day, or even on Fridays.

b- The symptom of the above urban landscapes is underused green-spaces.

HEALTHY CELL CHARACTER	PARAMETER	MEASURE	LOCAL SYMPTOM	Points of discussion
Self-Sufficiency	Densities	Densities distribution on high and minor streets	Cramming, visual blight, condensed minor streets	densities along high streets and internal streets



Fig 14. Testing self sufficiency through densities at Nasr City

Source: Shalaby, N.W., 2004.

c- The illness is non-regenerative green-spaces.

d- Recommendations

Increase the percentage of public green-spaces in the area; Increase accessibility of the public green-spaces by removing the obstacles like fences and fees; School sites could be vastly more utilized for numerous community functions spaces of playgrounds as parks in festivals and parking areas in daytime for serving cinemas at night regenerate front gardens to enhance social relationship between residents; The functional linkage between activities should be a key determinant of setting decisions. This will increase the potential for dual use of space, trip purpose sharing and multi-functional design.

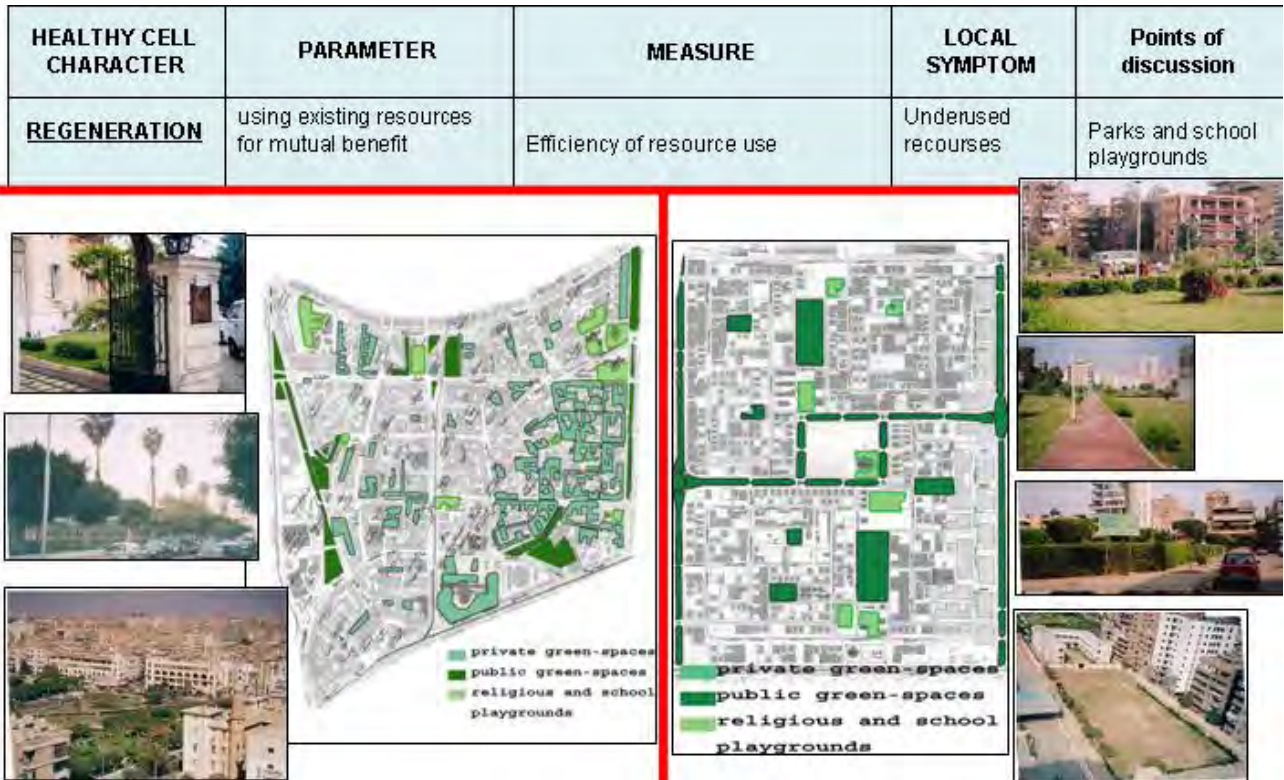


Fig 15. Testing regeneration through using existing resources

Source: Shalaby, N.W., 2004.

3-3-2 Nasr City

a- The observation: Deficiency of green areas as a whole in the area where the total green space presents 8% of the total area; There is a clear deficiency of private green-spaces in the area; shared external spaces are available within every home patch, but some of them are fenced and closed in front of the residents; school playgrounds and religious green-spaces are not opened to the public at any time of the day, or even on Fridays; some public green-spaces are opened to the public and used as playing area for children, with good interaction with the street and the pedestrian paths.

b- The symptom of the above urban landscapes is underused green-spaces.

c- The illness is non-regenerative green-spaces

d- Recommendations

Increase the percentage of public green-spaces in the area; Locate public green-spaces in a central place in the area to allow good accessibility; Locate public green-spaces beside other uses like schools, mosques and churches to allow mutual benefit of the resource; Improve quality of green-spaces to add a recreational resource for the green-space; Allow assemblage areas and promenades along the public green-spaces; Open the shared external spaces for playing activities for the children of the home patch; Increase private green-spaces to allow local food production.

4- CONCLUSION

Through the analogy undergone between the "human cell" and the "urban neighborhood", the research would export some terminologies from the biology of the human cell, in order to manifest this analogy, and to serve the research in explaining the proposed approach.

The term "*Health*" stands for "*Sustainable*"

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Through the analogy made between the "human cell" and the "urban neighborhood", the characteristics "regeneration, self-sufficiency, self-correction and dynamic adaptation to the environment" were viewed as an essentiality for maintaining the health of the neighborhood

- the "monitoring system" would record the "*symptoms*" :
 - Increased use of car in leisure time
 - Increased energy use
 - Increased air pollution
- an evaluation would be made to spot out the "illness":
 - Insufficient recreational areas
- and propose the "*remedy*" for the illness:
 - Increase self-sufficiency of recreational areas in the neighborhood

The two studies areas at Cairo showed different levels of health and illness. In so many urban landscapes, sometimes the same symptom could contribute to different illness, where both areas suffer deficiency in public transportation, "Heliopolis area" needs regeneration of existing metro lines and bus stations, while "Nasr city area" needs transplanted of a sufficient public transportation network inside the area. On the other hand, the same illness could have more than one symptom. Both areas suffer from "poor accessibility." Heliopolis area "needs redistribution of traffic flow on available entrances, while "Nasr city area" needs increase in the number of main entrances.

As the previous tables showed, the right and accurate diagnoses of the neighborhood would lead to the right treatment, even it is a long-term one. Accurate diagnosis depends mainly on accurate information and so depends on a very good "self-corrective system".

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