New urban indicators:
City capacity and capability (Capa²)

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BY:

Riham Salah Mohamed Abd El- Rihem.

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مؤشرات حضرية جديدة:

سعة و قدرة المدينة ($Capa^2$)

رسالة علمية

مقدمة إلى قسم هندسة الهندسة المعمارية بكلية الهندسة – جامعة الاسكندرية

إستيفاء للدراسات المقررة للحصول على درجة

دكتوراه الفلسفة

فى

الهندسة المعمارية

مقدمة من

ريهام صلاح محمد عبد الرحيم

مايو 2017

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الملخـــــــص

الزيادة السكانية تعد من اهم المشاكل الاجتماعية و التحديات التي تواجه العالم اجمع ، و علي وجه الخصوص دول العالم النامي، حيث معظم نمو السكان يتركز بالمستوطنات الحضرية المتوسطة و المدن الصغيرة و اغلب هذه المستوطنات الحضرية ذات طابع غير مخطط. النمو السكاني المتزايد يصاحبه العديد من المشاكل حيث ترتبط هذه الزيادة بالاوضاع الاقتصادية و الاجتماعية و الثقافية في المجتمع ، بالاضافة الي تاثيرها السلبي علي التنمية الحضرية و خاصة في مصر. و بالتالي يتواجد السكان بانحاء المدينة بطريقة عشوائية ناتجة عن عدم التوازن في التوزيع السكاني و الجغرافي و ذلك تبعا الي احتياجاتهم و متطالبتهم.

و من جهة اخري ، المدن لها انظمة معقدة و عندما يتواجد ذلك النمو بدون اي ضوابط له فان ذلك ينتج عنه غياب معظم البيانات و المعلومات التي تؤثر علي التحديات الانمائية علي مستوي المدينة و خاصة في الدول ذات الموارد الطبيعية المحدودة ، فالبيانات مطلوبة لصنع السياسات و القرارات لتوفير مقاييس موضوعية للاتجاهات لتجنب الاخطاء السابقة و اعادة التفكير لايجاد سياسة تخطيطية فعالة.

من اهم المظاهر المصاحبة للنمو السكاني هي زيادة الانشطة البشرية و التي تعتبرهي السبب الرئيسي في تغير شكل المدينة مثل التعديات علي الراضي الزراعية و اراضي الدولة، لذلك يجب ان يكون هناك رصد و اضافة الي سياسات التخطيط و حلول بديلة باستخدام اساليب جديدة و اكثر استدامة و فعالية للسيطرة علي هذه التحديات.

و من هذا المنطلق، فان الهدف من البحث هو ايجاد اليه جديدة مستدامة من اجل تحقيق مدينة افضل يمكن التحكم بما يحدث فيها و تتمثل هذه الالية بفرض بعض الاهداف التي تعزز سياسات التخطيط و اصحاب المصلحة من المخططين و الحكومة و المواطنين ، و ذلك بايجاد مؤشرات حضرية جديدة لمواكبة التغيرات الحادثة الي المناطق الحضرية بالمدينة، ومن أجل استكمال أهداف المؤشرات الحضرية لموئل الأمم المتحدة، اعتمدت دراستي نهجا أكثر شمولا من خلال دمج اهداف جديدة تندرج مع مؤشرات جديدة، لإظهار و تقييم التقدم الذي تم تحقيقه في المدينة، ومدى قابلية المدينة إلى تطوير، وقد تحقق كل ذلك من خلال قياس Planning Capa².

وبالتالي، فان هذا البحث يقوم بايجاد و معرفة مفهوم التنمية الحضرية و العوائق التي تسبب في بطئ هذه العملية و ذلك بايجاد التحديات الحضرية و ايضا القوي المسببة في التغيير الحضري و استنتاج كيفية تقييم التنمية الحضرية من خلال المؤشرات. ثم بعد ذلك، سيتم مراجعة المؤشرات من خلال التعرف علي مفهومها و دورها و كيفية التعامل معها و المنظمات التي تتعامل من خلالها مثل موئل الامم المتحدة (UN-HABITAT) ، و الي جانب ذلك سيتم مراجعة بعض النقاط في الدستور المصري الخاصة بمفهوم التنمية، و اخيرا مراجعة التقرير النهائي والتوصيات المتعلقة بحالة البيئة الحضرية ومؤشرات الإسكان المطبقة على سبع مدن مصرية، و ذلك وصلا لايجاد بعض الاهداف التي تساعد علي تنمية و رصد و تقييم المدينة.

كنيتجة لذلك ، سوف يتم تحليل هذه الاهداف و ما هي الغاية منها وصولا الي ايجاد مفهوم جديد يتم من خلاله التعامل مع المدينة من خلال قدرة و مقدرة المدينة و كيفية رصد التغيرات الحادثة فيها الا و هو "Planning Capa² Energy" من خلال وضع ستة اهداف رئيسية و كل هدف يحقق غاية من خلال المؤشرات التي تم وضعها و تندرج من خلال الهدف.

اخيرا، سوف يتم تطبيق "Planning Capa² Energy" من خلال الدراسة التطبيقية لذلك المفهوم علي احدي المناطق بمدينة الاسكندرية، هذه المنطقة هي طريق ابيس المار علي بحيرة المطار. هذه الدراسة تتم علي ثلاث مراحل : اولا دراسة تحليلية لهذه المنطقة، ثانيا اختيار ثلاث اهداف لهذه المنطقة لما تتميز هذه المنطقة بحدوث بعض التغيرات المهمة، ثالثا الاهداف المختارة تحتوي علي بعض الموشرات ، ثم بعد ذلك تطبيق خمسة من المؤشرات المناسبة لطبيعة هذه المنطقة، وصولا الي النتائج المحققة من تطبيق هذه المؤشرات لرصد و تقييم اداء المنطقة التي تعتبر جزء حيوي من مدينة الاسكندرية. فالتطبيق علي جزء من المدينة يعتبر انعكاس لحال المدينة بصفة عامة.

و بناء علي ذلك تتكون الرسالة من خمسة ابواب رئيسية يتبعها المراجع واخيرا الملاحق، و فيما يلي شرح مختصر لأبواب الرسالة الخمسة:

الباب الاول: المقدمة

يتكون الباب الاول من المقدمة و فرضية البحث و التعريف بالمشكلة و الاهداف و المنهجية:

ترتبط الرسالة بمسالة المؤشرات الحضرية، و ذلك لتعزيز هدفها الاساسي، الا و هو الفهم الاوسع للسياسات و خطط التنمية بالمدن المصرية، هذا بالاضافة الي معرفة قدرة المدينة علي تحديد الاتجاهات الجديدة و تقييم مدي التقدم و التنمية بالمدينة والتركيز علي رصد اداء المدينة.

الهدف:

يهدف البحث بصفة اساسية الي توفير فهم واضح للمؤشرات الحضرية و رصد مدي تقدم اداء المدينة و ذلك بتعزيز بعض المفاهيم علي سبيل المثال تاكيد و تعزيز التعاون بين المواطنين و اصحاب المصلحة في عملية صنع القرار و المشاركة في التخطيط الاستراتيجي ووضع السياسات، و ايجاد مؤشرات حضرية جديدة من خلال تاكيد مفهوم قدرة و سعة المدينة.

المنهجية:

في محاولة لتحقيق الاهداف السابقة فان البحث اعتمد في منهجيته علي ثلاث مراحل:

الاولي تحديد و ايجاد طريقة للتعامل مع النظم الحضرية لرفع مستوي الفهم للتحديات الحضرية و التنمية الحضرية و التي تكون مصاحبة بتزايد عدد السكان، و معرفة اتجاهات التحضر خاصة بالدول النامية، و ايضا ايجاد وسيلة لرصد و تقييم الخطط الحضرية.

الثانية القاء النظر بطريقة تحليلة علي المؤشرات الحضرية و ايضاح دورها في صنع القرار، مصاحبا مع ذلك مراجعة علي المؤشرات الحضرية التقليدية الخاصة لموئل الامم المتحدة و بعض النقاط بالدستور المصري و اخيرا التقرير النهائي و التوصيات حالة البيئة الحضرية و مؤشرات الاسكان المطبقة علي سبع مدن مصرية.

الثالثة تقديم مفهوم جديد من خلال قدرة و سعة المدينة يتم من خلالها ايجاد اهداف تساعد المدينة يندرج منها مؤشرات حضرية جديدة يمكن عن طريقها رصد اداء المدينة، ثم بعد ذلك تطبيق هذا المفهوم علي منطقة دراسية.

الباب الثاني: تحديات التنمية الحضرية

في هذا الباب سوف يتم تناول مفهوم التنمية الحضرية و الاثار المترتبة عليها و صولا الي توضيح ما هي اهم التحديات الحضرية التي يمكن ان تعوق التنمية الحضرية و ما هي الاحتياجات التي ترتبط وجودها في هذه العملية، حيث يتضح وجود بعض القوي التي تؤثر علي عملية النمو الحضري. ثم سوف يتم التعرف علي اتجاهات التحضر و خاصة في الدول النامية و خاصة في مصر كاحدي هذه الدول. و اضافة الي ذلك، سوف يتم التعرف علي كيفية التخطيط للنمو الحضري وذلك من خلال التعرف علي اهم المشاكل التي تعوق النظام التخطيطي. و اخيرا، الاشارة الي كيفية تقييم التخطيط الحضري و علاقته بالمؤشرات الحضرية.

الباب الثالث: المؤشرات الحضرية

هذا الباب يتكون من جزئين، الا و هم:

الجزء الاول: يتم التعرف فيها علي كيفية نشاة و بداية المؤشرات الحضرية و تعريفها، و اهم المبادئ التي يتم توجيه التخطيط الحضري من خلالها. و ما هي المحددات التصميمية التي لابد ان تتوافر في المؤشرات، هذا الي جانب التعرف علي مدي اهمية في عملية صنع القرار و السياسات التخطيطية و كيفية ارتباطها بالاهداف الخاصة بالمدينة.

ثم يتم تناول المرصد الحضري و انواعه و اهدافه و مدي ارتباطه بالمؤشرات الحضرية. و في النهاية مثال علي حالة دراسية يتم تناول فيها مفهوم الموشرات لمدينة Santiago de Chile.

الجزء الثاني: يتم تناول ثلاث مراجعات، اولا: المبادئ التوجيهية للموئل الامم المتحدة " UN-Habitat " ، ثانيا: اهم النقاط التي تساعد علي التنمية بالدستور المصري 2014، ثالثا: التقرير الاخير لتوصيات الدولة لمؤشرات الاسكان و تطبيقها علي سبع مدن مصرية، و ذلك وصولا الي ايجاد بعض الاهداف الجديدة التي تساعد علي التنمية الحضرية من خلال السياسات الحضرية المستقبلية.

الباب الرابع: الطاقة التخطيطية للمدينة

يتكون هذا الباب من جزئين، و هم:

الجزء الاول: يتناول الاهداف التي تم استنتاجها من الباب السابق و تناولها باستفاضة لتوضيح و شرح هذه الاهداف و ما تشير اليه من ابعاد. هذه الاهداف تساعد علي تعزيز مفهوم التخطيط الحضري من خلال carrying capacity للمدينة، مدي تاثير التغيير في استعمالات الاراضي علي المدينة. و ايضا ايضاح مدي اهمية عملية صنع القرار في العملية التخطيطية، بجانب ذلك تاثير الزحف العمراني الناتج من زيادة النمو السكاني علي المدينة، و اخيرا، مدي تاثير كل ذلك علي الموارد الطبيعية و ادخال مفهوم ايجاد مصادر متجددة للحفاظ علي الموارد الموجودة.

الجزء الثاني: استكمالا للجزء الاول المصاحب بالاهداف التي تم وضعها، سوف يتم ادخال مفهوم جديد لرؤية المدينة و كيفية التعامل معها من خلال" Planning Capa² Energy for city " ، و من منطلق هذا المفهوم الي جانب الاهداف المشار اليها حيتم وضع بعض المؤشرات الجديدة واخيرا، تطبيق هذه المؤشرات علي الحالة الدراسية علي منطقة طريق ابيس و بحيرة المطار و تقييم و رصد هذه المنطقة من خلال هذه المؤشرات.

الباب الخامس: الاستنتاجات و التوصيات

يحتوي علي الخاتمة و النتائج و التي تتضمن العديد من النقاط التي توضح مدي اهمية التنمية الحضرية و الحاجة الي التركيز علي المؤشرات الحضرية كنهج للدراسة، هذا تضامنا الي معرفة و فهم واسع الي التحديات و الاحتياجات الحضرية التي تؤثر علي التغير الحضري. بالاضافة الي قدرة المؤشرات علي قياس التقدم المحرز لجميع القطاعات الموجودة بالمدينة. بالاضافة الي توجيه النظر علي توجيه المشاركة الاجتماعية في عملية صنع القرار ، ايضا البحث يقم اهداف من خلال مفهوم "Planning capa² Energy" حيث يعتبر مفهوم يعتمد علي ستة اهداف يندرج من خلالها مجموعة من المؤشرات التي تطبق خمسة منها علي منطقة الدراسة و التي يتضح ان المنطقة يحدث فيها الكثير منن التغيرات التي تؤثر بالسلب علي المدينة. و ينتهي البحث بالتوصيات النهائية من خلال الدراسة النظرية و التطبيقية.

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R. S. M

Declaration

I declare that no part of the work referred to in this thesis has been submitted in support of an application for another degree or qualification from this or any other University or Institution.

ABSTRACT

The developing nations face the demographic challenges, rapid urbanization, and rapid growth of their cities. In order to evaluate the development of the city and find a way to help developed nations decision maker and planners to do their role. For example, Egypt as one of the most important country in developing nations, within the wide range of urban planning development understandings. Over many years, there was a huge gap in the Egyptian city planning.

The research attempted to create new indicators with several goals as planning capa² energy (PC²E) to evaluate the city and help in enhancing the quality of life in cities. (PC²E) is a system, reflects the environmental capa² to support human activity, from the perspective of resource supply and demand.

It was carried out by; first, reviewed of urban challenges and urban development with the increasing of populations, second, reviewed the conventional urban indicators, third, reviewed the components of urban planning and decision making, fourth, formulate of urban planning concept, and finally, calculated the comprehensive Planning Capa² Energy (PC²E) by creating new urban indicators and implements it on an agricultural road (Abies) in the middle of Alexandria, Egypt as a case study.

Keywords: Urban indicators, Urban planning, Lands to development, Land use changes, Decision- making process, Restore and intensify city management.

SUMMARY

Population increase is one of the most important social problems and challenges which facing the whole world, especially the developing world, where most of the growth of the population is concentrated in urban settlements and small cities, and the most of these urban settlements unplanned. The growth of population is accompanied by many problems, which related to the economic, social and cultural conditions in the society, as well as their negative impact on urban development, especially in Egypt.

Therefore, the population is located around the city in a random manner as a resulting of the imbalance in population and geographical distribution according to their needs and demands. On the other hand, cities have complex systems and when such growth exists without any controls, it results in the absence of most data and information that effect on the development challenges at the city level, especially in countries with limited natural resources. Data are needed for policy and decision making to provide objective measures of trends to avoid past mistakes and re-thinking to find an effective planning policy.

One of the most important features associated with population growth is the increase in human activities, which are considered the main reason for changing the shape of the city such as encroachments on agricultural lands and state lands. Therefore, it should be monitoring and an addition of planning policies and alternative solutions using new methods which more sustainable and effective methods, to control these challenges.

In this sense, the aim of the research is to create a new sustainable mechanism for achieving a better city that can be controlled. This mechanism is designed to impose some goals that promote planning policies and stakeholders from planners, government and citizens by finding urban indicators. In order to update the objectives of the urban indicators of UN-HABITAT, my study adopted a more holistic approach by integrating new targets with new indicators to reflect and assess the progress which had made in the city and the potential of city's development. It will be achieved that by measuring Planning Capa².

Thus, this research aims at finding and understanding the concept of urban development and the obstacles that cause this process to be slow down, by finding the urban challenges and also the reasons of urban change and the conclusion of how to evaluate urban development through indicators. After that, the indicators will be reviewed through the understanding of its concept and how to deal with it and the organisations that deal with them such as UN-HABITAT. In addition, some points will be reviewed in the Egyptian Constitution on the concept of development. Finally, review the final report and recommendations on the state of the urban environment and housing indicators applied to seven Egyptian cities, and reached to find some goals that help develop and monitor and evaluate the city.

As a result, these objectives will be analysed to find a new concept in which deal with the city through the capacity and capability of the city and how to monitor the changes occurring in it by "Planning Capa² Energy", and setting six main goals, each goal achieves an objective through the indicators.

Finally, "Planning Capa² Energy" will be implemented through the applied study of this concept on one of Alexandria's area. This study is conducted through three stages: First, an analytical study for this area, secondly, the selection of three goals for this region.

This region is characterised by the occurrence of some important changes. Third, the selected goals contain some indicators and then apply five indicators. The results obtained from the application of these indicators to monitor and evaluate the performance of the area, which is a vital part of the city of Alexandria. The thesis consists of five main chapters followed by the references and finally the appendices. The following is a brief explanation of the five chapters of the thesis:

Chapter One: Introduction

The first chapter is consisting of the introduction, the hypothesis of research, definition of the problem, aim and objectives and methodology:

The thesis is related to the issue of urban indicators, in order to enhance its main objective, which is the broad understanding of the policies and development plans of the Egyptian cities. This is in addition to knowing the city's ability to identify new trends and assess the progress and development of the city.

Aim:

The main objective of the research is to provide a clear understanding of urban indicators and to monitor the performance of the city by promoting concepts such as promote cooperation between citizens and stakeholders in decision-making, participation in strategic planning and policy development, with emphasising the concept of capacity and capacity of the city.

Methodology:

In an attempt to achieve the previous goals, the research was based on its methodology in three stages:

First, to identify and find a way to deal with urban systems to raise the level of understanding of the urban challenges and urban development that accompanied by increasing population, and to know the urbanization trends of developing countries, as well as finding a means to monitor and evaluate urban plans.

Second, to give an analytical view to urban indicators and to clarify their role in decision-making, with a review of the traditional urban indicators of UN-Habitat, some points in the Egyptian constitution, and finally the final report and recommendations on the state of the urban environment and housing indicators applied to seven Egyptian cities.

Third, introducing a new concept through the capacity and capacity of the city to find goals to help the city, include new urban indicators to monitor the performance of the city, and then apply this concept to the study area.

Chapter Two: Urban Development Challenges

In this section, includes the concept of urban development and its implications to clarify what are the most important urban challenges that can impede urban development and what are the needs associated with its presence in this process, where it is clear that there are some forces that affect the process of urban growth. Also, it was recognised the trends of urbanisation, especially in developing countries, and Egypt as one of these countries.

In addition to this, it was worked on how to plan for urban growth through identifying the most important problems that hinder the planning system. Finally, it was refered is made to how urban planning is evaluated and its relation to urban indicators.

Chapter three: Urban Indicators

This chapter consists two parts:

The first part is known the beginning of urban indicators, their definition, and the most important principles that guide urban planning through them. What are the design determinants that must be available in the indicators, In addition, it was recognised the importance of the decision-making process and planning policies and how they relate to the goals of the city. Also, it will be addressed what is the urban observatory, its types and objectives, and its relation to urban indicators. Finally, reviewed an example of a case study where the concept of indicators for the city of Santiago de Chile.

Second, three main issues are discussed: Firstly: UN-Habitat Guidelines, Secondly: The most important points that help development in the Egyptian constitution 2014; Thirdly: The latest report of the recommendations of the State for housing indicators and their application to seven Egyptian cities, to create some new targets that will help urban development through future urban policies.

Chapter Four: The Planning Energy for City

This chapter consists of two parts:

The first part deals with the goals that were derived from the previous section and dealt with them at length, to explain these goals and what they refer to from the dimensions. These objectives help enhance the concept of urban planning by carrying capacity for the city, the extent of the impact of the change in land use in the city. The importance of the decision-making process in the planning process, as well as the impact of the urbanisation resulting from the increase in population growth in the city, and finally, the impact of all this on natural resources and the introduction of the concept of finding renewable sources to preserve existing resources.

The second part: In order to complete the first part of the objectives that have been developed, a new concept will be introduced to the city's vision and how to deal with it through " Planning Capa² Energy for city ". In addition to these goals, Application of these indicators to the case study of Abeis Road and Lake Matar, to assess and monitor this area through these indicators

Chapter five: Conclusions and Recommendations

This chapter contains the conclusion, results and final research recommendations through theoretical and applied studies.

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List of Abbreviations

UNDP United Nations Development Program.

NASA National Aeronautics and Space Administration.

OECD Organisation for Economic Co-operation and Development.

UNCHS United Nations Centre for Human Settlements.

ADB Asian development Bank.

GUO Global Urban Observatories.

NUO National urban observatory.

LUC Land use changing.

NGO Non-governmental organization.

Capa² Capacity and the Capability of the city.

BA Built-up Area.

LPR Land Pooling /Readjustment.

PPP Public-private partnership.

GOPP General Organization for physical Planning.

NPO Non-profit organization.

PC²E Planning Capa² Energy.

OS Open Spaces.

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1 INTRODUCTION

CHAPTER ONE.

INTRODUCTION

"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect"

Aldo Leopold

Population increase is at the top of social problems with negative multidimensional effects. More than 50 percent of the world's population already lives in urban settlements. Thus, most urban growth occurs in urban centers of medium size and small towns, especially in developing countries such as Egypt.

Cities are complex systems that are affected by many social, economic and environmental factors. In addition, most data and information are largely absent, and domestic resources are limited to development challenges. Also, governance and institutional capacity are weak. The phenomenon of unplanned growth is evident and is characteristic of developing countries as a result of the urban problem, which is linked to social conditions, the different economic and cultural community.

It can be said that, the high population growth in resource-constrained or underutilised countries and the poor distribution of population leads to a lack of resources, energy, land, water pollution, traffic congestion, burden and pressure on human living standards, and finally, impedes the development process.

According to published research and studies, there are some solutions that had been taken, but without merit as a solution and as a means to fully control this problem. This calls for using new, more sustainable, and more effective methods to control and deal with these challenges. There is a global trend for some international organisations, which is considered a method to find a solution that called urban indicators. Urban indicators in developing countries have shown great potential to measure the city progress in achieving the goals and focus on monitoring the performance of cities, particularly as population growth, climate change and resource depletion are increasing [1].

Research Problem

Human activities which resulting from population growth is one of the most important and the main reasons that cause and change the shape of a city, (see Fig.1-1). As the poverty is not in the money, but in how a human can live a better life in a good place. Due to increased human activities, there is a lot of encroachment on land and appeared a lot of slums, thus, it must continue for monitoring and make an addition to planning policies to create new indicators to keep up with the changes incident to the city's urban areas, (see Fig.1-2).

Research Hypothesis

Like many developing countries in the last half-century, Egypt had been faced difficult urban planning challenges due to its economic and population explosions; there is a contradiction between the speed and the quality [2].

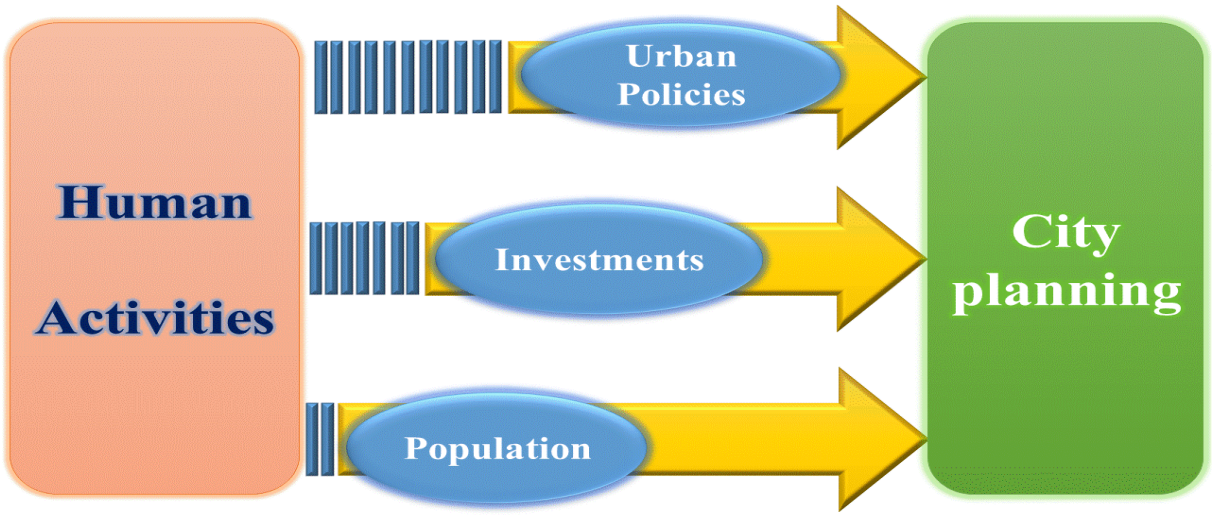

Figure 1-1: Relationship between Human and City Planning (Researcher, 2015).

There was a side of interest with respect to that, and this what was found at some points in the Egyptian Constitution*, 2014 [3] and the final report and recommendations for the state of the urban environment and housing indicators applied to seven Egyptian cities† [4].

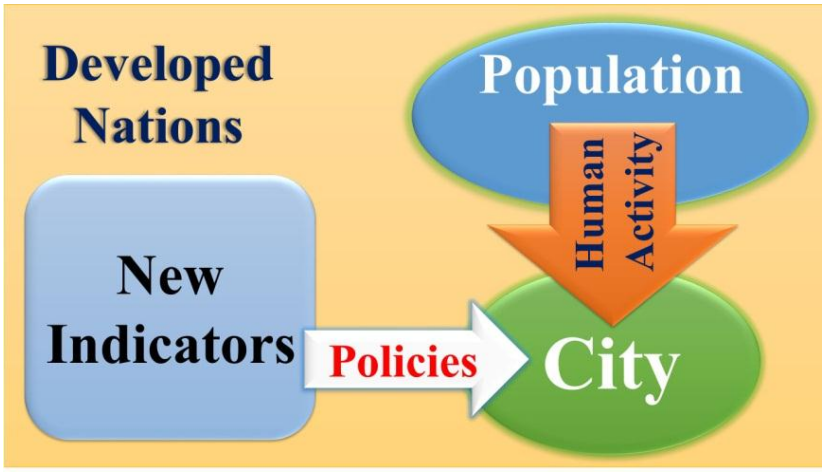

Figure 1-2: The Effect of the Population and Polices Makers on the Shape of City (Researcher, 2015).

*The Arab Republic of Egypt 2014, the main parts which are related to this research conceptualization could be summarized in three parts as: 1) Part II: articles number 27, 29, 32, 36 and 41, 2) Part III: articles number 77 and 78 and 3) Part V: articles number 175, 176, 177 and 180.

† The report aims to discuss and display the output of the study which based on urban indicators related to the goals of the Millennium and specialized in the housing indicators to the major capitals city of the seven economic regions of Egypt.

At the same time, high growth rate of real estate activities sector at around 13.3% in the four quarters of 2014/13 compared to about 4.4% from the same period of the previous year [5].

Climate change and resource depletion are seen to be interrelated with population growth which considers three sinister problems. Therefore, Stakeholders of planners, government and public people are officials on the three problems which previously mentioned. Urban policy makers have a huge problem of the lack of appropriate data at the city level. Data is required for policy making to provide objective measures of conditions and trends to avoid and correct mistakes, and to rethink in effective policy.

Many orgaizantion cares about collected data and information by indicators such as UN-HABITAT, Asian Development bank and World Bank. In order to complete the goals of urban indicators of UN-HABITAT, my study had adopted a more holistic approach by integrating **NEW GOAL WITH NEW INDICATORS**, to show the progress towards achieving it in the city, and the extent of susceptibility of the city to development. All of this was achieved by measuring the Planning **Capa² (city capability and capacity).**

Research Important

There must be a new point from knowing the city and it will be determine through the capacity and the ability of it. Each area has its advantages if stakeholders know these features and how to deal with it by the existence of appropriate indicators, where every area has its own indicators, so the problems of the city can be solved.

Each region has its own indicators which differ from the others because of the different capa². This will be achived by Stakeholder who should think internationaly by designing human needs (poverty, natural resource and amount of waste) in accordance with three wicked problems which mentioned before.

Thus, it must be clear that the main aim is to put new indicators for cities entitled: **"Planning Capa² Energy".** This will be explained in details in Chapter four by finding appropriate indicators help to assess the city.

Furthermore, the new list of key indicators will be taken as a starting point to supplement the general list of Habitat Agenda of 1996 which is endorsed by the government [6], and refine these based on user needs of Egyptian cities.

Aim and Objectives

The research is mainly concerned with the urban indicators issue. Its primary aim is a wider understanding of Strong policies and the development plans of Egyptian cities. In addition, the ability of cities must know to set new trends and approaches which have been addressed as a sub-concern. Thus, it must be clearly that the main aim is to put **‘‘ *New Urban Indicators for City* ”** in a way that could be addressed and applied to urban settlements to embody the state, processes, and strengths of a city’s progress. It must reflect the current status of the urban economy, environment, ecological and social construction and expected to contribute towards the measurement of a city's progress in achieving objectives and focusing on monitoring city performances, (see Fig.1-3).

Figure 1-3: Concept of New Urban Indicators (Researcher, 2015).

The Specific Objectives are.

- To provide a clear understanding of the urban indicators and monitoring progress toward achieving city.
- To emphasize the **‘‘Planning Capa² Energy”** approach as the one capable of conducting the urban indicators in the urban development.
- Fostering of increased cooperation and networking among all stakeholders, in decision-making at all levels, taking into account its cross-cutting nature, for example through strategic planning and policymaking in particular for developing countries.
- To highlight sub approaches (capability and capacity of city) to work between the general approaches and applicable methodologies.
- To develop conceptual model that puts the **‘‘Planning Capa² Energy Concept”** into framework by linking its wider understanding to Capa² and planning.

Furthermore,

- To promote the capacity of city.
- To Promote Land use change.
- To Encourage and support (restore, replace and intensify)
- To Involvement in decision making process.
- To Promote Urban sprawls energy.
- To ensure renewable resources energy.

Methodology:

This research is an analytical deduction research work, which ends up with new urban indicators entitled: **"Planning Capa² Energy".** The concept of the planning capa² is as a system that based on the equalization between resource supply and demand of the city.

This new indicators with several goals which are:

1- promote the capacity of city; 2- promote land use change; 3- Encourage and support (restore, replace and intensify); 4- Involvement in decision making process; 5- Promote Urban sprawl energy and 6- Ensure renewable resources energy.

To tackle previously mentioned methodology the following three parts would be achieved as shown in figure 1-4:

Part One: Identifying Correlational:

The identifying method was used in order to determine and find a way to deal with the urban systems through three steps which were:

- The first step: upgrading understanding of urban challenges and urban development with the increasing of populations especially in developing nations.
- The second step: knowing the diversity of urban context and trends of urbanization especially in developing countries.
- The third step: finding how to monitoring and evaluation of urban plans.

Part Two: Analytical Reconsideration:

The analytical reconsideration methods depended on two steps to clarify the urban indicators, analyse and focus on urban planning with the most famous organisation (UN-Habitat) in urban indicators field. Besides that, illustrate the role of decision making in Egypt, These steps are:

- Reviewing the conventional urban indicators. (Linking the important of data collected and the achievement of this need to understanding what's happened in a city).

- Reviewing the components of urban planning and Decision Making. (UN-Habitat urban indicators, Egyptian Constitution 2014 to know rights for Egyptian citizen and the final report and recommendations of the state of the urban environment and housing indicators applied on seven Egyptian cities in September 2012).

Part Three: Concept and Empirical Study:

The concept and empirical study method was used to achieve the thesis hypothesis to find new urban indicators by the following steps:

- Formulate of urban planning concept.

- Analyze previously collected data regarding and create main outlines of new urban indicator in six goals.

- Calculate the comprehensive Planning Capa² Energy (PC²E) by creating new urban indicators and implements it on an agricultural road (Abies) in the middle of Alexandria, Egypt as a case study.

Therefore, the programme of the research goes in a hierarchical sequence. Each part is linked to the conceptual understanding of Capa².

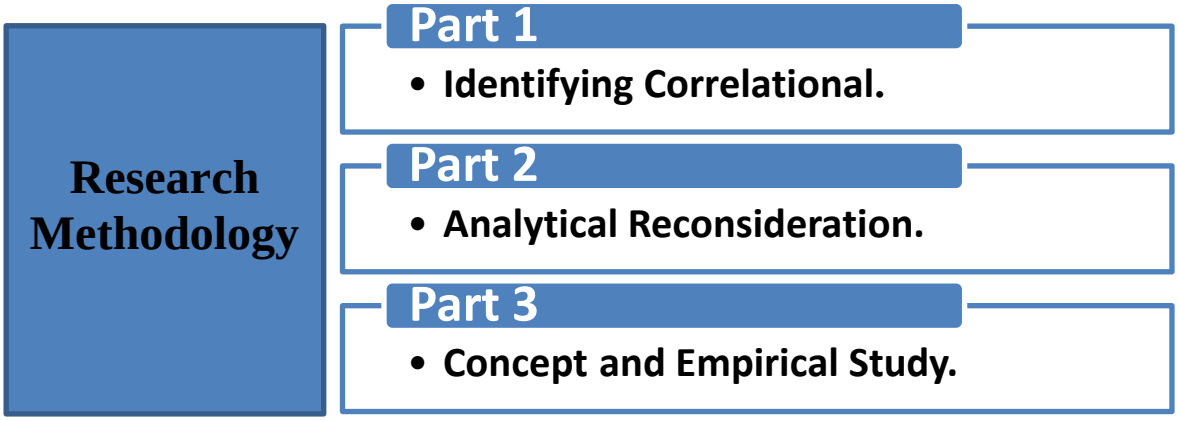

Figure 1-4: Thesis Methodology (Researcher, 2015).

Research Flow Chart:

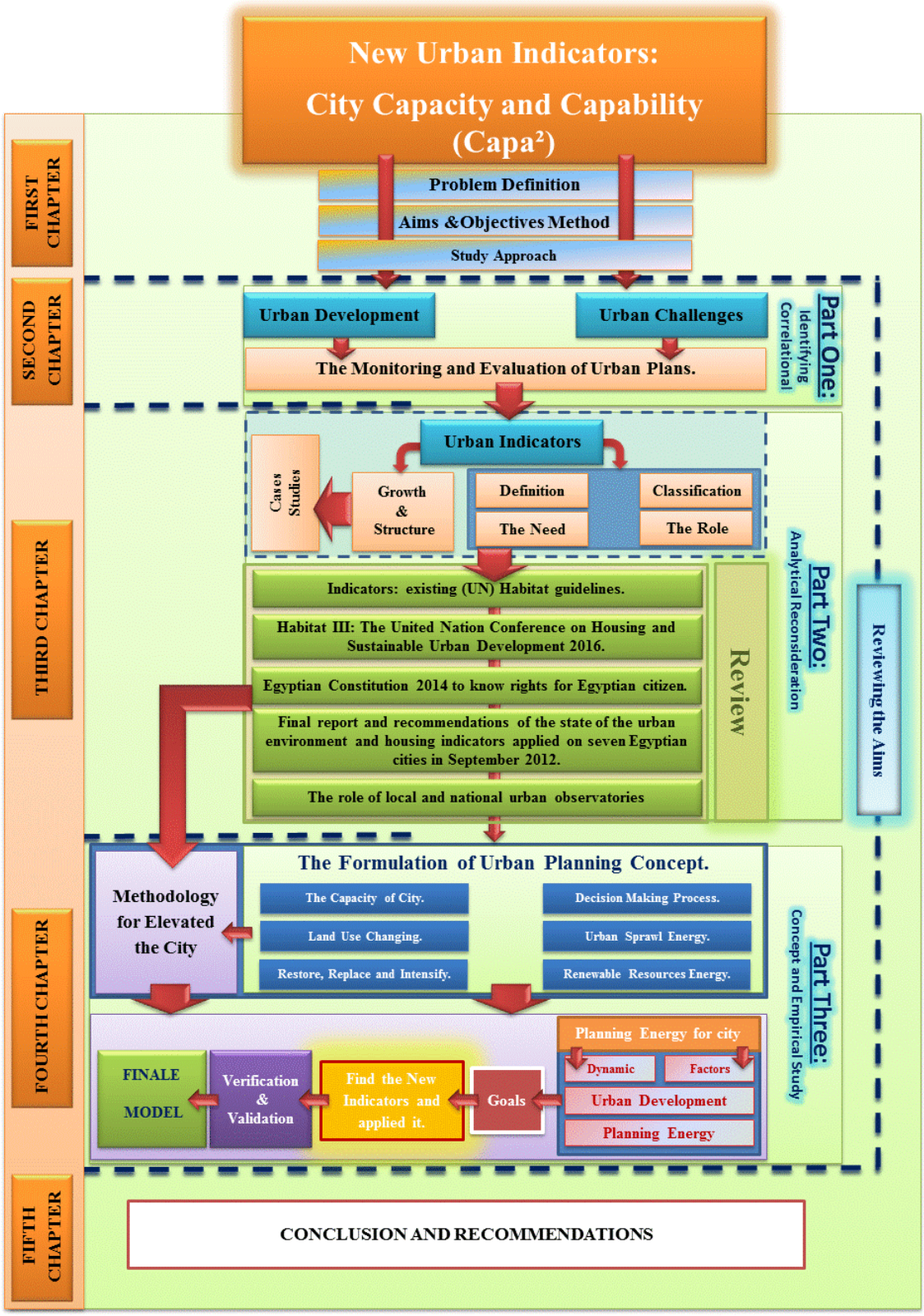

Figure 1-5: Skeleton of the Research (Researcher, 2015).

Urban Development and Challenges

2

CHAPTER TWO.

2.1 Introduction

This chapter covers three mainly points under the title of urban development and Challenges (see Fig. 2- 1):

- Urban challenges and the needs and what are the main forces for those challenges?
- Trends of urbanization especially in Developing countries and the effect of urban growth and the problems of that growth.
- Monitoring and evaluation of urban plans.

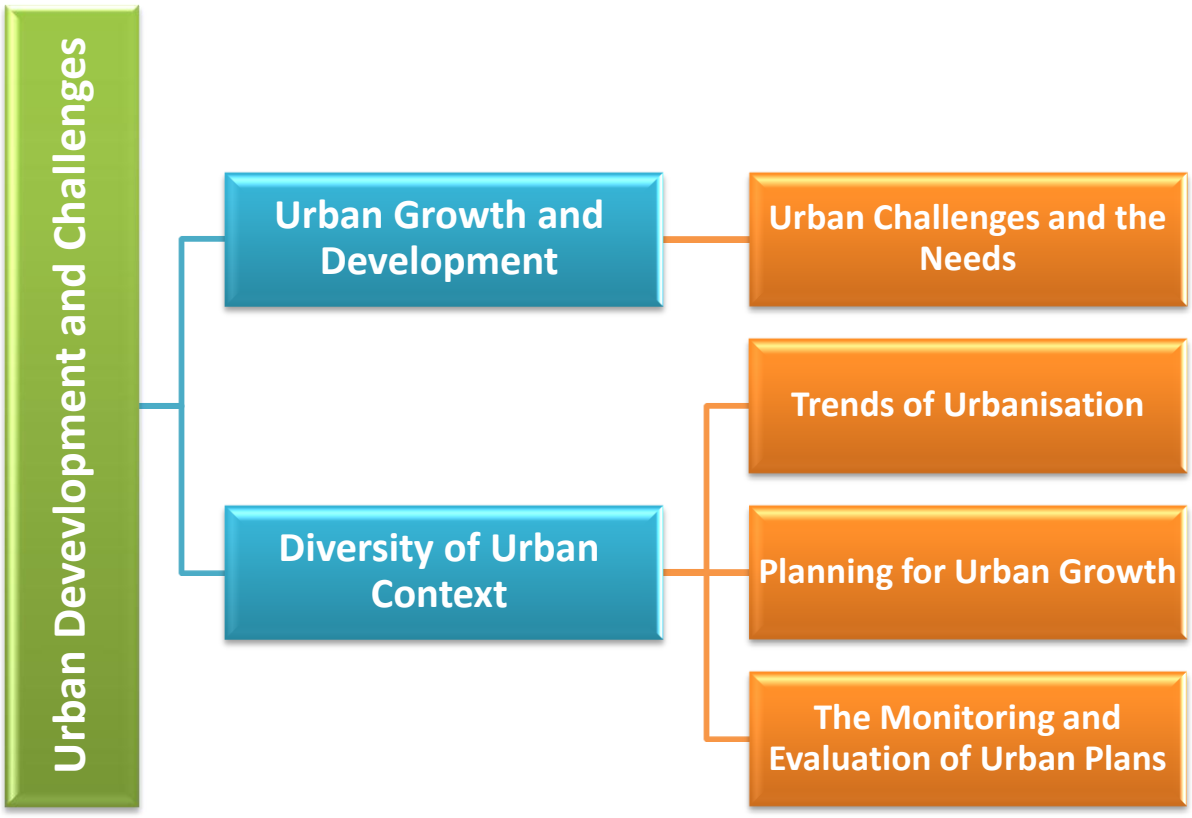

Figure 2-1: Chapter Two Structure (Researcher, 2016).

2.2 Urban Growth and Development

Cities are dynamic places and they are depending on the flow of resources, people, ideas and global connection where economic activities have a huge effect on the character and form of a city. In developing world, it is clear that, cities are growing faster than developed countries. Therefore, the activities whether from human or industrial have clear impacts on the city. In 2050, a lot of challenges will appear which linked with urban growth and 95 percent of urban expansion will take place, (see Fig. 2-2) [7].

Urban growth is a process occurs due to the volume of economic activity, associated labor, population attraction and leads to the configuration of large urban structures which need

coordination in terms of service delivery, public investment, fiscal policies, political representation and accountability. As a result, urban growth involves weak and unstable regions appear next to a lot of challenges which will be explained in the next pages as it should be known in order to complete the urban development process [8].

Figure 2-2: Percentage of Urban Population Growth Predicted to be in Developing Countries [7].

Now, urban development is a process where several major changes for urban areas under the influence of a combination of factors which are: social factors, economic factors and population growth which is the most important factor of them. Population increase has a clear impact and explicit, which causes some changes in form and function appearance. Also, urban development is defined as the relationship between places and scale. This leads to rediscover and find links between urban and political practices for citizens firstly, companies, scientists, and decision-makers to address these urban challenges [9].

2.2.1 Urban Challenges and the Needs

In case of development, it is needed to know the challenges as a first step to face the development problem. Urban areas are affected by several phenomenons such as depletion of natural resources, energy, economic instability and climate change, whether in developed or developing countries. Recently considered planning activities solve many of the problems and the forces that influence by the government in a manner of necessity and desirable [10].

In the developing countries, the systems of urban planning do not deal with urban problems in an appropriate manner through the development of realistic standards for the development of urban land. The government and stakeholders should be consensus to achieve common goals which include many tasks to achieve social-spatial equity, environmental sustainability, and economic productivity in the urban area and fight the forces which increase of urban changing.

The local government should be aware about some principal considerations such as: 1) Improving local services, 2) Achieving legal authority, 3) Renewing the policies which deal with rural land conversion and losses of agricultural lands, 4) Tending private sector to slum occupants to face the increasing of urbanization, 5) Treating and decreasing environmental degradation, 6) Improving spatial plans in local development and caring about slums and squatter areas and linked all land uses in a dynamic way, 7) Promoting the mobility for urban transport special for the poor and finally government should deal equally with

policy makers and civil society by giving all the tools of evaluation of alternatives for urban growth.

2.2.1.1 Main Forces Affecting Urban Change

There are several forces influencing the urban changes, these forces could be summarized as follows:

- **Environmental Challenges:** The environment is subjected every day to many challenges through many factors because of human rights or natural disasters. Cities including urban settlements are vulnerable to such risks through the negative effects of urban development and excessive exploitation of natural resources, the climatic changes, water resources degradation and instability [11].

- **Economic Challenges:** The recession and the current changes in the global economy are strong motivation to start and look for a way to get rid of the economic crisis. For example, what happened in Africa 2009 and the severe slowdown in economic activity in the region as a whole and the reduction of demand for Africa's exports.
  Therefore, the critical problem of economic will be the means to return to the path of sustainability of world growth through the implementation of new policies is aware of conscious and a full understanding of the markets and financial institutions that need reform [12].

- **Institutional Challenges:** During the past three decades, globalization had become a fundamental thing applied in various fields. In late 1990, good governance had become an important development in the developing countries and had the attention of United Nations agencies such as the United Nations Development Program (UNDP) in the practice of democracy, human rights and civil rights and encouraging civil society participation to achieve common objectives, (see Fig. 2-3).
  The Urban Planning depends on the existence of a local government and a strong civil society and that is not owned by the developing countries [13].

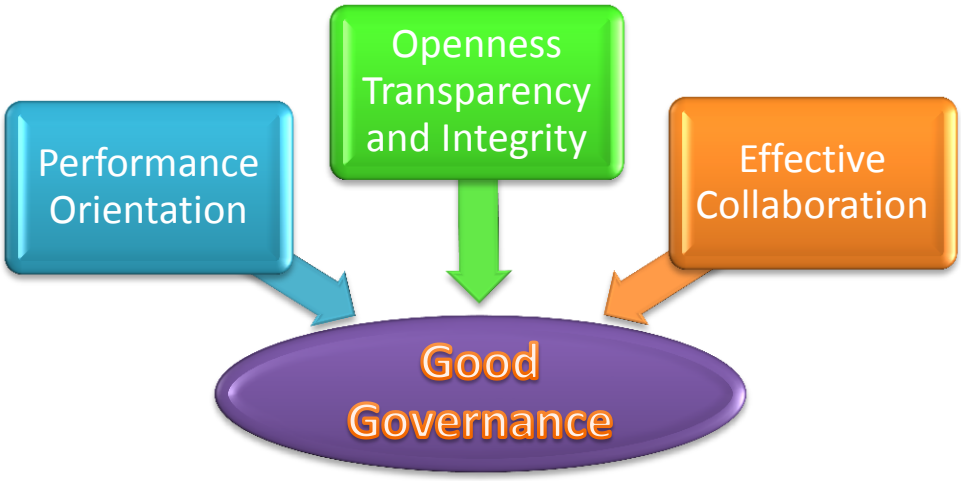

Figure 2-3: Benefits of Good Governance [14].

- **Civil Society Challenges:** The success of participatory planning conditional by civil society relations and the degree of acceptance of the democratic and this in all parts of the world where there is increasing in community divisions, in both of developed and developing countries because of disparities in income and employment. Participation between the State and society are the best means to achieve the best [15].

- **Urbanization and Urban Growth Challenges:** In the past decades, major urban changing was happened to few cities all over the world in conjunction with the economic changes. It is certain that more than half of the world's population lived in urban areas; by 2050 it will rise to 70%, especially in the developing regions. In Africa the average urban growth during the 2000-2005 was up to 3.4 percent per annum [16].
  Africa and parts of Asia are a great advantage of urbanization, as they are on the highest level of mobility of the population and such factors have an influential reflection on planning, (see Fig. 2-4).

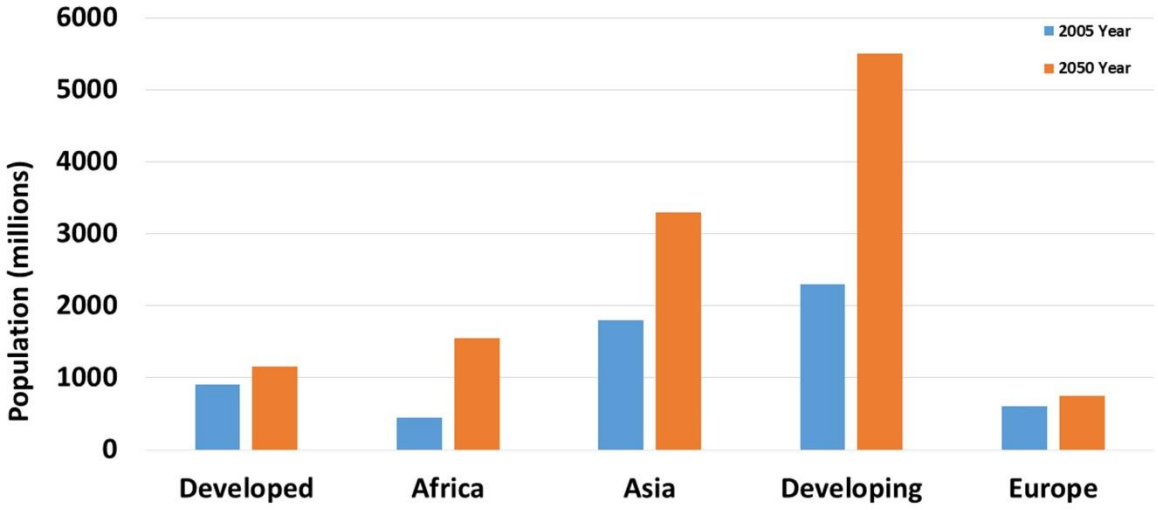

Figure 2-4: Urban population by region (2005-2050) [16].

- **Urban Socio-spatial Challenges:** The economic change has a major impact upon the socio-spatial change in cities. The planners and urban managers looking forward to facing the new spatial forms and processes which were neglected and out of the local government control. In the cities, market forces, land speculation, and real estate were the response to local policies as new approaches to attract the investments [17].
  The growth of investment is the motive of local authorities for the need to planning as a tool to manage the pressure and balancing of the social and environment concerns. In many poorer cities, spatial forms are largely driven by the efforts of low-income households to secure land that is affordable and in a reasonable location such as Egypt, West Africa and other poorer cities around the world. Such areas do not have access to complete service [18].

In my opinion, after knowing the challenges and the forces which affected on urban change, the real reason and most obvious problem that most of the master planning is not aware enough about the way of life of populations and their needs with the rapidly growing and informal cities.

2.3 Diversity of Urban Context

The urban context differs from region to another, and this is noted when we see the planning of some countries in the developed world. There is a huge different between developed and developing in some countries. The resulting message is that the city is the challenge, and living in the country is the solution [19]. Therefore, the planning needs to understand the diversity of urban contexts to avoid several problems.

2.3.1 Trends of Urbanisation

In the early 20th century, the world has higher rate of urbanization [16]. As shown in table (2-1), the level of urbanization in 1950 was 29 percent and reached in 2007 to 49 percent. By 2050, 70 percent of the world population will live in urban areas. In developing regions, the urbanization is less than in developed regions.

2.3.1.1 Developing Countries

The urban context differs from region to another with demographic, size, spatial and economic factors, mediated by globalization and location, which are the main reasons for rethinking for urban planning through the understanding of the diversity in urban context. In addition, the continuous increase of the population which has a negative impact on the process of urbanization. This is clear in the developing countries which experiencing the fastest rate of urbanization in parts of the world of more than 3 percent per year [20] and lead to increasing migration from rural to urban areas (See Table 2-1). Urbanization in the Middle East and North Africa are characterized by considerable diversity [21].

Table 2-1: Global Trends in Urbanisation (1950-2050).

Region	Urban Population (million)					Percentage Urban				
	1950	1975	2007	2025	2050	1950	1975	2007	2025	2050
World	737	1518	3294	4584	6398	29.1	37.3	49.4	57.2	69.6
More developed region	427	702	916	995	1071	52.5	67.0	74.4	79.0	86.0
Less developed region	310	817	2382	3590	5327	18.0	27.0	43.8	53.2	67.0
Africa	32	107	373	658	1233	14.5	25.7	38.7	47.2	61.8
Asia	237	574	1645	2440	3486	16.8	24.0	40.8	51.1	66.2
Europe	281	444	528	545	557	51.2	65.7	72.2	76.2	83.8
Latin America and Caribbean	69	198	448	575	683	41.4	61.1	78.3	83.5	88.7
North America	110	180	275	365	402	63.9	73.8	81.3	85.7	90.2
Oceania	8	13	24	27	31	62.0	71.5	70.5	71.9	76.4

Source: Researcher, based on [16].

For example, Cairo and Istanbul are the biggest two mega-cities in the Middle East and North Africa with 11.9 million and 10.1 million inhabitants, respectively [16]. The increasing of populations is a cause of transformation for some settlements such as in Cairo which is the traditional settlements coexists with the modern districts and squatter settlements. In another case, the external growth and expansion for Cairo and Alexandria which are 200 km apart, there is a possibility that they will be merged in the future to form a single city if the expanding process will continue [21].

2.3.2 Planning for Urban Growth

Now, urban Planning in developing countries becomes more difficult than before, especially in Africa [22]. As a result of urban growth in the lack of planning, slum, squatter and settlements are increasing in many areas with fewer infrastructures and degrading environmental conditions. This requires considering future plans as a vision of how to deal with such circumstances. For example, how to address the housing, water supply and sanitation needs with the environmental change. For towns and cities, urban growth is considering a chaotic to sustainable development.

2.3.2.1 The Problems of the Planning Systems

Planning systems and modern urban have many criticisms, despite some country try to develop the methods, but that the systems for the modern planning are still pursued in all parts of the world.

It should be noted that there are many problems associated with the planning systems, including:

1) Failure to understand the lifestyle of the population especially in poor cities which characterized with rapid growth.

2) Failure to give the necessary considerations to facing the challenges in planning.

3) The marginalization of communities and do not compliance with organizational aspects of planning systems.

4) Lack of understanding and awareness of population about how they should involve in decision making as a civil society to know their rights.

5) Tended to face ancient beliefs associated with planning systems and modern. In another way, there are many problems linked to the master plans prepared by foreign experts, the process of its implementation within the context of the institutional culture.

6) Believe that Egypt faces many problems such as:

- Lack of the housing units, but the real problem lies in the lack between the existing number of housing units required for a certain category in terms of physical potential and volume of wishing for habitation from this category, so people solved that problem by building the indiscriminate housing.
- Variance in building densities and physical infrastructure and bad distribution of the population and the lack consistency as a result of lack of balance between population growth and economic activity and between urban transitions and industrial development [23].
- The spread of the phenomenon of informal housing.
- Insufficient attention to rural housing.
- Lack of real estate maintenance and preservation.

2.3.3 The Monitoring and Evaluation of Urban Plans

As mentioned before about the challenges and problems in the systems of planning. It can be seen that, in both developed and developing countries, planning and managing cities are an increasingly complicated proposition. The challenges in the provision of safe and affordable housing improved incomes and social stability. In all countries, urban planners and decision-makers need to know the best methods and how to use limited resources to address the complex urban challenges. To achieve these, decision-makers need information and direction that can be provided by urban planning. Monitoring and evaluation of plan help decision-makers to make decisions about resources to enhanced sustainability and improved the quality of life for the inhabitants [24].

All organizations even public or private such as UN-Habitat and Asian Development Bank[‡] must contend with considerable challenges in their operating and decision making. In view of the rapid change in local markets always there is a need and continuous manner to the evaluation and monitoring of activities and performance and can define this process as **(Monitoring, Evaluation, and Related Indicators)** [25]. The evaluation takes many different forms as there are many international agencies that require evaluation for programs and projects, especially associated with the development of initiatives such as urban development.

2.3.3.1 The Defining of "Monitoring, Evaluation"

Monitoring can be considered as a method of information gathering and analysis activities that can affect the performance of the current plan [26].

Evaluation helps decision-makers to measure the effectiveness and achieving the objectives of the plan to be implemented and the efficiency of the resources that have been used. Three main forms of evaluating urban plans exist:

1) Ex-ante evaluation (undertaken during the plan formulation before the implementation starts). 2) Formative evaluation (undertaken as part of plan administration during the plan implementation) and 3) Summative (ex-post) evaluation (undertaken normally after implementation of plans) [26].

The process of monitoring and evaluation has been described in several methods and depended on sponsoring agency. Therefore, there are common stages when design monitoring and evaluation [27]:

- Set goals and outcomes.
- Select outcome indicators to monitor.
- Collect baseline data on the current condition.
- Set specific targets to reach and dates.
- Regularly collect data to determine progress.
- Analyze and report the results.

[‡]UN- Habitat is one of the international agencies which monitoring and evaluating. It helps countries and cities design, collect and apply policy-oriented indicators data. It will hold a conference soon which is Habitat III for a "New Urban Agenda".

Asian Development Bank is the one of institution all his policies and strategies to promoting three complementary agendas on inclusive economic growth, environmentally sustainable growth, and regional integration and it has social and economic indicators to support the government.

In urban plans, monitoring and evaluation reflect achievement for healthy community goals and objectives. Many organizations worked by these methods of monitoring and evaluation, but those must have a supportive culture.

Indicators represent a role in providing quantitative data and qualitative information where this data and information provide the evidence needed to support the evaluation, so that the indicators have a significant role in local government administration and also the urban development of any state, and that research will address it later.

2.4 Summary

It is clear from the above that there are urban challenges that dominate the city, along with some of the forces that affect urban growth. Urban challenges are as; Environmental, Economic, institutional, Civil Society, Urban Growth and Urban Socio- Spatial.

As a result, there are many problems in the planning system that hinders planners and decision-makers. However, there are some international organisations such as Habitat whose purpose is to find some solutions to such problems through monitoring and evaluation of urban plans. The organisations have been developed a plan by finding appropriate indicators, the role of these indicators assess the problems which existing in the city.

Conventional Urban Indicators and Decision Making

3

CHAPTER THREE.

3.1 Introduction

This chapter consists two parts:

- **The First Part: Conventional Urban Indicators**
- **The Second Part: Components of Urban Planning and Decision Making.**

▪ The First Part: Conventional Urban Indicators

In this first part will explain in details all about urban indicators. In many cities around the world, urban growth made huge gap and problems towards the approach of urban development and how the growth effect on the resources and services, (see Fig. 3-1).

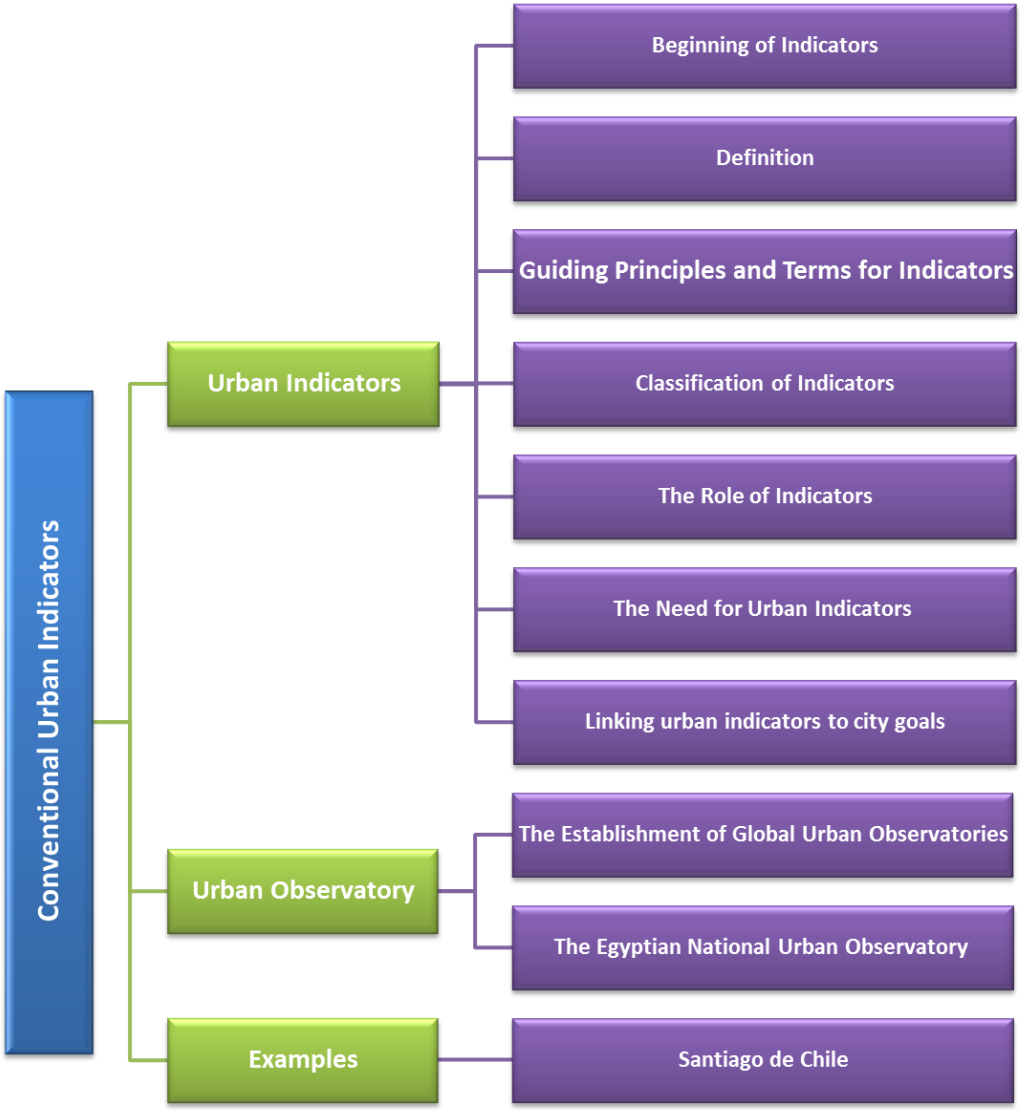

Figure 3-1: Chapter Three, First Part Structure (Researcher, 2016).

It can be seen that, there is a lack of the level of services in many parts of slum and urban settlement. Consequently, most cities are suffering from inadequate data and information which control the ability to understand the force of society and bring the affected policies to deal with the urban development. The absence of data and information affected in the sector of urban planning and management, thus the government has not the ability to do their roles in a good way. Therefore, many organizations have a role in collecting the data for cities and help to create urban indicators by preparing workshops for some selected cities.

Urban indicators are important tools for meeting those challenges and measure objects which need in a development process. The end of the previous chapter, presented the monitoring and evaluation and how indicators took a role in evaluation progress which leads to present the overview about urban indicators in this chapter and the role of urban indicators for managing cities.

3.2 Urban Indicators

''An indicator is like a lighthouse, if we don't pay attention we'll end up crashing on the rocks''

Robert H. Armon

There are many key indicators has an alarming story, people don't pay attention to the specific facts about urban development. Urban indicators closely linked to development and sustainable urban development and this requires a good understanding and always looks forward to find new indicators to cope with what is happening in the world and what the urban indicators refer to.

3.2.1 Beginning of Indicators

Indicators become a common thing in worldwide; most of the global institutions as the United Nation and World Bank were interested to some local community indicators projects. In fact, the start of indicators was in the 1940s when the monthly economic indicators were first published to measure the buoyancy of the US economy.

This pushed scientists to think to set indicators to measure social change in the mid-1960s, and in 1966 titled as 'social indicators' by Raymond Bauer who was commissioned by the National Aeronautics and Space Administration (NASA) to examine the impact of the space programme on US society. This idea was met with success and vogue in some other international organisation such as the Organisation for Economic Cooperation and Development (OECD) and the Social and Economic Council of the United Nations. The influence of social reports was obvious and began to develop that trend. In the early of 1990s, started a new wave all over the world for indicators in try to save the environment and creating a new approach to sustainability and quality of life indicators at all spatial scales. In Rio de Janeiro, stated in Agenda 21 of Earth Summit conference to provide a solid base for decision-making [28].

Habitat II conference in Istanbul in 1996, offered some national reports towards achieving sustainability. In 2001, there was Habitat II conference and the Istanbul +5, which allocated by a quantitative index of 23 and 9 qualitative indicators [23].

Member States and the Habitat Agenda Partners have requested that UN-HABITAT continues monitoring urban conditions worldwide. Since then, the magic start and consider as a starting point for ‘sustainability indicators', 'quality of life indicators' and ‘performance indicators'.

3.2.2 Definition

Most of the people unknowing the indicators as a word or understand the meaning of it. In fact, indicators have many definitions such as:

Indicators could be as policy to save resource distribution [29]; some types of assessing and measurement tools when indeed to know about particular phenomenon [30] or that help to evaluate the success of the roles assigned to the policy process such as urban development [31] and could also be defined as is the quantitative description of the environmental, social, economic, political and physical qualities any urban system [28].

On the other hand, indicators defined as a part of data system descriptive of the social system or some of the rules which are collect and organize data to assigning meaning in the future [32]. Finally, indicator provides the measurement of concepts, problems. Also measure the divergence between desired and current states and this leads us to think about how the appearance and the emergence of indicators.

3.2.3 Guiding Principles and Terms for Indicators

In opinion of many experts, a good indicator must have some terms and conditions. These terms and conditions can be summed up as follows [33]:

- **Representativeness:** the indicators must be clearly linked with specific problem or phenomenon and all factors which surround of it, was very obvious;
- **Accessibility:** it must measure it in easy way, monitor it automatically and accessible it with standard techniques;
- **Effectiveness:** it must be directly and easily usable to quantify interventions, costs and benefits.

3.2.3.1 What Indicators Should Reflect?

- Needs of governments, cities and partners.
- Habitat II Commitments.
- Habitat’s strategic vision & operational activities.
- Agenda of international development community [34].

3.2.3.2 The Design of Indicators:

There are two stages when indicators designed and used them for monitoring and evaluating progress towards the achievement of certain goals:

First stage: must be a statement of those goals.

Second stage: it is a specific approach, particularly with regard to housing and environment to collect information only concerning conformance or non-conformance to set standards.

From previous definitions of indicators, it can be seen that indicators have a relation with data and statistics (see Fig. 3-2).

The data triangle divided into four sections as phases, each phase depended on the others. In the bottom of the triangle, there is a phase of collected data or information. This data is usually assembled into statistics, which is the next phase and this phase organize in tables of the framework. The next phase is the stage of indicators, which are usually single numbers, mostly ratios, such as the unemployment rate or the economic growth rate. Finally, the top is indexes which are the designed indicators [35].

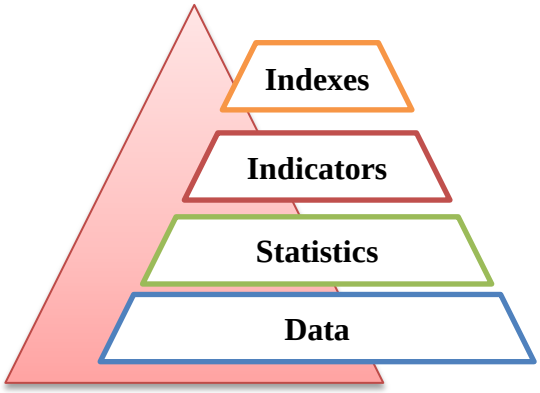

Figure 3-2: The Data Triangle (Researcher, 2015).

3.2.4 Classification of Indicators

Indicators have many types of classification which are by international agencies or studies, for examples, there are three main approaches are applied by different international agencies:

First, there is a policy-related approach originating in the social indicators movement in the late 1960s, which is now used by the World Bank, the United Nations Centre for Human Settlements (UNCHS) Indicators Program, and the Global Urban Observatory.

Second, the thematic approach is used in the State of the Environment Report and by the United Nations Development Program [35].

Third, there is the system approach, which includes a physical model or systems diagram of the city [36].

According to Westfall, the classification [35] is more flexible by the main types of indicators which encountered in policy are:

1) **Performance Indicators**, which measure the performance of sector, organization or cities and also can be used by management for strategic planning purpose [37];
2) **Issue-based Indicators**, which focus on some issues such as the indicators include crime and safety, air quality, urban sprawl, etc.;
3) **Needs Indicators**, which measure need or deprivation.

In addition, UNHCR's OMS uses two types of indicators: impact indicators and performance indicators [38].

3.2.5 The Role of Indicators

Urban indicators have many different roles and many potential users, such as:

- Alibegovic´ and Hezri found indicators like a learning tool [36], communication tool, and management tool for policymakers [39], citizens, researchers, the private sector, and international agencies [40].
- Indicators could be a report card [41], to measure progress towards achieving a target and ensure the accountability of governments to their citizens [42], (See Fig. 3-3).

Figure 3-3: The Role of Indicators is help to Measure the Goals Performance and Progress for all Sectors in City (Researcher, 2015).

- Indicators help to understand the present conditions of the system for urban analysis and provide data in some situations in different communities [30].
- In some cases, promote the changing for population [43].
- Leads many function, for example, social indicators reveal the size of the changes occurring in the community and located the change in any direction.
- Also, statistical indicators play their role in the rationalization of the policies and decisions [44].
- Allows for analyzing and monitoring for urban change.

3.2.6 The Need for Urban Indicators "Policy and Decision Making"

The governance and policy-making has been changed to be in line with the dynamic process of socioeconomic and other forces. So indicators used as a policy tool, shaped and applied at various fields and their importance. This tension is the reason to push the government departments to invest resources on gathering new information to improve indicatorsresearch.

- Indicators can be mighty instruments for understanding and communicate urban development processes [45];
- They are helpful for stakeholder participation and empowerment as well as for discussing differing interests [46];
- Sometimes indicators represent the social problems and from here they are helping the communication between city authorities and their stakeholders [47].
- When indicators linked with decision-making and applied, they allow for achieving sustainable urban development;
- Indicators always need to keep pace with the development of the incident changes now such as Habitat III conference [48] and ADB support [49].

3.2.7 Linking Urban Indicators to City Goals

Most cities differed from the others; each one has her own conditions and every city needs various goals to apply them. Thus, there are a lot of indicators for every city and region. For cities which, develop and apply urban indicators system, it would have some steps:

Firstly, review the priority concerns in their strategic plan. Secondly, put a list of urban indicators. The strategic plan should be put for short and long term, also, city performance goals and objectives need to be cleared and identified. Thirdly, measure the progress in sectoral strategies, institutional reforms, and financial forecasting. Fourthly, follow up the performance of city officials, department heads and employees to improve city performance.

3.3 Urban Observatory

The urban observatory is an interactive exhibit that gives you the chance to compare and contrast maps of cities around the entire world from one location. It aims to make the world's data both understandable and useful [50].

3.3.1 The Establishment of Global Urban Observatories

As extended to indicators which depended on data and statistics of cities, UN-Habitat was the starting point to establish the Global Urban Observatories (GUO) in 1997. The main aim for Global Urban Observatories is to find a scientific solution to the urban crisis for better cities.

The GUO initiated its partnership with local and national authorities in selected countries to develop a system for urban data collection with a framework of locally relevant as well as globally linked data. In 2000, UN-Habitat seeks to achieve goal 7, target 7D: by 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers. In order to this, UN-Habitat wanted more data and urban information.

Therefore, Global Urban Observatory in partnership with cities around the world and cooperative urban monitoring systems [51]. The GUO addresses an urgent need to improve the worldwide base of urban knowledge by supporting governments, local authorities and organizations of the civil society develop and apply policy-oriented urban indicators, statistics and other urban information.

3.3.1.1 The Purpose of Global Urban Observatories

The purpose of GUO is supporting governments, local authorities and civil society [52]:

- Improve the collected data and analysis it to be more effective for urban policies.
- Promote a better urban decision-making.
- Help identify and integrate urban data needs.
- Exchanging data, knowledge and experience.
- Make data available for all stakeholders for more effective participation in urban decision-making.

3.3.2 The Egyptian National Urban Observatory

Due to Habitat II and what mentioned about the importance of national observatories to be linked with regional urban observatories in countries and the attention of the Ministry of Housing, Utilities and Urban Communities in Egypt to create their own national observatory.

In May 1995, the ministry decided that the General Authority for Urban Planning prepared to create national and local urban indicators and follow-up as the headquarters of the National urban observatory [53], (See Fig. 3-4).

3.3.2.1 The Aims and Objectives of the NUO

- Monitor and evaluate national development policies and provide decision and policy makers with information on urban conditions and trends.
- Organize the partners' efforts in monitoring and evaluation activities.
- Establish local urban observatories to create an integrated network to link them.
- The Urban Observatory, in cooperation with the General Organisation for Physical Planning (GOPP), has prepared case studies of the urban environment, housing indicators and maps for land use. These maps have all data about the city, such as agricultural land, existing buildings, land space, blank blocks, etc.

Figure 3-4: The Administrative Structure of the Current Urban Observatory, (Research, 2016).

3.4 Example

The example point to the fact that cities have problems in planning systems, lack of resources required to address the urgent need to reconsider supply side management in all sectors and improve efficiency to achieve more success for cities by indicators which help in a way or another.

3.4.1 Santiago de Chile

Santiago de Chile, one of Latin America cities which characterized by rapid growth of cities and increase of urban population due to birth surplus and in-migration and that cause high land demands. The city has a lack of data for her policies and planning and many cities trying to put the concept of sustainable urban development by integrating ecological, economic, social, and cultural aspects of urban development in a long-term perspective (See Fig. 3-5).

In 2007, started research initiative by cooperated with scientists from five research centres of the German Helmholtz Association and four partner organisations in Latin America. Based on the interdisciplinary analysis and provide the concept of sustainable urban development by overcoming the ecological, economic, and social risks of mega-urbanisation.

3.4.1.1 The Problems of City

Area of Santiago de Chile has comprised 34 municipalities, but the studies within selected municipalities and the main aim refers to land use management. The city is characterised by increasing in urbanization and planned as well as informal, but it has many problems especially with flood hazards becoming risks, the location of some building where are on the peri-urban piedmont, the clearing of avalanche forests in mountain regions and the changing of land use is rapid, which is the reason for attention people to living in hazard-prone areas.

All of these problems make the need to develop indicators which deal with these risks for sustainable land-use management. These indicators should be used to assess both the land-use changes and the closely connected development of flood risks.

3.4.1.2 The Concept of Develop Indicators

In this case, the indicators based on a theoretical and methodological fundamental and used scientific concept ("top-down" approach) (See Table. 3-1). On the other hand, when sets the indicators taken decision making into consideration. One of the trends is designing new policies to promote the urban environment. As a result of that, The Regional Office of the Chilean Ministry of Housing developed a set of indicators to monitor land use changes and sets land use plans based on the needs and using GIS system to monitoring public and private investments.

Table 3-1: Purpose –Adequate Sustainability Indicators.

Purpose, user	Complexity	Types, numbers	Examples
1- Communication, awareness raising General public, politicians	High, but intuitively understandable	**Indices and / or Key indicators** (few, 1-3)	Ecological footprint Sustainability index
2- Decision making Administrations, interest groups.	Middle	**Key indicators** (medium number, 5-20)	Built-up area/ha Degree of imperviousness
3- Research, monitoring Experts, scientists.	Low, specialized	**Monitoring indicators** (medium-high number)	Green spaces/ municipality. Proportion of settlements in risk Prone areas. Number of people living in flood prone areas.

Source: Researcher, based on [45].

The System Proposed About Actions of Urban Developers and the Indicators Included: urbanised surfaces outside urban areas per year and municipality, total investments in infrastructure per year and municipality, new green areas per year and municipality, number of new housing per year and municipality, new areas of industrial land per year and municipality, changes on population density per municipality, changes on land prices per municipality.

In 2006-2010, there are indicators of the regional development strategy to provide the framework for making regional public policy decisions and provide investments. Indicators

linked with environmental problems such as green areas per inhabitant and solid waste recycling rate.

The mentioned indicators are not relevant to practice for two reasons: 1) not achieve all goals and the institutions cannot apply them, 2) they are not applied in decision making.

3.4.1.3 Land Use Indicators for Santiago de Chile [45]:

It's noted that city has urban growth, increasing population and urban expansion. For this reason, the land use is changed and thus leads to an increase in flood risk and urban vulnerability. So, indicators depended on: population, built-up area, imperviousness, green spaces, and elements at risk. Thus, it must respect for changing in land use and land cover.

To ensure that the indicators set a 'bottom-up approach' is very valid by involving stakeholders, the representation of important local practical knowledge, and the comprehensibility of each indicator. These indicators especially green spaces are considered a sustainability indicator, which is serving the flood risk. The selected indicator set is characterized as follows:

1. Inhabitants per ha and municipality: This indicator refers to the population density.
2. Built-up area per municipality: This indicator points at the predominant land-use type in a megacity.
3. The degree of imperviousness per municipality: This indicator adopts the aspect mentioned above and refers to the total amount of impervious surface in a municipality.
4. A number of green spaces per municipality: A number of green spaces in hectare per municipality depict the average greenness of a municipality.
5. The share of green spaces in the built-up area of the municipality: This indicator refers to the proportion of green spaces to the built-up area within the municipality.
6. A number of people living in flood-prone areas per municipality: The amount of population per municipality that is living in areas facing a high flood hazard level.
7. The amount of new settlements and infrastructure developments in areas facing a high flood hazard level (one or more events every two years): This indicator shows the direction of new urban growth and allows identifying the vulnerability of inhabitants or buildings.

From here, it can be seen that a set of indicators collected to improve urban development in Santiago with involving of stakeholders and decision-making with respect to urban planning and flood risk management. Indicators used here as the communication tool between administrative levels and sectors.

In this case, Santiago showed that a set of tools can develop them to be more valuable, addition and can be applied in practice even governance deficits and a strong influence of the real estate market in urban expansion strategies.

▪ The Second Part: Components of Urban Planning and Decision Making

This part covers the main idea and the aim of this study. In the previous chapter, there are many of international organizations linked with indicators as a solution of any problem around the world. For example of these organizations is, United Nation, The World Bank, Asian development Bank and UN-Habitat. Their general aims are:

- Long-term strategic framework promotes economic growth, environmentally sustainable growth and regional integration.
- End extreme poverty and promote social and environmental sustainable human settlements development and the achievement of adequate shelter for all.
- Provide leadership and catalyze action in promoting and coordinating implementation of internationally agreed development goals, including the seventeen Sustainable Development Goals.

Therefore, when creating or develop indicators, it should be reviewed for their works and this is the aim of this chapter.

The work in this part goes in three main parts, (see Fig. 3-5):

- Firstly, review for guidelines for most famous and important agency, which is UN-Habitat.
- Second, review Egyptian Constitution 2014.
- Finally, review the final report and recommendations for the state of the urban environment and housing indicators applied to seven Egyptian cities in September 2012.

This review will help for achieving the aim of this research as a start point to put goals and after that sets the list of new indicator. The new indicators will be in the same form of UN-Habitat.

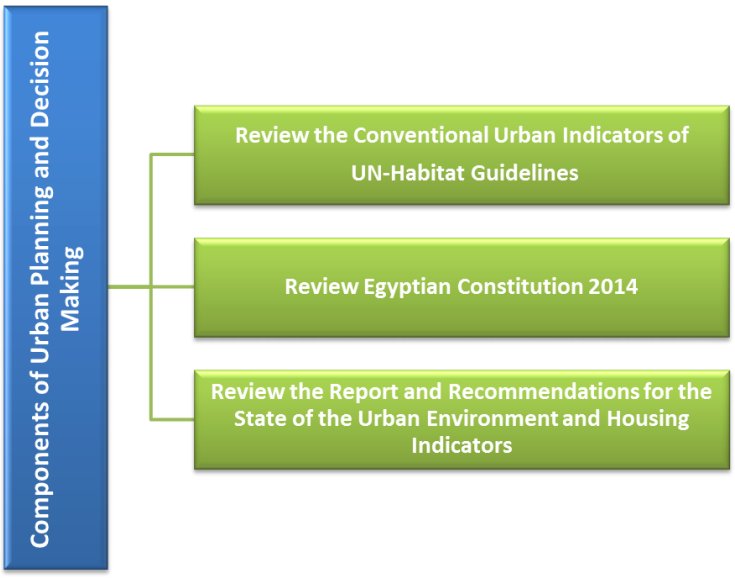

Figure 3-5: Chapter Three, Second Part Structure (Researcher, 2016).

3.5 Review the Conventional Urban Indicators of UN-Habitat Guidelines

UN- Habitat is one of the international agencies which monitoring and evaluating urban condition worldwide. In 1988, The Urban Indicator program of the United Nations Human Settlements was established by (UN- Habitat), as the Housing Indicators Program. In 1996, the trend of it was changed to sustainability [54]. UN-Habitat is in continuously renewed for more development and that what happened in Habitat III conference in 2016. Habitat III is "The New Urban Agenda" to promote a new model of urban development and find a relationship between them [55]. The main point in New Agenda is the goal 11 which refers to various objectives for urban future [56].

3.5.1 UN-Habitat Guidelines

Referring to the report of United Nations human settlements programme in 2004, the urban indicators in UN-Habitat was designed to monitor, evaluate and reviewing global urban conditions.

UN-Habitat agenda including five chapters entitled: 1) Shelter, 2) Social development and eradication of poverty, 3) Environmental management, 4) Economic development, and 5) Governance. Each of these chapters composed of several goals. Every goal promotes many indicators and related to housing, human settlements, land, services, safe and healthy life and authorities.

The indicators were about twenty key urban indicators, a checklist of nine qualitative data subset and thirteen extensive indicators. Indicators formed as:

- **Key Indicators:** are numbers, percentages and ratios.
- **Checklists:** questions which are check boxes for yes or no answers.
- **Extensive Indicators:** which are intended to complement the results of the key indicators and qualitative data.

The concept of design that indicators collected data in two clusters (cluster A and Cluster B):

- Cluster A: indicators gained data from Census, Demographic and Health Surveys, Multiple Indicators Cluster Surveys and national household's surveys;
- Cluster B: indicators gained data from other sources.

In some cases, it not only depended on data but also the decision of some experts to get results. Latterly, this methodology will be followed when setting the list of the new indicator and applied it to the case study in chapter four.

3.6 Review Egyptian Constitution 2014

Egypt is one of the developing countries. During the past six years, Egypt exposed to several events. The revolution of January 25, 2011, was the most important event which changed many concepts in a bid to claim many reforms, whether political or economic, all of these demands in the presence of a new vision to Egypt for development and sustainable development. This will be achieved by creating a new constitution to achieve these demands.

3.6.1 Review Egyptian Constitution 2014 to Know Rights for Egyptian Citizen

The Arab Republic of Egypt (Draft Constitution 2014), which was prepared by a committee 50, consisted of six parts including 247articles. It includes all sides which related to people, society, policies, and city [3].

The main parts which important and related to this research conceptualization in three parts as 1) Part II: Basic Components of the Society, 2) Part III: Public Rights, Freedoms & Duties, 3) Part V: The System of Government.

Each part of them refers to serious objectives, wherein specific articles. It can be seen that in Part II: articles number 27, 29, 32, 36 and Part III: articles number 77 and 78 and Part V: The System of Government articles number 175, 176, 177 and 180.

3.6.1.1 The Aims of Mentioned Articles

- Achieving prosperity through sustainable development and social justice.
- Protect and expand agricultural land, and will criminalize encroachments thereon natural resources will preserve and effectively exploit them.
- Motivate the private sector to undertake its social responsibility in serving the economy and society.
- Striking a balance between population growth rates and available resources.
- Ensure the citizens' right to adequate, safe and healthy housing in a manner which preserves human dignity and achieves social justice.
- The needs of local units in terms of scientific, technical, administrative and financial assistance.
- Follow up the implementation of the development plan, monitor of the different activities, and exercise of oversight over the executive authorities.

3.7 Review the Report and Recommendations for the State of the Urban Environment and Housing Indicators

(The Final Report and Recommendations for the State of the Urban Environment and Housing Indicators Applied to Seven Egyptian Cities in September 2012)

The report aims to discuss and display the output of the study which based on urban indicators related to the goals of the Millennium and specialized in the housing indicators to the major capitals city of the seven economic regions of Egypt (Cairo, Alexandria, Ismailia, Tanta, Minya, Asyut, and Aswan). There is another, which is finding common mechanisms to deal with the pressing developmental issues and start towards the clear identification of some problems by all authorities and experts. Also, aims to develop the Egyptian urban indicators and activating the role of urban observatories in urban development.

The report has been devised output through 150 different areas in the seven cities, according to the levels of housing and scientific methodology in design and sampling in order to be representative of the population, so get out groups of indicators illustrate the quality of buildings, Quality Urban and access to housing and vacancy rates. Also, mentioned that in housing, there are indicators of the distribution of services, buildings and public facilities

connection, the economic activity of the population, the proportion of vacancy Residential units, agricultural land, etc.

3.7.1 The Most Important Points that have been Mentioned and Which have had a Major Role in this Research [4]:

- Rationalizing the decision-making process and bridging the information gap not only within state institutions but the private sector and civil society through the Urban Observatory.
- The need for universities and research centres to participate in how to convert the information to the indicators and policies that serve the decision-makers experience which showed the role of universities in the indicators.
- Reconsider the data that result in indicators and to take into account the events of recent developments Accompanied the Revolution.
- Propose recommendations and the results will help decision-makers.
- Necessity updated indicators.
- Beneficiaries of the indicators of multiple beneficiaries of indicators between (real estate developers-Hardware Government - civil society organizations) .
- Link from the observatory of the global and local rates until measuring it.

3.7.1.1 There is Three Main Themes Discussed:

First, the use of indicators in the preparation of architectural plans and housing strategies in Egypt:

1. How can the use of indicators in the preparation of urban housing schemes and strategies?
2. How can the use of indicators in popular participation and strategies housing operations?

Second, the use of indicators in monitoring the implementation of urban planning and housing strategies:

1. How can the use of indicators in monitoring the implementation of the outputs of urban plans and housing strategies outputs?
2. How can the use of indicators in assessing the extent to which the results of the outcomes of urban housing schemes and strategies?

Thirdly, proposals to develop and improve the working methodology:

1. Do we need to prepare the planned indicators such as indicators of how popular participation in the preparation and implementation of the scheme?

3.8 Summary

The previous reviews have shown that there are common goals between them, which are: First, the importance of community participation in the political and state and respect for human rights of life and on the other hand, the importance of the relationship between urbanization, environment and the population. Secondly, there are political and social challenges for cities that turn it very quickly into a huge area. This leads us to find solutions that will help the city in terms of planning and reduce the size of the problems were facing now.

In addition, taking advantage through the questions which rose by the latest report and consolidate what has been referred to in the Egyptian constitution. Finally, take advantage of how indicators designed which have been mentioned in the first review by UN-Habitat.

Those solutions are to find suitable targets and put indicators support these goals and promote the main forces of urban changing and the challenges which mentioned in chapter two by improving environment, urban, social and economic, these goals are:

1- Promote the carrying capacity of city.
2- Promote Land use change.
3- Encourage and support (Restore, Replace and Intensify).
4- Involvement of decision making process.
5- Promote Urban sprawl energy.
6- Ensure renewable resources energy.

These goals will explain with all details in the next chapter.

4 The Planning Energy for City

CHAPTER FOUR

4.1 Introduction

This chapter consists two parts:

- **The First Part: The Formulation of Urban Planning Concept.**
- **The Second Part: Planning Capa² Energy.**

▪ The First Part: The Formulation of Urban Planning Concept

This part deals with the abstract of goals which mentioned in the previous chapter, (see Fig.4-1). It is a trial for answering the following question: what is the importance of these goals? Understanding all subjects, which is related to them?

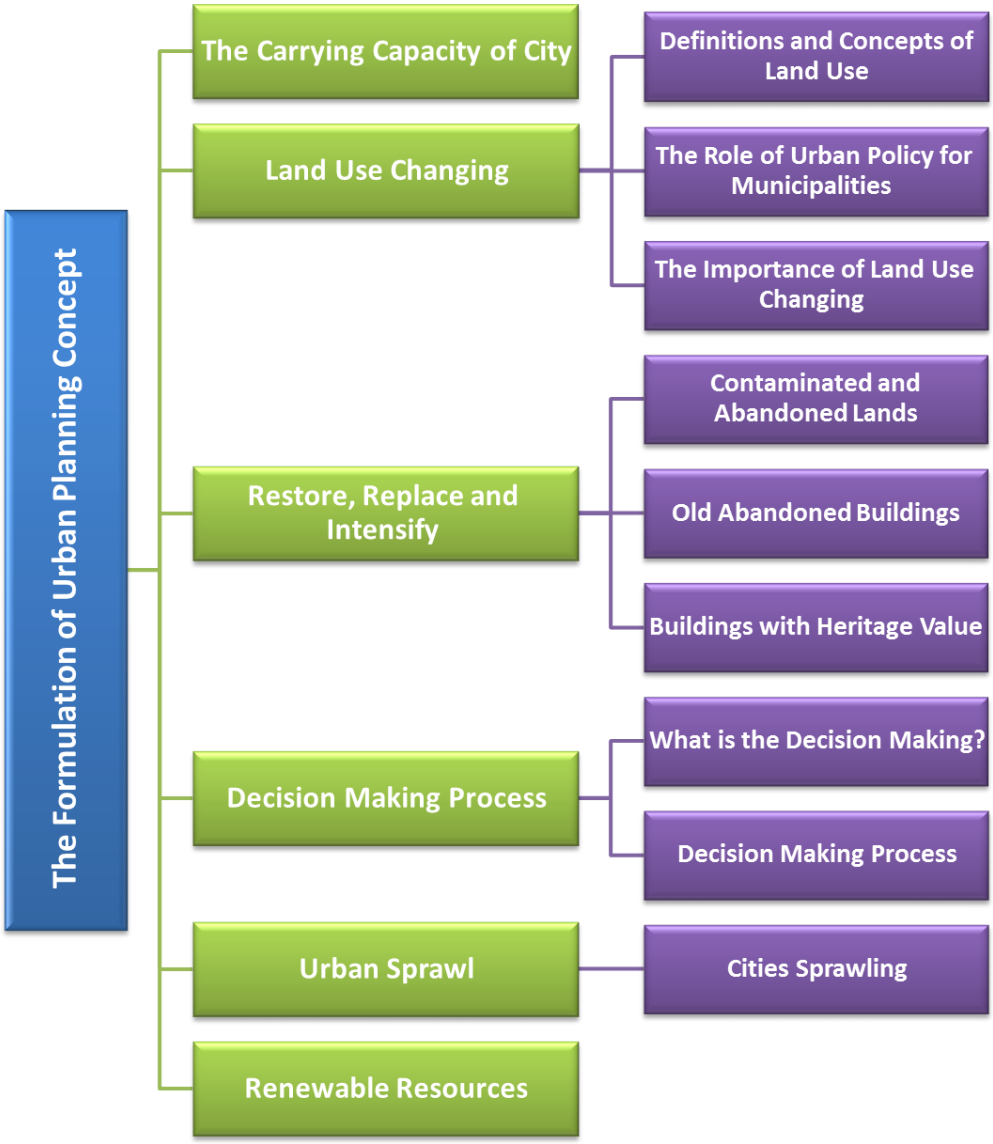

Figure 4-1: Chapter Four Structure (Researcher, 2016).

Urban environments are a set of important ecosystems that have been transformed by human activities. In addition, the human has the effect on global and regional environments through the development process, manufacture and construction of places. As examples of these activities, the increasing and continued population growth, which has a direct impact on the environment by caused a change in form and size of a city and the emergence of the challenges which mentioned in chapter two.

As a result of that urbanization changed a lot of areas in a city. The most proof of the impact of human action on the environment around us that what has happened to Lake Mariot and the huge contraction in the size of the lake and the volume of pollution in it. All of this due to human activities that are held by the business and dumping of toxic waste impacted negatively on the natural environment and the waters of the lake, which is reflected in the fish, and establishment of settlements and urban slums.

The rapid urbanization has impacted on the environment as well as economic, social, political process. There is a link between human activities and city. Human activities affected on carrying capacity of resources, land use change and decision making process in urban development.

It can see that on environmental quality in both quantities and quality of air, water, land, etc. Therefore, that what Motivate to put the six goals which improve the environment, urban, social and economic.

The work in this chapter consists of six main parts of goals:

- The Carrying Capacity of City.
- Land Use Change
- Restore, Replace and Intensify.
- Decision Making Process.
- Urban Sprawl.
- Renewable Resources.

4.2 The Carrying Capacity of City

Carrying Capacity is the how the city can handle with human activities and it considers the capability of environment and the act which happened in the city. Carrying capacity has a relation with the resource which can support region. On the other hand, planners have thoughts that carrying capacity is the ability to reconcile population growth within the city, but without any damage (See Fig. 4-2).

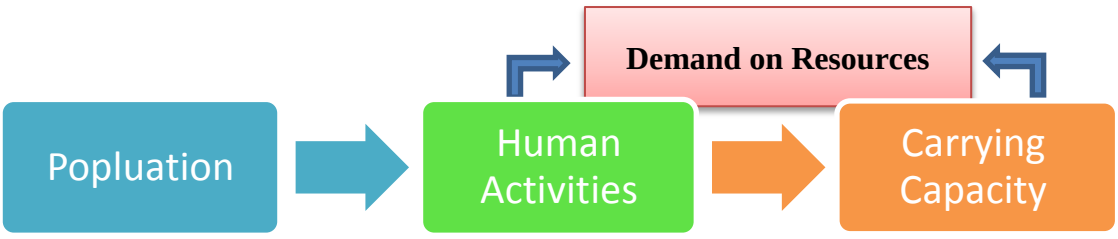

Figure 4-2: Relationship between Population and Carrying Capacity (Researcher, 2016).

In addition, it can see that carrying capacity is in a dynamic process and supported many demands in both of natural or artificial system. So, it can say that related to scale of city when depended on the environmental resource and the human action [57].

Carrying capacity affected by many factors, such as - economy of city, - the culture of society and - the conditions of the environment [58].

Therefore, researchers attracted the attention and did some studies about urban carrying capacity in the most main fields, which are land, water [59]. Researchers determine some factors which helped when evaluating the process of urban carrying capacity.

These factors related to energy, green areas, roads, water, housing, and waste treatment [60] (See Table. 4-1). Andersen in 2012 mentioned that when deal with carrying capacity and set the indicators especially for wide area must think in many principles because it have a lot of sides and complicated [61].

Table 4-1: Components of Urban Carrying Capacity.

Urban Carrying Capacity			
Environmental and Ecological	Urban Facilities	Institutional	Public perception

Source: Researcher, 2015.

Finally, to promote the carrying capacity of a city, it should look to the city that has a lot of environmental resources but also has human power, the power of the housing. In Egypt, there are a lot of buildings which must reuse them in multi-table uses instead of building and regarding lands for new projects. So when creates indicators, it must have carrying capacity dimension for city.

4.3 Land Use Changing (LUC)

Through studies by scientists, it has found that there is a close relationship between urban development and land use. But urban development has many factors and forces that control them, which have been mentioned earlier in chapter two and including economic, social and political change and these factors are also reflected in the land use. In 2015, Niemi in his search about environmental indicators confirm that human action the main reason for changing in urban environment specially changing in land use [62].

4.3.1 Definitions and Concepts of Land Use

We have a clear definition of the potential land uses in terms of:

- Historical perspective. - Environmental perspective. - Urban perspective.

- Historical perspective: Is meant to develop the land with the use of the types of activities that allowed them over the past period of time, whether these activities [63, 64].
- Environmental perspective: Is the human interaction with the environment [65]. It's also a complex process caused by the interaction between nature and social systems in different spatial and temporal scales [66].

- Urban perspective: Is the main focus of instruction traditional land division [63, 64].

After known about the definition of land use, addresses in our mind what is the land use change? Land use change: key element shows the extent of human influence on the natural environment and development of it. That influence on natural system includes soil, water, atmosphere and agricultural lands. It considers also the reason of climate change [67].

In 2007, Rietveld make study about the models of land use change to improve and support the spatial planning. These models considers as a tools to support analysis of the reasons and the dynamic of results for land use. Any kind of models of land use should be based on the theory of microeconomics.

4.3.2 The Role of Urban Policy for Municipalities to Guide Urbanism and Determine Land Use

The distribution of land use is responsible for the presence or absence of various activities; so planners have the responsibility to distribute land uses consistent with the natural environment.

The trends which affecting the decision-making for the distribution of land uses exist [66]:

There are two factors, both internal and external factors have impact on the decisions of land use as shown in table (4-2) in terms of economic resources, social, market policy and the needs of the, such as land owners or specialists from government and employers environmental or socio-economic units or organizational units, such as farms. Decision-making process must be specifically linked to the rules; these rules can be based on either artificial or experimental data.

Table 4-2: The Impact of Land Use on Any Decisions Site.

Land use Decision	
External Direction - Economic and Social Network. - Policies and Market.	**Internal Direction** - views and Intentions. - Characteristics and Personal Location.

Source: Researcher, 2015.

The experimental data can facilitate the understanding of the processes of land use to ensure the diversification decisions. Land use strategies at the regional scale, it needs to simplify the diversification among all agents.

4.3.3 The Importance of Land Use Changing

There is a massive change happen in Land use patterns as a result of urban expansion. That is related to the rapid of urban population growth, urban housing and economic investment [68]. The increasing in land use change lead to increase in motorized transport, increasing for using energy [69], air pollution and decreasing of agricultural land [70].

Land use change caused several transformations in both agricultural and natural ecosystems, so if planners want to measure the rate of that transformation, it needs to put indicators to support that and trying to achieving the balance between saving the natural resource, development and the rapid of growth rate of population with lack scientific information and exchange technical. That will improve the land use change [71].

4.4 Restore, Replace and Intensify

To benefit as much as possible from the land and property unused, this involves not only the construction of new and interesting structures, but an attempt to reduce energy consumption in an attempt to affect the concept of sustainable development of an urban area.

Can be handled from this point with many of the lands and properties, for example:

4.4.1 Contaminated and Abandoned Lands

There are some abandoned and contaminated lands which can be cured which were considered as a serious problem especially in the industrial countries [72]. It can be classified as contaminated land, which its nature or that it polluted because of previous uses. This may cause a risk to the proposed development and also on the health of living organisms and the ecosystem and consequently on human health and property.

As a consequence, establishing a number of projects that will benefit the community, such as Lake Mariot was suffering from pollution, (See Fig. 4-3). It becomes a danger in the environmental balance of the region and to the health of the population of the city because of contamination. It is the most polluted lake in the northern Nile Delta (See Fig. 4-4), local pollution due to heavy volumes of untreated waste launch large-scale industries through the channels and sinks [73]. The government must clear the pollution from it and build some recreational clubs which serving the region.

Figure 4-3: Drainage of Factories [74].

Figure 4-4: The Pollution of Lake Mariot [74].

4.4.2 Old Abandoned Buildings

Are buildings that need some repairs and renovations? Instead of demolition, it can be reused and take advantage of them in one way or another, and such facilities exist in abundance. For example, in Alexandria, there are some closed government facilities such as hospitals and the purpose of the closure is repairing, but there is any reform and also there are some vital installations in important areas of the country. If there has been interesting in such facilities, it will benefit the state.

4.4.3 Buildings with Heritage Value

The re-use of facilities or old buildings is a target which has heritage value such as many of the buildings in the Heritage folder. There is prohibited from demolition, it can be re-used with another using, such as museums because most of these buildings represent a heritage value terms due to: an important personal was living in it or the design of famous architect or represent a significant architectural value. There are many attempts to demolish these buildings. As example, Villa "Aghion", (See Fig. 4-5) designed by French architect Auguste Perret one of the most important and famous architects of the world [75], in the wabor el Meyah, downtown Alexandria which demolished (See Fig. 4-6).

Figure 4-5: Villa "Aghion"[75].

Figure 4-6: Villa "Aghion" after demolishing [75].

Therefore, it needs to promote like this buildings. As example, eastern district of the city of Alexandria has a number of these buildings up to nearly 464 building.

4.5 Decision Making Process

Planning is a process depends on the future outlook with the use of scientific and theoretical application under the laws of planning to achieve an integrated form of planning but over the years, there demanded lands which increases due to changes that occur in the city. So it must be some steps for that process.

4.5.1 What is the Decision Making?

It is the ability to put the right decisions and approval of all parties participating in the process. The aim of these decisions is to strengthen the strategic goal of any organization and to guide stakeholders yield by these decisions [76]. It must be choosing a decision among several choices and alternatives taking into consideration the pros and cons of each choice [77].

4.5.2 Decision Making Process

To make a successful decision process, it must involve people in it, with some important elements such as data collection, choices and values. In fact, lack information is the main problem when any organization wanted to take decision making, so it takes a lot of time to collect data and take choices.

The approaches of collaborative or participatory in planning and decision making are a new target to find a method to deal with stakeholders and to ensure that all conception are clarify in decision making [78].

For more successful decision making process, it should to improve the role of stakeholders such as (local organizations, NGOs, the citizens themselves, etc…) in urban decision making [79] (See Fig. 4-7).

Figure 4-7: List of Stakeholders, (Researcher, 2016).

Nowadays, the huge develop in land use caused a lot of challenges, so urban decision-making process becomes very complicated but increasing the numbers of stakeholders will help the decision making to promote the urban development (See Fig. 4-8).

Figure 4-8: Urban Environmental Concentration, (Researcher, 2016).

Therefore, to improve the quality of decision making process, it must consider three steps in this process (See Fig. 4-9). These steps including factors, if any organizations have these factors, it will get the effectiveness which wanted to have it.

- Step one: it should have (good environment, Strategy, Ethics, Information and feedback about the problems).
- Step two: puts the Programs, options and tries to avoid the risk.
- Step three: focus on resources and opportunities.

Figure 4-9: The Steps and Main Factors for Improve the Quality of Decision Making, (Researcher, 2017).

4.5.2.1 The Role of Inhabitants in Decision Making Processes

First of all, the involving of inhabitants is necessary to promote the urban decision making and this process depended on two aims, (see Fig. 4-10) [80]:

- To help architects, planners and policy makers to identify the real needs and find the perfect solutions.
- Achieving the needs and goals of inhabitant's themselves.

As example of that, Egypt has lacked the presence of decision-making process and thus reflected on the country itself; exacerbate the problems that exist in the city because of the lack of government and the local administration and the absence of popular participation to the presence of corruption and lack of periodic follow-up.

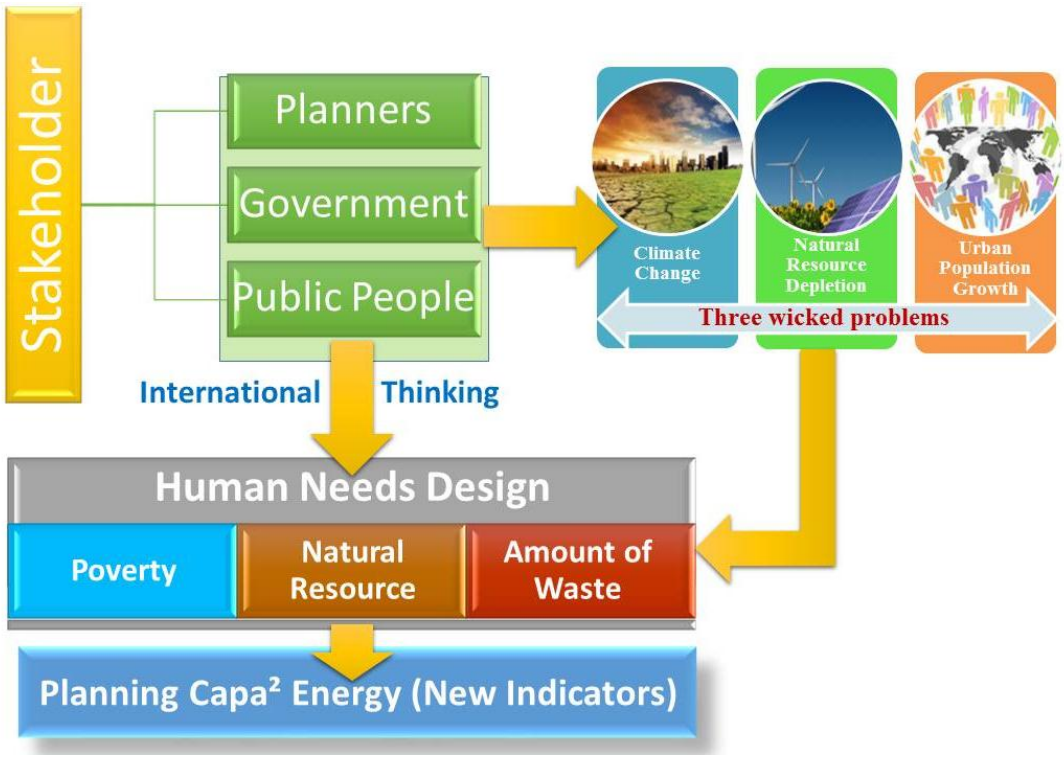

Figure 4-10: The Role of Stakeholder (Researcher, 2016).

4.5.2.2 Example for Decision Making Process (The Cities of Peru)

The cities of peru have experiments, which promote the role of popular participation and universities next government's role in decision-making [81]:

These cities have lack resources so that encourage municipalities to innovative as possible as to deal with their resources.

- **The Problems of Municipalities:**

- Limited budgets which do not allow to investment proposals.
- Not enough human resources to do its functions.
- Irrational utilization of available resources.
- Lack of municipal autonomy and un-defined role of the community.
- No urban infrastructure services and huge environmental problems.

In Peru, the urban context has principles. These principles such as the involving of civil society and public private in urban service provision and find a way to reduce the poverty. On the other hand, Peru tried to improving the management and data systems. One of these methods to improve the decision making is establish forum of cities for life, this forum help to promote technical assistance to municipalities and agencies. That forum is growing very fast and in increasing.

Due to its growing relevance, The Forum has become part of the consultative mechanisms established by the Ministry of Transport, Housing and Construction.

- **The Mission of Forum of Cities for Life**

It considers as a national network formed from four types of institutional actors: local governments, universities and organizations of civil society (NGOs, community organizations) and private sector associations.

The aims of forum are to focus on the management of Peru local agenda and build the most needed institutional. That is not only the aim but also to find a way to solve the environmental problems.

4.6 Urban Sprawl

Urban future for cities is causing serious concern, where urban land, influenced by the constant change of land uses. As a result, demand for lands has become growing. Thus, urban affected with land use. On the other hand, farmland in the countryside began to decline.

4.6.1 A Definition of Urban Sprawl by the US Bureau of Statistics [19]

Urban sprawl is an unplanned process which impacts on urban development, where mixed of land use, but with a little rate. It considers as a result of urban growing in urban area which describe physically the expanding of these areas [82]. Also, sprawl is the spreading out of a city and its suburbs over more and more rural land at the periphery of an urban area.

This involves the conversion of open space (rural land) into built-up, developed land over time. Knowing the actual square miles of urban expansion (sprawl) provides a key indicator of the threat to the natural environment, to the nation's agricultural productivity and to the quality of life of people who live in cities and in the small towns and farms that are near cities.

It uses the term "sprawl" to refer to the reduction of rural land due to the increase of the total size of the land area of a city and its suburbs over a particular period of time. Thus, it appears on the city outskirts small cities where sprawling on the edges of the city. This causes a negative impact on the quality of life for the population.

4.6.2 Cities Sprawling

In the beginning of urban sprawl, the reason for the formation of cities is the increasing of the population but now it becomes as a search for creating a new of lifestyles in suburban environments, outside the inner city.

Most of the residents who live outside the city depend on both of personal or public transportation, but relying on public transportation that occupies the bulk and they are not available abundance. Most workers inhabit on other towns or villages outside the city. This process of urban sprawl occurs in a dynamic way.

This point pushed us to focus on the empowerment and how to control this process parallel with the problems which result from it, especially in Egypt. Therefore, creating for new indicators will help in this point.

4.7 Renewable Resources

The world contains a lot of natural resources, renewable and non-renewable, but with the passage of time and the pressure of population growth and technology. These resources are exposed to attrition and became a fear of scarcity something troubling of all. The trend was to preserve these resources, sustainability and recycling are the best solutions to keep these resources, reduce the degradation of the environment and reduce the fears of depletion of non-renewable resources.

Natural resources such as [83]: agricultural land, forest land, natural land areas, the fresh and salt water fisheries, mineral resources that include the mineral fuels and non-fuels, the renewable non-mineral energy sources of solar, tidal, wind and water resources.

Renewable energy resources is the one of trends which promotes sustainability and these includes both of [84]: as solar, thermal, photovoltaic, wind, hydro, biofuels, wave, tidal, ocean and geothermal sources. This trend becomes the new strategy for several countries to save the environment, (see Fig. 4-11).

Egypt has several of renewable resources, which it helps to improve the sustainable development. For that it should exactly know what Egypt have?

Egypt enjoys perfect wind regimes, especially in Suez Gulf. The speed of wind reaches to 10.5 m/sec at 50 m height. In addition, Egypt have high intensity of direct solar radiation range between 2000-3200 kWh/m²and year from North to South, so it very useful to use this to reduce the use of resource.

These renewable resources have huge benefits, for example: the economic impacts, the environmental impact, social impacts and political impacts.

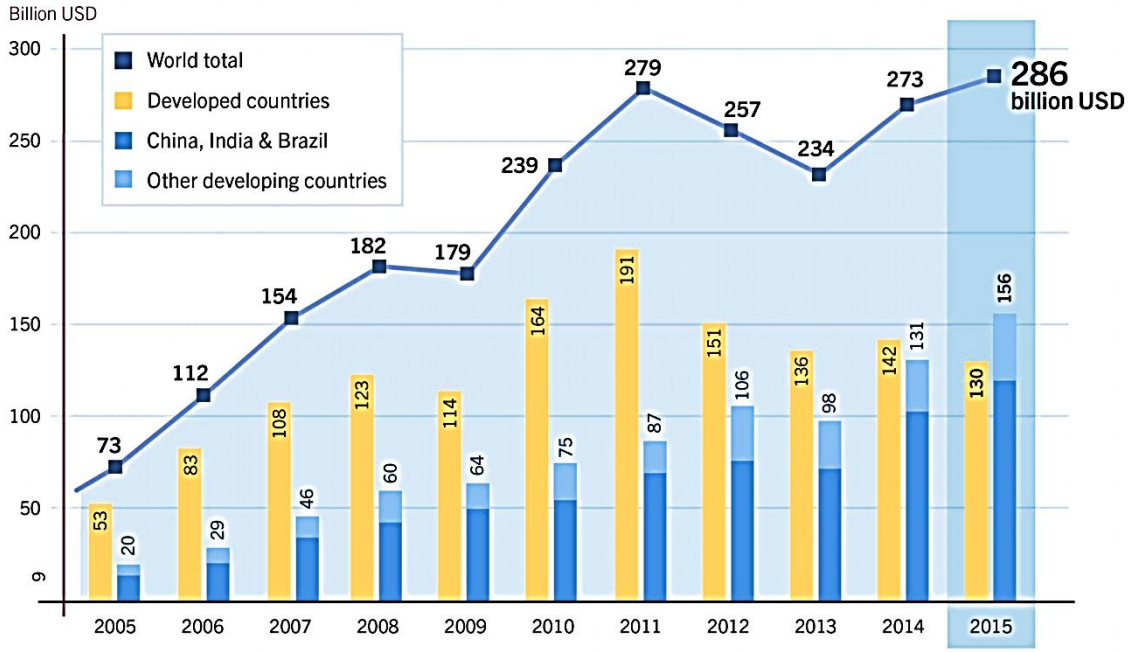

Figure 4-11: Global New Investment in Renewable Power and Fuels, Developed, Emerging and Develoing Countries, 2005-2015 [85].

Through previous goals that have been mentioned in this chapter, we find that there are a lot of points. If they united together in a special concept for the city, it will result in overcoming many of current problems which facing the city and that will be achieving by creating indicators support these goals.

- **The Second Part: Planning Capa² Energy**

The aim of this study is to create new urban indicators based on the findings of goals and previously mentioned literature review. These new urban indicators with goals will put into a conceptual model which will title: Planning capa² Energy. This concept considers the issues that have been concluded from both, the review for the problems and urban challenges *(Chapter two)*, and understanding of Why was set these particular goals *(Chapter three)*. It discusses the possibilities of the city and how guidance them through the principle of indicators where will be put it.

The work in this part goes in three main parts,

- **The first part** is finding and explains the concept for new urban indicators**.**
- **The second part** is putting the new urban indicators in addressing the practical dimensions of *(Planning capa² Energy concept)*.
- **The third part** is implementing the indicator on an agricultural road (Abies) in the middle of Alexandria, Egypt as a case study.

- **The Structure Management for Planning Capa² Energy, (See Fig. 4-12).**

Urban development can be considered a process of a lot of major changes which are in all urban areas under considerations and basic principles such as economic conditions and technological implications. These changes show its effects in the form and function, so it requires a re-discovery of links between urban and political practices.

- **Theoretical Study:**
  The stage of the current situation: Determine problems.
- **An Analytical Study:**
  Literature review, examples of international experiences and draw conclusions and methodologies.
  Future Vision phase: finding solutions to the problem through goals and creating indicators support these goals under the framework of a new concept for Planning Capa² Energy.
- An implement Study:
  The stage of realization of the vision: the application of these indicators, and how to calculate and describe them.

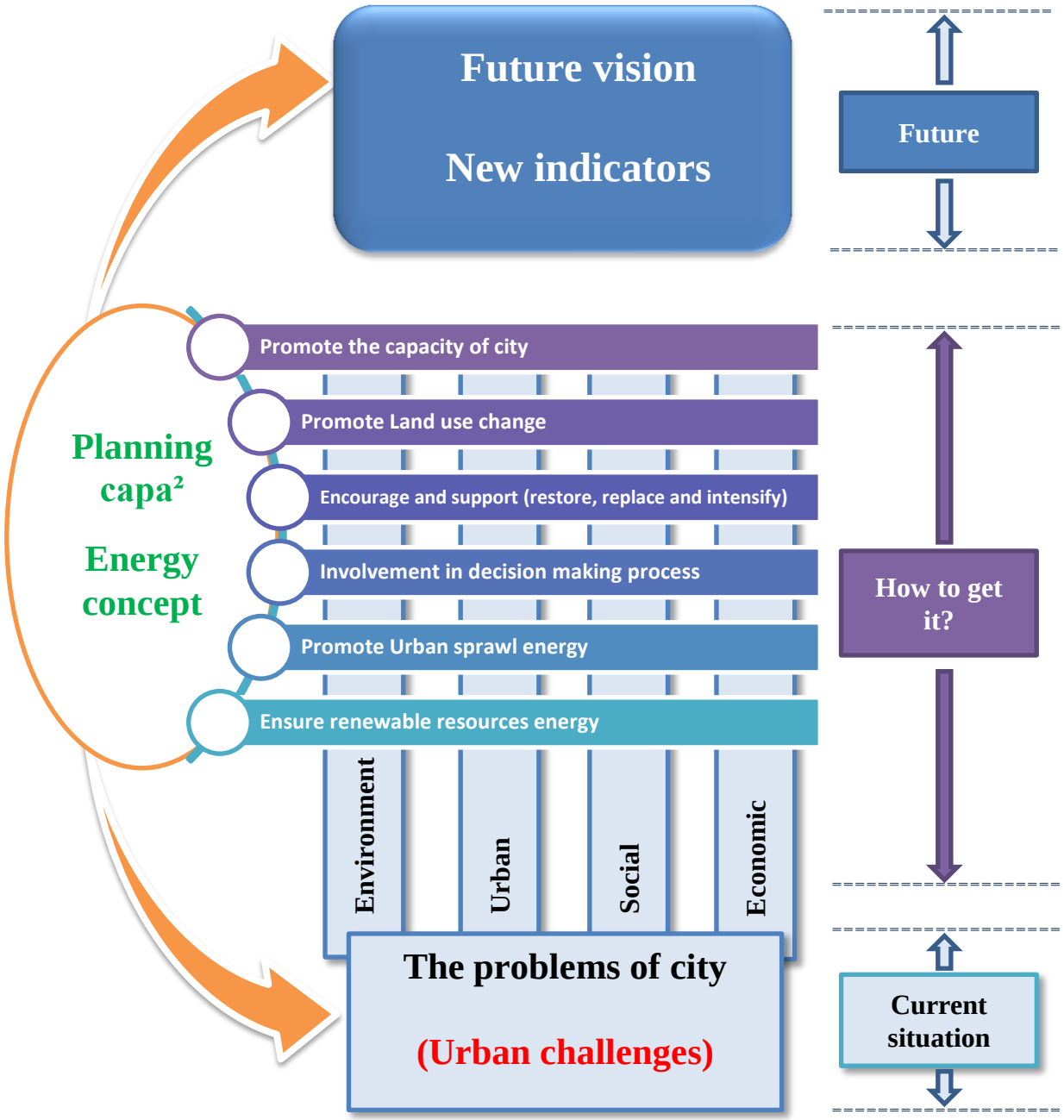

Figure 4-12: The Structure Management for Planning Capa² Energy, (Researcher, 2015).

4.8 Planning Capa² Energy for city

Through what be mentioned above, Planning Capa² Energy could be clarified some of the points that help the planners to understand and find a solution to assist in the development and evaluation of some countries, especially developing countries, which have some of the properties. For example, Egypt and the previously mentioned of the review for constitution and review for final report and integrate this with the objectives of international organizations such as UN-Habitat.

Planning Capa² Energy is divided into two terms which are: First, Planning Energy, Second, Planning Capa².

4.8.1 Planning Energy

Energy as Dauer defined that "Energy is what makes things happen" [86]. If we focus our thinking on most activities that we practice during the day, we will observe that it related to energy. All activities are involving either energy transfer or change in energy. For example, walking is considering as energy and change in movement of walking speed caused a change in the energy. Measure for that, large-scale the application of engineering operations, such as the power of generating electricity and run Auto and cooling systems [87] and also the process of planning and construction of cities, etc.

4.8.1.1 Concept of Planning Energy

Energy is the numerous amounts and it cannot observe directly. It can be felt or evaluated. It considered absolute value is difficult to measure it [88]. On the other hand, Energy related to objects, so it could transfer energy to another type of energy by physical processes [89]. This concept of energy will help understand what happen with the city during the urban process. Indeed, the city was exposed to several major changes.

First of all, City has a several definition such as; that a place where large number of inhabitants live and work; it is center of government, commerce and transportation [90]. At the same time, cities are places that have some physical circumscription and intimately engaged with their countryside or that are place made up of buildings [91].

In my opinion, city could be like a body or a form which restructured with these changes and affected on land use. What happened to the city is such as a type of energy (potential energy or kinetic energy) and any energy can be converted to simple tools.

Through previous literature review a new definition for **Planning Energy could be defined as** the Processes that occur in the city through changing in land usage by some tools. These tools were the changes as a result from human-induced.

4.8.2 Planning Capa²:

Capa² is the Capacity and the Capability of the city (See Fig. 4-13). The planning processes could be a result of Capa² within material, human potentials, natural resources and thought of people.

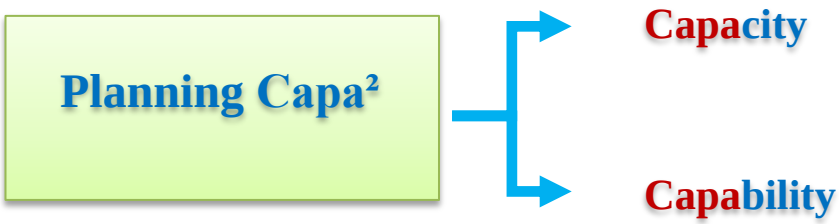

Figure 4-13: The Meaning of Planning Capa², (Researcher, 2015).

The changes happened in the cities linked with the relationship between urban built and natural environment. As a result the shape of the city changed by capacity and capability (See Fig. 4-14).

Figure 4-14: The Shape of City, (Researcher, 2015)

4.8.2.1 Capability

What does it mean?

Is the ability to achieve and accomplish something specific through the use of the possibilities and available resources by the humanitarian act. Human action is responsible for everything that happens in the city, whether positively or negatively.

On the other hand, Capability defined as the ability that has the potential to develop or use. Also, as a set of various alternative combinations of beings and doings anyone [92], The potential of capability is concerned in natural resources (land – water - green areas - petroleum, services and infrastructures, etc.) and human resources.

This Notion Includes Two Inseparable Conceptions [93]:

1- that of ability, a notion referring to the 'internal' power, possessed, but not necessarily exercised by a person, to be or do.
2- that of opportunity, related to 'external' conditions allowing the person to be or do. The presence of opportunities is, thus, a necessary, but not a sufficient condition for owning capabilities.

4.8.2.2 Capacity

City is consisting of land, agricultural Land and water area. Part of the Land areas was shaped in buildings. Capacity is the power to hold, it's about the amount or volume [94].

It Possible to Clarify the Concept of the Capacity of the City Through the Following:

1- The number of major projects in the city, and size.
2- The land area and the existing space in the city.

Definition of Planning Capa²: Is a Carrying capacity and the real capability of the city planning or ability of a natural and it could be an artificial system to support the various demand in the city, this refers to the systematic inherent limits.

Where the quality of the human activity that controls the environment surrounding and which can be controlled and measured by finding some new indicators that will remember later.

It is worth mentioning that there is an inverse relationship between human activity and the quality of the city (See Fig. 4-15).

Both Capability and Capacity completed each other, where there is a common factor associated with the place (City), the resource is that factor, whether natural or human resources capabilities. The more of available resources is the more of increasing the capacity of the city to continue and success.

Figure 4-15: The Relationship between Human Activity and Planning Capa², (Researcher, 2015)

As long as there are human actions it follows the trends of a social, environmental or industrial which related to this concept because human activities affects all living things, including cities.

4.8.3 Approach of Capa²

Capa² considers the combination of all available resources and possibilities so it has huge effects on the environment, social, urban and economic. They are complementary to each other. In other words, there is a positive relationship between the two connected for example natural resources linked to a capacity of the place (City) and the ability of a human to deal with these resources.

This requires one factor, which is the using of these resources but in a useful way and not wasted it. Thus, the more energy planning has increased the higher the energy of the city, but in a positive energy. As a result, there will be an end of the use of non-renewable resources and that to promote the concept of sustainability.

So the approach of Capa² in four fields:

- Environment.
- Social.
- Urban.
- Economic.

4.8.4 Planning Capa² Energy:

Definition of Planning Capa² Energy (PC²E) is a system, reflects the environmental Planning Capa² with Planning Energy to support human activity, from the perspective of resource supply and demand. To achieve some of the goals in the presence of some basic assistance factors, this will evaluate the city by indicators (See Fig. 4-16).

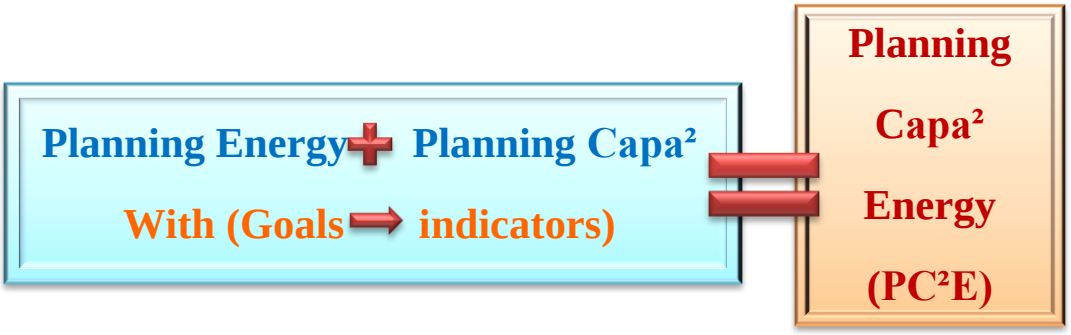

Figure 4-16: The Concept of Planning Capa² Energy, (Researcher, 2015).

The Goals, Represented in the Following (See Fig. 4-17):

1) Promote the capacity of city.

2) Promote Land use change.

3) Encourage and support (Restore, Replace and Intensify).

4) Involvement in decision making process.

5) Promote Urban sprawl energy.

6) Ensure renewable resources energy.

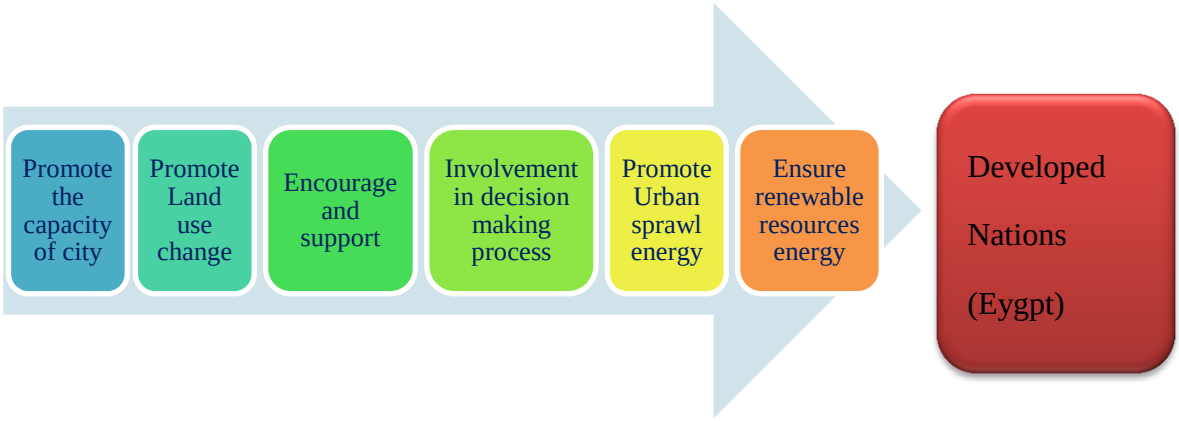

Figure 4-17: The Role of Goals for Developed Nation, (Researcher, 2016).

Since planning is a humanist approach aims to make decisions in the present and have an impact on the future. So the city can be evaluated through Planning Capa² Energy, which contains goals mentioned above where each goal contains some indicators to achieve those goals.

4.8.4.1 PC²E (Concept & Dynamic)

- **The Concept of (PC²E)** is a system that includes the resources (land, water, transportation and environment) and the comprehensive carrying capacity of the city. Firstly, analysis the city based on the supply and demand of resource which it must be equal and without any waste of resource. Second, find appropriate indicators. Finally, evaluate PC²E of the city. In 2015, for example, United Nations

human settlements program refers [95] to design green housing of fulfilling environmentally sustainable objectives by energy. Here the concept of PC²E as energy is different, it is all about what happened and related to city.
The development of planning capa² profound impacts on the country's competitiveness and it also shows great significance for sustainable and stable economic development of the country .As the most important spatial development form.

- **Dynamic of (PC²E):** Energy demand is a dynamic three-way interaction between climate, people, and buildings. But it has been found that there had been relation between policies, people, and cities in urban planning level. Therefore, the dynamic of (PC²E) is matter and function. Differing densities of buildings, urban and lack distribution of the population led to poor in equilibrium between population growth, economic activity and also between urban transformations and the problem of housing shortage in urban areas. On the other hand, lack geographical distribution of the population led to higher densities and buildings in cities and increasing the pressure on facilities and services.

There is a closed-loop which related to three levels associated with (See Fig. 4-18) started with: economic context and preferences are partly determined by policies, population increase and human activities control city to suit themselves in policies context and ended with energy use in influenced by climatic, social, economic and cultural context.

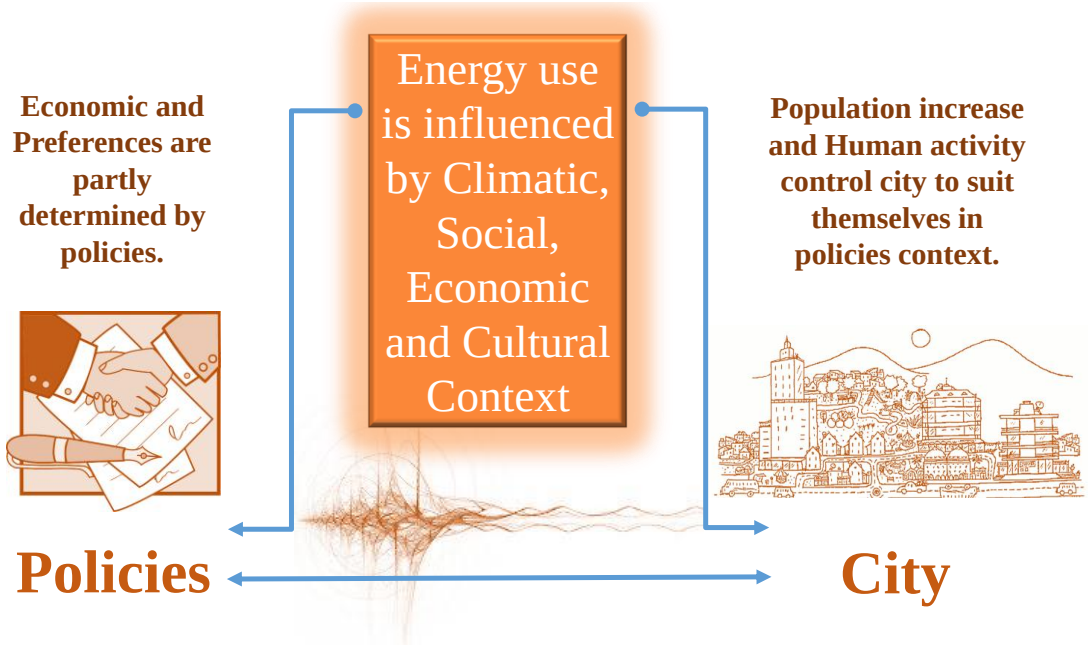

Figure 4-18: City with Land Use Changing Suit Demand and Supply within Social Norms, (Researcher, 2015).

4.8.4.2 Classification of Planning Capa² Energy

PC²E, it can be classified when evaluating any city. There are two types of PC²E which are:

1- Positive PC²E: The city can able to continue and develop.
2- Negative PC²E: The city settled and difficult to develop it.

It can be represented in three colours when applied on maps as the level of vertical or horizontal plan:

- Green colour for Positive PC^2E.
- Yellow colour for Medium PC^2E.
- Red colour for Negative PC^2E.

4.9 New Urban Indicators

The Proposed of Urban Indicators: The Ultimate Aim is to Utilize Indicators to Measure Urban Performance (See Fig. 4-19).

Planners should know five points to understand and to deal with the rapid urbanization. These areas are:

- The development investment of land market.
- The important of informal sector and his role in the process of urbanization.
- The important of community participation.
- The changing forms of governance.
- The understanding of sustainable system and the role of city with it.

4.9.1 Indicators have Several Benefits

1- Assessing urban performance.
2- Providing a means for the diagnosis of urban areas.
3- Follow-up side sectors in urban areas.
4- Use it to areas that have been identified problems.
5- Evaluate the decision-making process for the city
6- Collect information.

4.9.2 The Causes for Sets New Indicators

The main reasons for making new indicators due to many problems which are:

- Increasing population density and its concentration in the city's urban areas.
- Increasing energy consumption per unit in urban areas.
- Lack sufficient green surfaces and there are few urban parks and playgrounds.
- Lack infrastructure (water facilities, electricity, roads and sanitation).
- Increasing of informal and slums areas.
- There are many cases of abuse and lack respect and implementation for the law (licenses buildings - encroachments on land).
- Lack adequate community participation in the decision-making process.

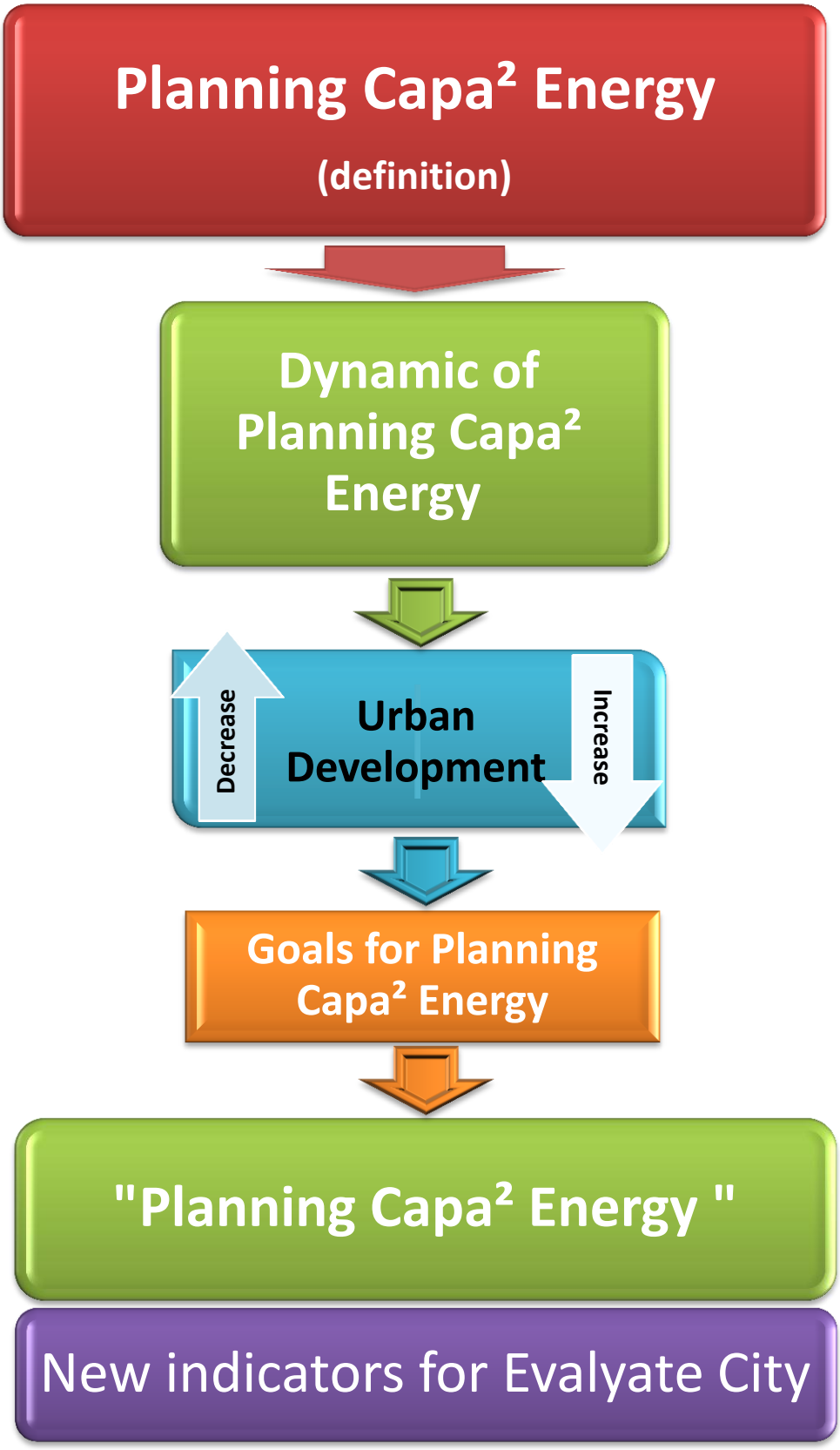

Figure 4-19: The Proposed of New Indicators, (Researcher, 2015).

4.9.3 The Concept of New Indicators

PC²E, include many of the economic, social, environmental and planning aspects providing a set of indicators will help to assess the progress which made at the local level in the light of the continuing demands for resources.

The Concept of Indicators Depended on Two Factors:

1. A measure the progress to improving urban planning, social participation in the process of decision making and policy and quality of life.
2. Defining the problems which have been helped to identifying the indicators in the field of urban development.

4.9.4 List of Planning Capa² Energy Indicators

The list had twenty five 'potential' indicators, each linked to elements from the concept of Planning Capa² Energy (See Table. 4-3).

4.9.4.1 Indicators Methodology Sheets

In order to complete the goals of urban indicators of UN-HABITAT, This section describes the different indicators like the methodology of UN-HABITAT, with explanation about:

- **Rationale** of each indicator for analysing urban conditions and trends.
- **Definitions** of each indicator.
- **Sources and methodology** for obtaining the data and calculating the results.

Indicators are composed of:

Key Indicators: They are either numbers, percentages and ratios;

Check -Lists: They are audit questions generally accompanied of checkboxes for yes or no answers.

Extensive Indicators: which are intended to complement the results of the key indicators and qualitative data in order to make a more in -depth assessment of the issue.

The indicators followed by were added based on our observations of key characteristics of Alexandria city.

Table 4-3: The List of Indicators for Planning Capa² Energy

Goal	Indicators	
Planning Capa² Energy:		
Goal 1: Promote the Capacity of City	Indicator 1.1:	Provision of Open Spaces (OS) to the Built-up Area (BA).
	Indicator 1.2:	Lands to Development.
	Indicator 1.3:	Uninhabited to Inhabited Units.
	Indicator 1.4:	Road Situation.
Goal 2: Promote Land Use Change	Indicator 2.1:	Law and Administration.*
	Indicator 2.2:	Land Pooling / Readjustment (LPR).
	Indicator 2.3:	Building Blocks to Blanks Blocks.*
	Indicator 2.4:	The Density of Development Lands within Renewal Site.
	Indicator 2.5:	Erosion of Agricultural Land.*
Goal 3: Encourage and Support (Restore, Replace and Intensify)	Indicator 3.1:	Rehabilitation of Repairable Properties.
	Indicator 3.2:	Re-use of Abandoned Lands.*
	Indicator 3.3:	Buildings with Heritage Value (Maintenance and Preservation).
Goal 4: Involvement in Decision-Making Process	Indicator 4.1:	Citizen Involvement in City Consultation (Societal Habits).
	Indicator 4.2:	Citizen Involvement in City Consultation (People Needs).
	Indicator 4.3:	Government Policies.
	Indicator 4.4:	Civil Society Organisations.
	Indicator 4.5:	Learning and Growth to Evaluate the Performance of Local Authorities.
Goal 5: Promote Urban Sprawl Energy	Indicator 5.1:	Urban Deformation.
	Indicator 5.2:	Urbanised Surfaces Outside Urban Areas.
	Indicator 5.3:	Sound Urbanisation.
Goal 6: Ensure Renewable Resources Energy	Indicator 6.1:	Coastal Process.
	Indicator 6.2:	Using of Alternative Technology for Transport.
	Indicator 6.3:	Sun Solar (PV).
	Indicator 6.4:	Recycling Rate.
	Indicator 6.5:	Efficient Use of Natural Resources (Recreation).*

Source: Researcher, 2015.

*This indicators will apply on the case study just to show how to use them.

4.10 Evaluation and Validation

The Urban Indicators will be Evaluated and Validated by:

4.10.1 Framework for the Implementation Process

a- The Conceptual Approach

In the analysis to follow, the conceptual approach to successfully a system of new indicators for evaluation of city is described by Planning Capa² Energy (PC²E).

The First Step is an extensive review of the needs of the city to know and create a new approach in urban indicators.

The Second Step is the step includes the definition of (PC²E) and the goals of that system.

The combination of the first two step leads to an initial set of news indicators for achieving the aims that mentioned before.

Among the Important Characteristics of Urban Indicators are:

i. Easily understood by decision-makers who are usually not scientists [96].
ii. Related to the interest of more than one group of stakeholders.
iii. Measurable using immediately available data at a city and national levels.
iv. Clearly related to urban policy goals and capable of being changed.

b- Implementation

Implementation could have its validity through several types from stakeholders meetings such as:

1) Public-private partnership (PPP) would consist of: experts, General Organization for physical Planning (GOPP), local authorities.
2) Decision Makers, vulnerable groups, Women's breadwinners, landlords, a non-governmental organization (NGOs), a non-profit organization (NPOs), etc.

c- Beta Testing is Through Proposal a Questionnaire

After many times of meeting, it will be a presentation for the new indicators with goals. Then, Beta testing will be present to a decision about how far the indicators will be a useful and poll opinion on these indicators and their quality and the possibility to implement them (See Table. 4-4).

The aim of beta testing meets the requirements that guided its design and development, determine if indicators are sufficiently usable, and achieves the general result its stakeholder's desire.

d- Voting

Voting is another step to set the indicators and the goals, In any case, it is necessary to continuously monitor the reliability and the representativeness of the statistical data on which the analysis of the indicators is based. It is also preferable to work on trends rather than just on isolated data and, as mentioned previously, it is important to review existing databases.

e- Organizing Regular Meetings to Maintain and Follow-up for a Period of time like Ten Years.

f- Prepare Reports within Ten Years.

g- Submit Report Every Two Years to all Matters of the Organization of the Framework.

Table 4-4: Beta Testing

Subject	Question	
Planning Capa² Energy (PC²E)	1-What is your opinion about the concept of Planning Capa² Energy?	□Accept □ Not Accept
Goals	2-What do you think about these goals? 3-Do you think that goals will help the city? 4-Did the goals promote the value of development process? 5-Are the goals having a good connection with planning Capa² energy? 6-What is the ratio of success that goals?	□ very good □ Good □ Weak □ Yes □ May be □ No □ Yes □ May be □ No □ Yes □ May be □ No
Indicators	7-Are the indicators matching with the aim of goals? 8-What do you think about these indicators? 9-Do you think that indicators can help the planner and decision makers? 10-Do you think these indicators will help the city and evaluate it if the planning Capa² energy implement? 11-Which of these indicators need to develop or change? 12-Any suggests:	□ Yes □ May be □ No □ very good □ Good □ Weak □ Yes □ May be □ No □ Yes □ May be □ No

Source: Researcher, 2015.

4.11 Case Study (Agriculture Road)

Alexandria with 4.0 million inhabitants on the northern coast of Egypt is one of the major cities on the Mediterranean Sea and Egypt's second largest metropolitan (See Table. 4-5). Sited on the sea and close to a number of lakes and canals, and has a fresh water reserve for agriculture.

Table 4-5: Estimated Population Growth in Alexandria and Egypt (2006-2021).

population	2006	2011	2016	2021
Alexandria	3.864	4.199	4.561	4.944
Egypt	70.473	76.972	83.327	89.381

Source: Researcher, based on [97].

Despite being located in an arid zone, natural and green spaces are numerous, thanks in particular to agricultural activities. However, this green environment that could balance the mineral environment of the dense urban area is at risk with informal urban growth and poor waste management invading green and blue (canal) spaces.

In my opinion, Alexandria is divided into four parts from north to south (See Fig. 4-20):

- The first part is the area which near of shore.
- The second part is the coastal area which is the waterfront of the city.
- The third part is the residential area and that is the most area which more planned.
- The fourth part is the agricultural part and this area is decreasing through the time.

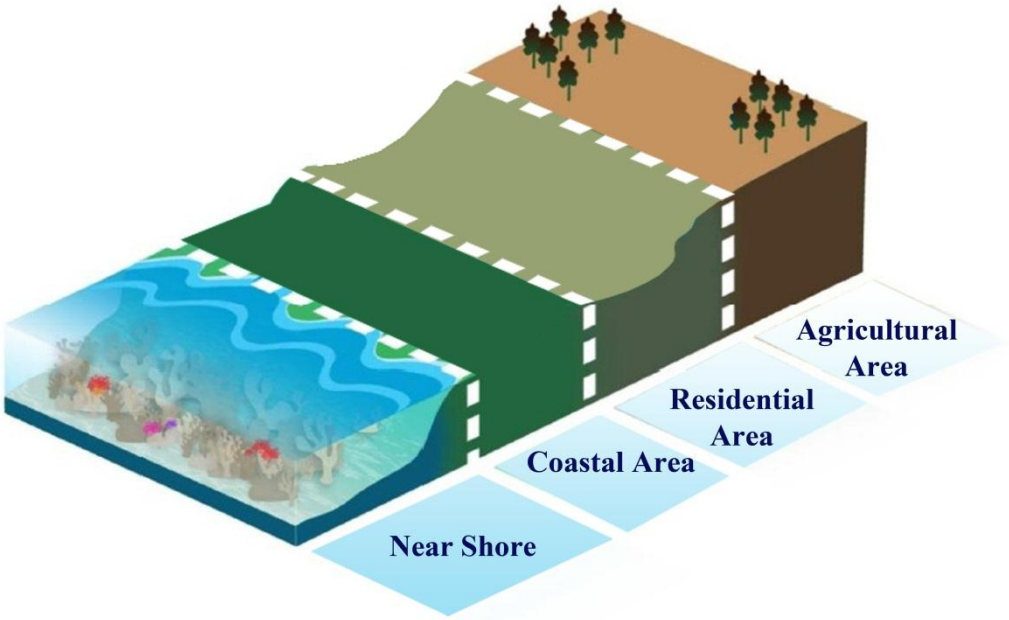

Figure 4-20: Zones of Alexandria, (Researcher, 2017).

Alexandria accounts for about 5.5% of Egypt's Population. It embraces a coast line of 70 kilometres and is home to 40% of Egypt's industrial establishments [98], serving about 80% of Egypt's imports and exports and also an important tourist resort [99].

Alexandria is an urban governorate that includes the city Alexandria and the new industrial town, Borg El Arab. The City of Alexandria consists of seven districts (Hai): Al-Montaza, East (Sharq), Central (Wassat),Gomrok (Customs), West (Gharb), Al Ameriyah and Burg Al Arab City.

However, Alexandria Faces Several Challenges Such as:

1) Alexandria Governorate faces the challenge of creating more jobs to meet a rapidly increasing demand.
2) Alexandria has 30 squatter settlements where one-third of the population lives (1.2 million) lives with limited access to infrastructure and municipal service and high rate of unemployment, 15-20% [100].
   These areas lack many amenities, such as open spaces and green areas; the streets are narrow; solid waste collection and unpaved (See Fig. 4-21).
3) As many Mediterranean cities, Alexandria is facing increasing water needs to service a rapidly growing population [101].

Figure 4-21: Alexandria, Informal and Slum Areas, [99].

4.11.1 Application

Urban processes in Alexandria: One of the most important areas which have urban processes in Alexandria is an agricultural road (Abies), located around the Matar Lake in the middle of Alexandria (between east and west) in districts (Hai): East (Sharq) and section Second (Raml).

4.11.1.1 Layout and Location of the Site

The site is positioned in the middle of Alexandria (between east and west). It is surrounded by a lot of landmarks as (See Figure 4-22):

1- Victor Emanuel square.
2- Smouha club.
3- Green plaza.
4- Farous university.
5- Green tower.

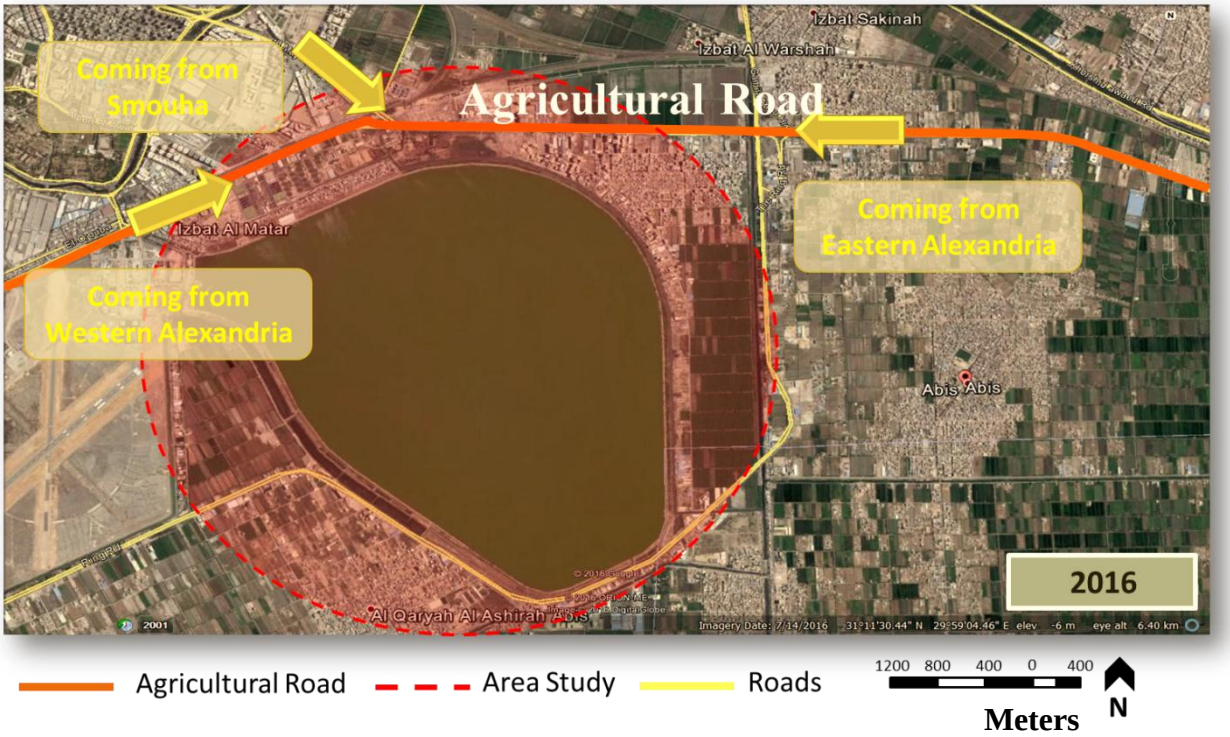

Figure 4-22: The Location of Case Study (Agriculture Road) [102].

Agriculture around the Matar Lake has slowly disappeared under urban pressure; informal residential buildings, educational and industrial zone are encroaching on areas where zoning should have protected green space for agricultural activities. This stage considered as a monitoring for the case study as a phase for preparing the indicators which had applied on the site.

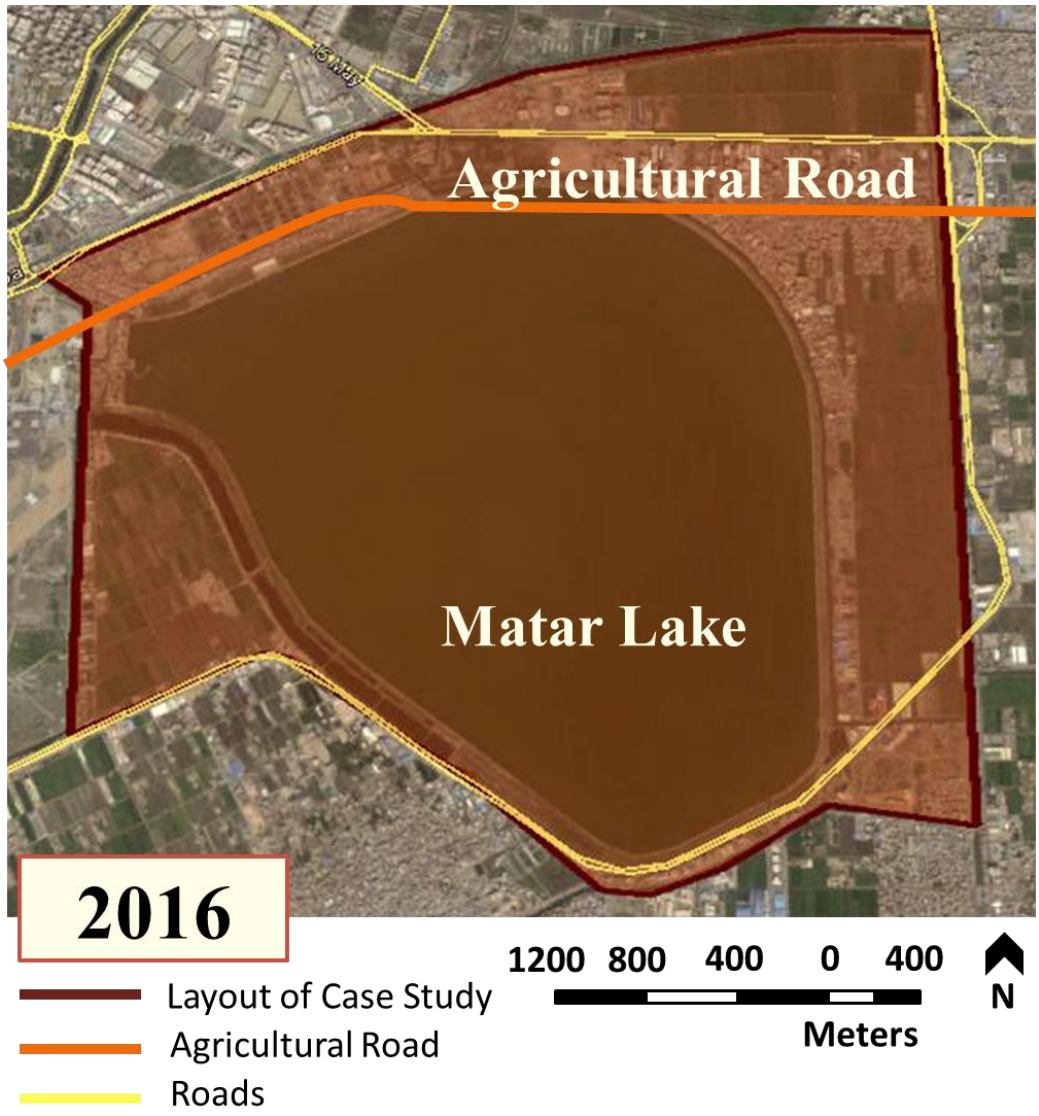

Figure 4-23: The Layout of Case Study (Agriculture Road) [102].

Figure 4-24: Appearance of Mixed Use (Residential Buildings) Around Schools (Researcher, 2016).

Figure 4-25: The Increase in the Concentration of International High-Level Schools (Researcher, 2016).

Figure 4-26: High Standard Residential Compound, (Researcher, 2016).

Figure 4-27: Invasion on Agricultural Lands, (Researcher, 2016).

Figure 4-28: High Differences in Social Levels, (Researcher, 2016).

Figure 4-29: High Standard Residential Compound, (Researcher, 2016).

Agricultural road has conversion of land use from the year 2001 until 2016 (See Fig. 4-30 and Fig. 4-31).

However, this conversion has a lot of weakness point as it leads to disappearing of the agricultural land gradually, also leads to informal housing areas that lakes all kinds of services, (See Fig. 4-24, 4-25, 4-26, 4-27, 4-28 and 4-29).

Differential distribution of population and economic are activities in a city, and the manner in which they have focused on the center of the city. It is a result of urban bias in which decision makers concentrate the investments in some places according to his opinion, and this leads to concentration (centralization), increasing service in places on expense of other places and it's to urban disparity. Polices must be put to mantis this concentration and preserve good way of living. Over the past year, major changes happened on the around areas of Abies road, this is clearly shown in figures (4-30 and 4-31).

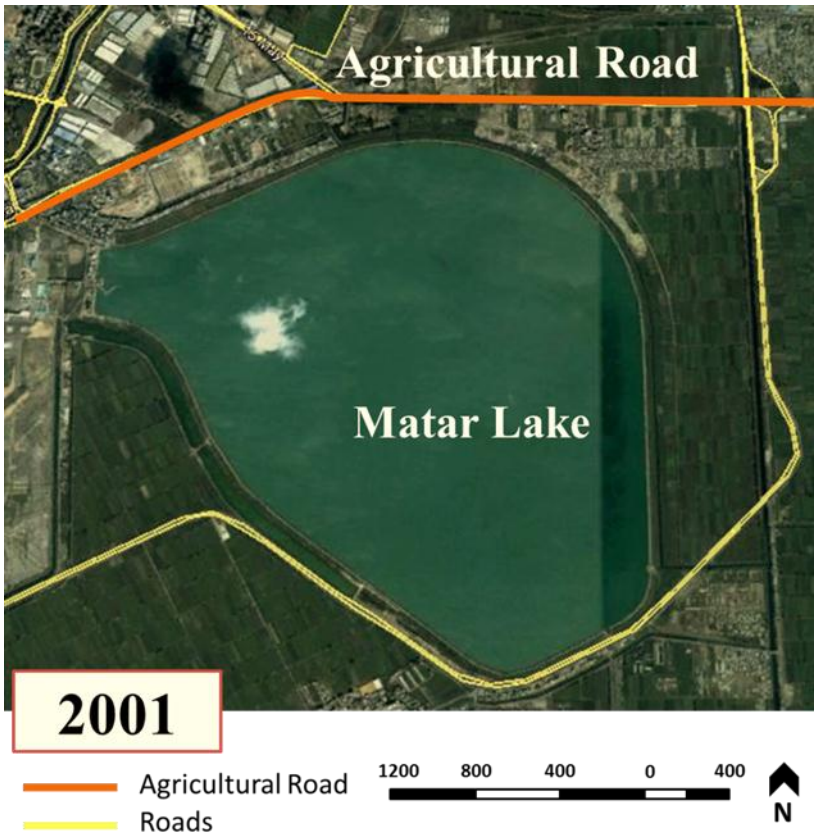

Figure 4-30: Showing the Matar Lake and its Surrounding in 2001[102].

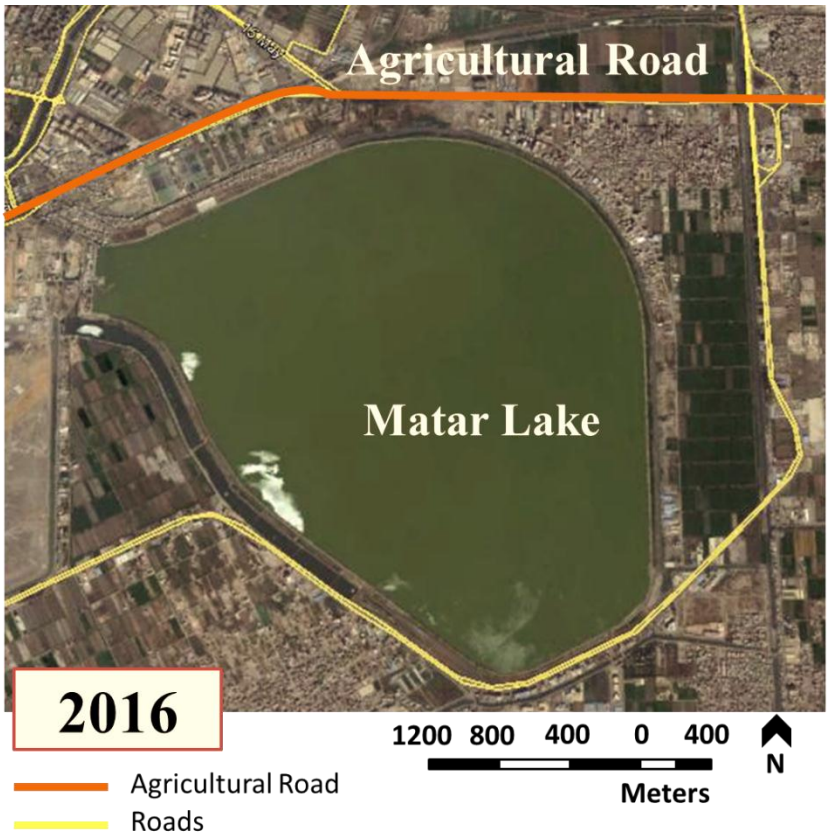

Figure 4-31: Showing the Matar Lake and its Surrounding in 2016 [102].

There is a lot of changing in land use because human intervention and the lack oversight by the decision-makers are the main reasons and the result of what happened and known as noted previously "Planning Energy".

4.11.2 Adoption Stage Indicators, Determinants and Question Formats

For the area under consideration in 2016, the methodological steps led to three goals included in Planning Capa² Energy concept and applied on the case study, which are:

Goal 2: promote land use change.

Goal 3: Encourage and support (Restore, Replace and Intensify).

Goal 6: Ensure renewable resources energy.

Each region is different from the other which has own Capa², so five of the urban indicators which mentioned before in Table (4-3) will applied on the case study. These indicators will be suitable for the study area and her Capa².

Each indicator is detailed: (I) Theoretical bases, (II) Description. The final list of indicators is presented in Table (4-6). The selected set of indicators clearly is focusing on the area's specific characteristics.

Table 4-6: List of Planning Capa² Energy Indicators for Abies Road.

Goal	Indicators	
Goal 2: Promote Land Use Change	**Indicator 2.1:**	**Law and Administration.**
	Indicator 2.3:	**Building Blocks to Blanks Blocks.**
	Indicator 2.5:	**Erosion of Agricultural Land.**
Goal 3: Encourage and Support (Restore, Replace and Intensify)	**Indicator 3.2:**	**Re-use of abandoned lands.**
Goal 6: Ensure Renewable Resources Energy	**Indicator 6.6:**	**Efficient Use of Natural Resources (Recreation).**

Source: Researcher, 2016.

This section describes the different indicators, with an explanation about - Rationale of each indicator for analyzing urban conditions and trends. - Definitions of each indicator and - Sources and methodology for obtaining the data and calculating the results.

As shown in Table 4-6, indicators are composed of (I) **Key Indicators:** They are numbers, percentages, and ratios; (II) **Check -Lists:** They are audit questions generally accompanied by checkboxes for yes or no answers. The indicators followed by were added based on our observations of key characteristics of Alexandria city.

Table 4-7: Indicator 2.1: Law and Administration.

Theoretical bases	Description Goal 2: Promote Land Use Change
Rationale	The lack affordable housing combined with a poorly administered public land, weak land management, and administration. Also, the lack effective property taxation is the main causes of the increasing informal land subdivisions and encroachments on agriculture land. This is the most serious threat to sustainable urbanization in Egypt [103]. How to trust between the government and the citizen, and that can be achieved by monitoring the administrative performance of the localities and measuring corruption.
Definition	**Achievements of the Law and Administration for building and lands in the constitution or National low for all citizens.** 1-Are there administrative corruption? ■ Yes ☐ No 2-Is the implementation of the law and its application in the housing sector and planning? ☐ Fully applied ■ Applied With exceptions ☐ Applied in some cases ☐ Not applied 3-Size of irregularities. ■ Considerable ☐ Some ☐ None 4-Is there a follow-up to the performance of services responsible for the planning and implementation of the Egyptian drawings to construction and housing strategies? ■ Yes ☐ No 5-Is there extract of building permits? ■ Yes ☐ No 6-Services permits. ☐ Considerable ■ Some ☐ None 7-The rate of new construction for new construction extraction licenses. ☐ Considerable ■ Some ☐ None 8-The rate of new construction for new construction without extraction licenses. ☐ Considerable ■ Some ☐ None
Methodology	In the Constitution 2014, there are many articles about low and administration which promote the land and buildings such as articles number: 29, 32, 77, and 180. Housing quality in this area is informal and low Which indicates the existence of irregularities in the application of the law and not to abide by it and also the existence of corruption, local administration of the city [104].

Gender	Governmental sectors and citizens.
Comments and Limitations	The existence of rights in the law does not necessarily mean that they are applied. This check- list will not be able to inform about the implementation of the law. But they illustrate the size of the abuses that occur in the city.
Level	City, national urban.

Source: Researcher, 2016.

Table 4-8: Indicator 2.3: Building blocks to blanks blocks.

Theoretical bases	Description Goal 2: Promote Land Use Change
Rationale	Effective planning of settlements is a key to effective urbanization and a prerequisite for well-functioning urban markets. This indicator explores the main dimensions of strategic settlements planning from the elaboration and implementation of strategic plans themselves to their budgeting processes. Also the existence of blanks blocks is a chance to do investment projects or recreational for future planning, to inclusion all population needs in the future and promote the environment.
Definition	**The percentage of blanks blocks from all the building blocks.** The built-up area of the block is more than 96 Hectares [105], As shown in the figure. 4-32, the land number one is blank block, but in fact, it considers as agricultural land. So it may not be used as an investment using.
Methodology	Data sources are mainly the Ministry of Housing, Utilities and Urban Development and Urban Planning Authority.
Gender	State, government, private sector and landlords.
Comments and Limitations	Most of the buildings in the study area buildings informal and low in poor condition because they are built on agricultural land and non-licensed, and the land price ranges in this area to of 800 Egyptian pounds.
Level	City, national urban.

Source: Researcher, 2016.

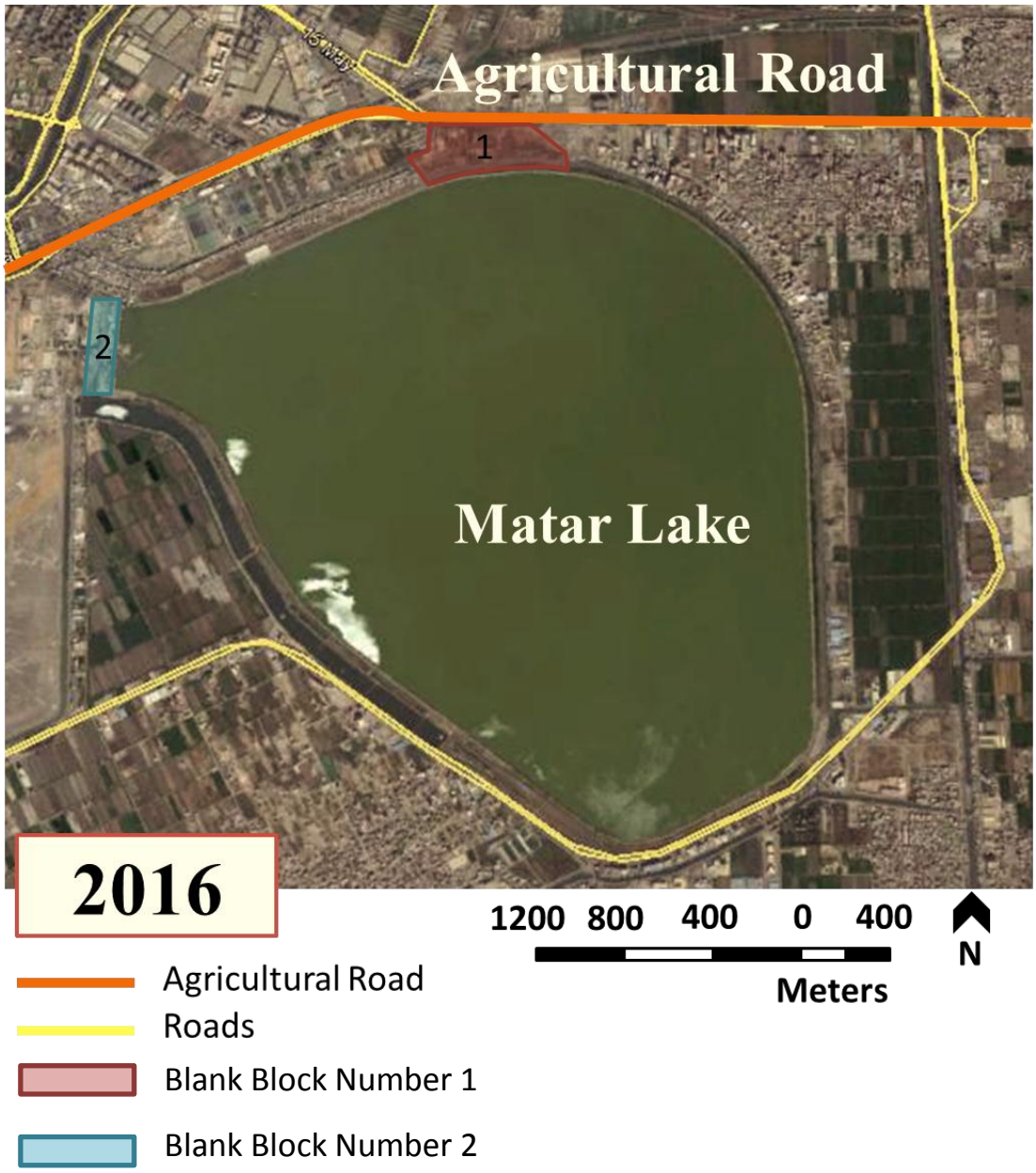

Figure 4-32: Blank Block in Matar Lake, (Researcher, 2016).

Table 4-9: Indicator 2.6: Erosion of Agricultural land.

Theoretical bases	Description Goal 2: Promote Land Use Change
Rationale	Informal settlements on agricultural land: which constitute about 80% of all informal settlements in Egypt, the informality label characterizes housing built in violation of existing urban planning legislation and the building code, often by converting (legally owned) agricultural land to urban uses without land subdivision or building permits. And also in almost all cases without registered property titles or typically take place through the informal subdivision of privately-owned land into small plots, which are sold to individuals who gradually build their own houses. Even though Egyptian laws prohibit the conversion of agricultural land to urban uses [103].
Definition	**Percentage of erosion of Agricultural land from the total Agricultural land in a specific area.** The area of Agricultural land as shown in figure (4-33) is 307.57, but the area of Agricultural land as shown in figure (4-34) is 212 Hectares. So during for 16 years ago, Agricultural lands was decreased about 95.57 Hectares, it's about 31.1% from all the total of Agricultural land.
Methodology	Local authorities and urban environment experts dealing with all stakeholders in the city should be consulted for this information.
Gender	When it comes to environmental planning at the national and local level, it is important to involve key partners, men and women in all the stages of decision-making. Both men and women should be involved in prioritisation, consensus, action plans and institutionalisation.
Comments and Limitations	In order to supplement this indicator, the evaluation may be certain periods of time. By the competent bodies must be periodic follow-up and future plans urge not to decrease these lands available. Agricultural land considers the source of economy and increasing the green element to maintain the balance of the environment.
Level	City, national urban.

Source: Researcher, 2016.

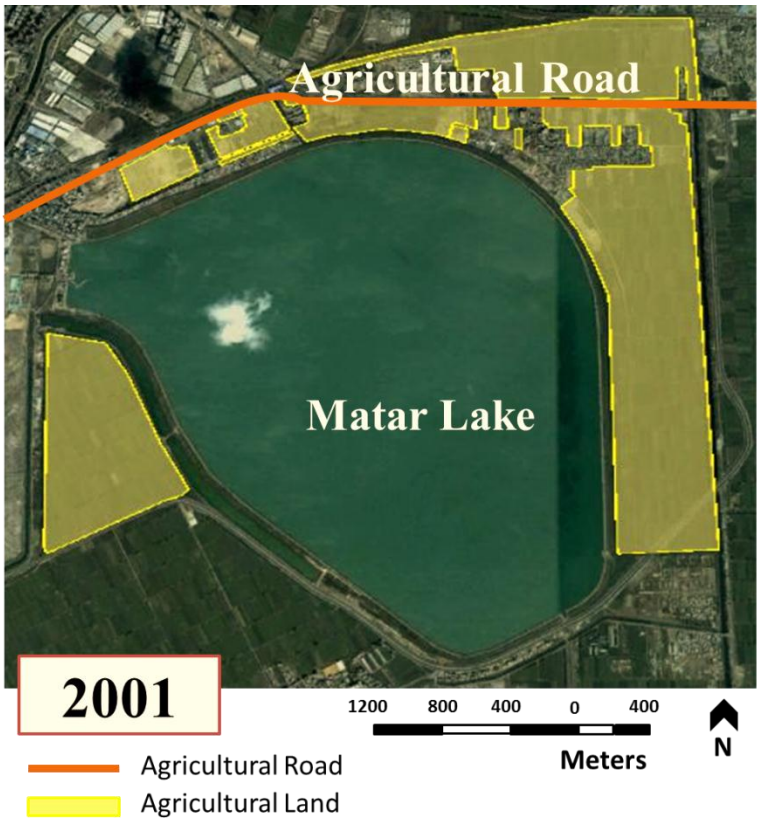

Figure 4-33: The Agricultural Land in 2001, (Researcher, 2016).

Figure 4-34: The Agricultural Land in 2016, (Researcher, 2016).

Table 4-10: Indicator 3.2: Re-use of Abandoned Lands.

Theoretical bases	Description Goal 3: Encourage and Support (Restore, Replace and Intensify)
Rationale	In the past, the Matar lake received unmodified Nile water. In the last two decades, however, its feeding water became contaminated with untreated sewage and industrial wastes [105]. To benefit as much as possible from the land and property unused, This involves not only the construction of new and interesting structures, but an attempt to reduce energy consumption in an attempt to affect the concept of sustainable development of an urban area. As a consequence, there is a pressing need for these areas to be redeveloped [72].
Definition	**The number or percentage of abandoned or contaminated lands and recoverable for reuse in the city.** In this case study, there are two of abandoned or contaminated lands located around of Matar Lake as shown in a figure. 4-32. The land number one is Vacant land, but land number two is belonging to the El Nozha Airport which in the past was a club called the Aviation Club, but now was becoming unused. Area of this land ratio does not exceed 1% of all lands which surrounding the area of the study area.
Methodology	Data collection and sources are mainly Statistics and studies by Urban Planning Authority.
Gender	Private sector, government.
Comments and Limitations	The Matar Lake is the nearest to the city centre, and was established on the city's southern boundary during the rule of King Farouk as a strategic water reservoir in the Second World War. The whole area around this lake is currently experiencing chaotic urban expansion at the expense of agricultural land. In spite of the small number of vacant land, but it is the source of investment and recreational services, especially its location on the lake, which gives it advantages of increasing the open spaces and increasing the activities of the inhabitants, especially after the lake be cleaned from pollution and harmful waste in it, which will give aesthetic form and improve the quality of life. This area could houses new recreational and touristic amenities for the local community and the city as a whole. The state has been proposed several projects including the establishment of (medical city Premises entertainment places- smart village-educational complex-hotels), but it is not performed any of these projects so far.
Level	City, national urban.

Table 4-11: Indicator 6.6: Efficient use of natural resources (Recreation).

Theoretical bases	Description Goal 6: Ensure Renewable Resources Energy
Rationale	Recreation is an essential part of human life and finds many different forms which are shaped naturally by individual interests but also by the surrounding social construction. Recreational activities can be communal or solitary, active or passive, outdoors or indoors, healthy or harmful, and useful for society or detrimental. Recreation-related business is an important factor in the economy; it has been estimated that the outdoor recreation sector alone contributes economy and generates million jobs.
Definition	**Recreation is that places which provide the availability of urban recreational natural resource (green space and water area or both) compared to the number of residents.** 1-Is this area contains natural resources? ■ Yes ☐ No 3-In the Constitution, are there any articles promote the natural resources? ■ Yes ☐ No 4-Has the city established a long-term strategic plan for natural resources? ■ Yes ☐ No 5-Is the environmental plan accompanied withappropriate funding for implementation? ■ Yes ☐ No 6-Does the state urge the citizens by any methods to preserve the natural resources? ☐ Considerable ■ Some ☐ None 7-Did this area have features that promote to do a recreational project? ■ Considerable ☐ Some ☐ None Is there any recreation park on this site? ☐ Considerable ■ Some ☐ None
Methodology	Rate per capita of leisure services at the level of the district is 0.04 m²/ person [50], So in the new the Constitution 2014, puts article 78 for ensuring the citizens' right. Many of the strategic plans and workshops for the city of Alexandria worked to raise this rate by the Urban

	Planning Authority.
Gender	Families specially youth, Recreation Services for Youth: the on-going growth process in which all youth are engaged in attempting to meet their basic personal and social needs to be safe, feel cared for, be valued, be useful, and be spiritually grounded. Youth needs to build skills and competencies that allow them to function and contribute in their daily lives.
Comments and Limitations	noted the rate is very low due to lacks the necessary spaces in this area, the past strategic plans were the aim to increase the opens places and entertainment services, but with the low rate and there are many places in district East (sharq) far away from the site, these services are a social club and one of sports stadium, and two of Youth Centre.
Level	City, national urban.

Source: Researcher, 2016.

4.11.2.1 The Results

Urban process in Alexandria Agricultural Road (Abies) has to lead that there are a lot of changing on it and it can be seen that through land use conversion which took place from the years 2001 until 2017 as the following:

- The agricultural land has begun to decrease gradually and the urban area increased.
- Most of the urban area included residential, industrials and educational areas.

As a result of that, the area has several threats such as increasing in urban sprawl, increasing in the social differences between residents of the area, and finally more invasion on agricultural lands.

In this case, three mainly processes had happened which are:

1- Concentration: it very clears in the educational zone.
2- Specialisation**:** it very clears in the difference between the educational zone which includes high stander of living and the residential zone which contains low stander of living.
3- Invasion: it clears the invasion of the residential and educational areas on the expense of the agricultural land.

As is clear that this area have a lot of changing in land use "Capa²"in terms of natural resources such as: lands, agricultural, natural water area, many important projects and human energy where most of the residents of these areas of young people and 51% of the population is under the age of 20 and needs to create more jobs to meet a rapidly increasing demand.

When applying the mentioned indicators accordingly to achieve the three of main goals which are:

- Promote land use change
- Encourage and Support (Restore, Replace and Intensify).
- Ensure Renewable Resources Energy.

In addition, when applied the five mentioned indicators, it cleared:

- That there is non-application of the law and lacks cooperation between the citizens and the competent bodies. In general, the area of case study faces a number of considerable sustainability pressures.
- For the Indicator 2.3: Building blocks to blanks blocks, there are two blank blocks, but that lands cannot use them because, in fact, they are agricultural lands.
- The local ecosystem is severely threatened by enormous ecological, social and economic impact. Additionally, the area was characterised by a shortage of green spaces, posing a burden to local air quality, public health and aesthetics of city. However, the state should limit further erosion of agricultural land that leads to increasing environmental imbalance and also affects the economy negatively.
- Lack optimal use of Matar Lake and increasing of pollution in it.
- There are no recreational areas because in the first place this area was not planned for this use.

Although this area has many advantages and capabilities, which applies to the concept of capa², but with everything that happened in it, which leads and indicates that there is no planning and future vision.

Furthermore, due to a poorly-integrated waste management infrastructure as a result of informal buildings, so these areas have "Planning capa² Energy" but in a negative way.

Conclusion and Recommendations

5

CHAPTER FIVE

5.1 Conclusions

This research is mainly concerned with performing a different approach for urban development through urban indicators. It emphasises urban indicators as a concept capable of fulfilling the desired "Planning capa² Energy" goals. Moreover, it draws brief conceptual guidelines for application purposes.

Within the previous conceptual frame, the research presents a specific understanding of:

- The need for urban development with a very wide scope of vision. Moreover, it clarifies the conceptual outlines through reviewing the different dimensions, emphasising the urban indicators as an approach for the study.

- The way we can achieve the urban development. It considers the wide understanding for urban challenging and needs by known the main forces which affecting urban change. The research also presents the trends of urbanization especially in developing countries and how to monitoring and evaluation of urban plans through urban indicators.

- The ability of urban indicators of measuring the goals performance and progress for all sectors in city. Moreover, it discusses the ability of linking urban indicators to city goals and policies.

- The linkage of urban indicators to national urban observatory. This linkage is, essentially useful to monitor and evaluate national development policies and provide decision and policy makers with information on urban conditions and trends.

- The need for organizations such as international organizations "UN-Habitat" which linked to unban indicators as a solution for any problem around the world. Moreover, it reviews the methodology of "UN-Habitat" and achieves the goals with indicators.

- Know polices for urban in Egypt through the review for constitution and the state of housing report.

- The severe need to set goals with new urban indicators as a key for measuring the progress in city. These goals helped to know what has happened in city as formulation urban planning concept.

- The research presents goals with conceptual model which title "Planning capa² Energy". This concept is a system that includes the resources (land, water, transportation and environment) and the comprehensive carrying capacity of the city to achieve the goals though a list of new urban indicators.

- The concerns of urban indicators to measure the progress to improving urban planning, social participation in the process of decision making and policy and quality of life, and defining the problems which have been helped to identifying the indicators in the field of urban development.

- It in its final part applies five of the urban indicators to the agricultural road (Abies) to demonstrate the feasibility of integrating indicators using a systematic process.

Towards this end, the implementing of Planning Capa² Energy is the opportunity and way to the city through indicators and targets, and including the encouragement of all stakeholders to adopt the selected core set of indicators as a starting point for policy-oriented activities.

It is important to continue the link between environmental scientists and local policy-makers to improve monitoring and communicate. Monitoring the goals is the best solution to keep pace with the changes that occur in the city and will meet the needs of GOPP to promote the planning process in with Egyptian context.

Such indicators if they existed before the current situation, the city will not have to get to this current state of problems and on-going changes over time.

Finally, for urban areas that face environmental, social and economic problems, indicators point to a better future. However, indicators generate discussion among stakeholders with different backgrounds and viewpoints and this will lead towards sustainability.

5.2 Recommendations

In the light of the description and explanation discussed, the research recommends the following:

- Facilitating broad-based consultation among national partners on urban development issues and providing mechanisms for the consultative interface between policy-makers and technical experts.

- Analysing local plans of action to identify common issues that may be the subject of national policy.

- Monitoring national and local progress in implementing enabling strategies and other objectives of the HABITAT Agenda.

- Proposing national urban policy options for harmonising sectoral policies and strategies in the context of the national plan of action.

- Providing expertise, experience and know-how in building capacity among local urban indicator focal points.

- Supporting networking among local authorities in order to facilitate peer-to-peer learning processes.

- Organising training programmes in the use of empirical information for policy makers and technicians at the national and local levels.

- Organising national best practices competitions.

- Promote access to the Internet by all partners groups.

- Designing and maintaining a national Internet homepage and a newsletter for reporting on the activities of city urban focal points.

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Appendices

Introduction

This section describes the list of indicators for **Planning Capa² Energy** which shown in table 6-1. As mentioned before that there are six goals and each of these goals having several indicators. So, it will explain each indicator to know how to deal with them.

Goal 1: Promote the capacity of city

Table 1: Indicator 1.1: Provision of Open Spaces (OS) to the Built-up Area (BA).

Theoretical bases	Description Goal 1: Promote the Capacity of City
Rationale	The main aim of that indicator understands the values, needs and aspirations of the community, visitors to the city and other users whilst promoting greater social inclusion. In another side, is establishing a clear understanding of the types of open space and their distribution across the city. In the city there are relatively few large Passive Parklands across the city [106]. Open space is any open piece of land that is undeveloped (has no buildings or other built structures) and is accessible to the public. Open space can include: ▪ Green space (land that is partly or completely covered with grass, trees, shrubs, or other vegetation). Green space includes parks, community gardens, and cemeteries. ▪ Schoolyards. ▪ Public seating areas. ▪ Public plazas. ▪ Vacant lots. ▪ Free areas (football grounds, parking lots and free lands).
Definition	**Percentage or ratio of open spaces to built-up area in the city.** $\frac{\text{total area of private and public spaces provided (m)2}}{\text{total site area (m)2}}$ *** 100 percent.**
Methodology	Data collection and sources are mainly Statistics and studies by Urban Planning Authority.
Gender	These open spaces are available to all citizens to incorporate the element of comfort. It helps to create paths to replenish the air in crowded places.

Comments and Limitations	Traffic congestion in the city has become a source of threat due to the increase in the number of cars. As a result, air pollution is increasing. But in the presence of such areas, they help to renew the air, especially with the presence of green areas inside them. Open space provides recreational areas for residents and helps to enhance the beauty and environmental quality of neighborhoods, (see fig. a-1).

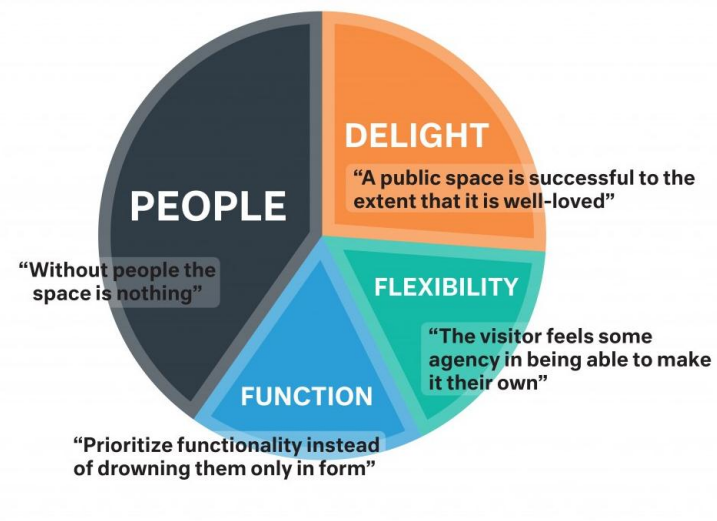

Figure a-1: what makes good public spaces?

Level	City, national urban.

Source: Researcher, 2016.

Table 2: Indicator 1.2: Lands to Development.

Theoretical bases	Description Goal 1: Promote the Capacity of City
Rationale	Land development refers to how urban land is produced in the form of both buildings and sites for various activities. That refers to the role of the ownership, the organization of the construction industry and the developers to property consultants In the past, poorly planned land development has led to urban sprawl. The features of the place change and that related to the human activities. Therefore, several areas need to develop in order to adapt the changing
Definition	**Percentages of the lands area which can be develop to total lands in the city. It needs also to some of Statistical and graphical data.**
Methodology	Data on development plans including the reports for the city own development plans. Planning studies environmental, social, economic and infrastructure.
Gender	Investors and government.
Comments and Limitations	Land is physic graphically defined as the natural synthesis of natural elements including geology, landform, climate, soil and vegetation, and is increasingly branded with human activities. Sections of lands with similar natural attributes are called land type. Land types and their spatial structure are the scientific basis for sustainable land use patterns. Natural attributes of land shows areal differentiation, including zonal and a zonal [107]. Land areal differentiations the basis for classification of land types. Accordingly, the conflict between population increase and land resource shortage becomes more and more sharpened.
Level	City, national urban.

Source: Researcher, 2016.

Table 3: Indicator 1.3: Uninhabited to Inhabited Units.

Theoretical bases	Description Goal 1: Promote the Capacity of City
Rationale	Vacant dwellings in Cairo are not significant. Only 7.3 percent of the dwellings of Cairo are vacant. The most common reason for the vacancy is the future use. This indicates the use of dwelling units as a shield against inflation, and a means for protecting savings but the reasons for uninhabited units vary from city to another. It could be not used at all; occasionally closed, not fully finished and need plaster, painting, the like, etc. This is a sign of distorted housing market [4].
Definition	**The number of uninhabited to inhabited units.**
Methodology	Data sources are mainly household surveys and censuses.
Gender	Households and ownerships.
Comments and Limitations	It could be not used at all; occasionally closed, not fully finished and need plaster, painting, the like, etc. One of the most distinctive features of the housing problem is the lack of proportion between the supply of population units required for a certain category in terms of potential and size of those wishing to live in this category.
Level	City, national urban.

Source: Researcher, 2016.

Table 4: Indicator 1.4: Road Situation.

Theoretical bases	Description Goal 2: Promote the Capacity of City
Rationale	In this case, this indicator is intended if the road have several elements just as: lighting, paved or not paved. This also includes intelligent transportation systems and smart parking systems [108]. There are some roads in many areas of the city, especially slums without lighting. In addition to not booting to the motorway what causes many accidents. In the winter, however, the road stops if the rain falls because of the accumulation of water and the accumulation of mud.
Definition	**Percentage of roads paved to unpaved roads or number of years, which estimated to be modified or renovated bridges and roads.**
Methodology	It required knowing qualitative data.
Gender	All citizens.
Comments and Limitations	It is noted that there are many traffic accidents in the city because of the lack of maintenance and follow-up roads through the renovation and maintenance of asphalt in an appropriate manner and continuous each period. And also not to consider providing good lighting on both sides of the road in and out of cities, both poles lighting.
Level	City, national urban.

Source: Researcher, 2016.

Goal 2: Promote Land Use Change

Table 5: Indicator 2.2: Land Pooling / Readjustment (LPR).

Theoretical bases	Description Goal 2: Promote Land Use Change
Rationale	It can be reorganised of the undeveloped areas in a manner land readjustment, where the reorganisation of the properties with the provision of surfaces and basic services in some areas, which grew on agricultural land owned by individuals, although it considered of private property. And, these areas called "zones of organising the construction" land readjustment zones". Land pooling is a technique for managing and financing urban land development when a group of neighboring landowners on an urban fringe area combine in a partnership for the unified planning, servicing and subdivision of their land with the project costs being recovered by the sale of some of the building plots from the project and with the remaining plots being distributed to the landowners in exchange for their rural land parcels in a proportional manner [109].
Definition	**The number of lands which applied to readjustment.** Data for these indicators may be difficult to get it through secondary sources.
Methodology	This information is usually collected using several indirect sources collected through public housing boards, housing finance institutions, real-estate agencies, non-governmental organizations.
Gender	Landowners and government.
Comments and Limitations	In this context, the technique of (LP/R) has been gaining wider recognition as a powerful tool to address many of the urban land related problems. Urban LP/R is a land development technique for the unified design, servicing and subdivision of separate land holdings for planned urban development. The technique is widely used in Japan, Taiwan and South Korea, and in some cities of Australia and Canada.
Level	City, national urban.

Source: Researcher, 2016.

Table 6: Indicator 2.4: The Density of Development Lands within Renewal Site.

Theoretical bases	Description Goal 2: Promote Land Use Change
Rationale	There is close relationship between development density and environmental quality; therefore, it is necessary to decide the form of development carefully before hand. The form of development is shaped either by new development or urban renewal which is a major tactic to improve the living condition of the citizens and the quality of the built environment [110].
Definition	**Ratio of the total above ground construction area of all types of building in the site to the total site area to be renewed.**
Methodology	This information is usually collected using several indirect sources collected. The framework is based on a literature review, questionnaire survey, descriptive analysis and exploratory factor analysis. A comprehensive literature review which helps to develop a framework for this study and prepare for the questionnaire survey. Urban design considerations applicable to local context were verified through a pilot study.
Gender	Privet sectors and government.
Comments and Limitations	In order to ensure that sustainable development can be achieved through urban design, numbers of design considerations have to be taken into account when preparing urban renewal proposals. There are no consistent and definite rules in producing a good urban design. Various scholars and urban planners have their own considerations when designing urban areas
Level	City, national urban.

Source: Researcher, 2016.

Goal 3: Encourage and Support (Restore, Replace and Intensify

Table 7: Indicator 3.1: Rehabilitation of Repairable Properties.

Theoretical bases	Description Goal 3: Encourage and Support (Restore, Replace and Intensify)
Rationale	Egypt has a lot of real estate wealth, but the maintenance of these properties is non-existent. Due to several reasons, including the decrease in rental value and lack of interest of owners and occupants, which led to the deterioration of the construction of buildings and the decline in life expectancy. Also, this led to the need to enact laws that empower for the replacement and renewal of some of these properties. This indicator can be used to re-classification of vacant units pointer to the government, private sector, the people and also different kinds of rent (old rent - new - furnished) which ending with ownership (old real estate).
Definition	$\frac{\text{Total number of the property to be repaired}}{\text{total number of existing properties}}$ *** 100 percent.**
Methodology	Real estate wealth, both economic and administrative management.
Gender	Owners of private property and public sector
Comments and Limitations	Restructuring the system of property law will increase the size of the untapped supply of units instead of creating hundreds of thousands of them and their allocation to citizens in need of housing of young people and low and middle income.
Level	City, national urban.

Source: Researcher, 2016.

Table 8: Indicator 3.3: Buildings with Heritage Value (Maintenance and Preservation).

Theoretical bases	Description Goal 3: Encourage and Support (Restore, Replace and Intensify)
Rationale	The re-use of facilities or old buildings which have heritage value such as many of the buildings in the Heritage folder. There is prohibited from demolition, it can be re-used with another using, such as museums. For example, the number of buildings of heritage value in the district of Sharq in Alexandria to more than 460 buildings. This indicates the importance of these types of buildings and their heritage value.
Definition	**The numbers of maintenance and restoration of properties for each period of time**.
Methodology	Data will be taken from Supreme Council of Antiquities and the General Authority for Antiquities and Heritage of Egypt.
Gender	Private ownership and the public sector of the government.
Comments and Limitations	The enactment of laws and legislation to ensure the programs for maintenance and hygiene of buildings. Strengthen the implementation of these laws without irregularities the elaboration and application of sanctions.
Level	City, national urban.

Source: Researcher, 2016.

Goal 4: Involvement in Decision-Making Process

Table 9: Indicator 4.1: Citizen Involvement in City Consultation (Societal Habits).

Theoretical bases	Description Goal 4: Involvement in Decision-Making Process
Rationale	Societal habits meant that most of the citizens had not known about the importance and necessity of popular participation. Since ancient times, citizens have relied entirely on their representatives in the people's Assembly to solve their problems and that became social habits for the citizen is not involved in democratic practice and popular participation. Therefore, it's very important to enhance democratic practice. The democratic ideology which has a principle tenet the right to participate in decision-making. Public consultation allows and promotes participation, thus avoiding the further issue that can arise when the public is excluded from a decision-making process.
Definition	1- Are citizens aware of the need for popular participation in decisions and planning? ☐ YES ☐ NO 2- Is the government doing its part to educate the people to participate in making decisions? ☐ YES ☐ NO 3- Are there any methods to raise the awareness of citizens? ☐ YES ☐ NO
Methodology	Data from local government and A non-governmental organization.
Gender	Citizens and the government.
Comments and Limitations	Many of our urban problems will not be solved, even if we bring in experts from everywhere, unless people participate in planning and decision-making, people are more knowledgeable than experts, but experts improve the ways of looking and working methods.
Level	City, national urban.

Source: Researcher, 2016.

Table 10: Indicator 4.2: Citizen Involvement in City consultation (People Needs).

Theoretical bases	Description Goal 4: Involvement in Decision-Making Process
Rationale	Participation here to enhance the role of citizens because they are more knowledgeable and related to the problems that occur to them. Through this participation, many ideas will emerge which can become an effective solution to their problems.
Definition	1- Are citizens involved in making some decisions about the city? ☐ YES ☐ NO 2- Are citizens involved in urban projects? ☐ YES ☐ NO 3- Are the demands of the population concerned about a project has taken into account? ☐ YES ☐ NO 4- Did public meetings hold with the relevant civilian for any project? ☐ YES ☐ NO 5- Are there enough local organizations in society? ☐ YES ☐ NO 6- How did representatives of citizens meet the demands of citizens and civil associations during their consultations and meetings?
Methodology	Data from local government and A non-governmental organization.
Gender	Citizens and the government.
Comments and Limitations	In the last century, the theory of international development emerged as an independent body of ideas. This has led to the establishment of institutions that aim to help the people. Also, these institutions focus on alleviating poverty, improving living conditions and emphasising the democratic practice in third world countries.
Level	City, national urban.

Source: Researcher, 2016.

Table 11: Indicator 4.3: Government Policies.

Theoretical bases	Description Goal 4: Involvement in Decision-Making Process
Rationale	Government policies have a major role to active the role of citizens through popular participation and give a trend to do all the needs of citizens through projects.
Definition	**Percentage of the role of popular participation in government policies.** This is achieved by answering the following questions: 1- To what extent does the role of community participation in the development of municipal work plans work? 2- How did the society aware about the concept of community participation? What is the level of community participation priority? 3- What are the permitted areas for citizens to achieve community participation? What are the obstacles to achieving the principle of community participation? 4- What is the commitment of municipalities to implement the concept of community participation? Are future projects planning serving citizens who living in slums? 5- Is there a special policy for citizen participation in urban planning and decision-making? 6- Is there any part of the annual budget allocated to promote the principle of community participation? Is the annual budget constant or increasing?
Methodology	Government, municipalities and private studies by the Urban Planning Authority.
Gender	Government.
Comments and Limitations	There should be a forward-looking view of the method of active community participation with the government in achieving the required expansion, through the provision of educational institutions to meet the population increase.
Level	City, national urban.

Source: Researcher, 2016.

Table 12: Indicator 4.4: Civil Society Organisations.

Theoretical bases	Description Goal 4: Involvement in Decision-Making Process
Rationale	The aim of these organizations is to support development and institutional capacity-building to promote a vibrant and sustainable civil society. Recently, there has been an interest for such these organisations. The number of such organisations is estimated at 137 in Egypt, but only 97 are accredited [111].
Definition	**The number of civil society organasations in the city.**
Methodology	Data from local government and A non-governmental organization.
Gender	Citizens and the government.
Comments and Limitations	In the light of the growing for the importance of the role non-governmental organizations which played for the development and development of Egyptian society. Some associations have launched some aims to raising the capacity of local NGOs and civil society organisations in Egypt to enable them to achieve their objectives and contribute to sustainable development in Egypt.
Level	City, national urban.

Source: Researcher, 2016.

Table 13: Indicator 4.5: Learning and Growth to Evaluate the Performance of Local Authorities.

Theoretical bases	Description Goal 4: Involvement in Decision-Making Process
Rationale	The aim of this indicator is to strengthen the efficiency of procedures and coordination between different parties and increase technical and managerial skills and also increase the participation of elements of society. Where the development of local administrations must be strengthened by updating the system, updating the data and introducing the GIS. Therefore, the Urban Observatory and Maps should be linked.
Definition	**Number of courses to update the administrative system.**
Methodology	Data from local government.
Gender	Local authorities.
Comments and Limitations	Lack of awareness of new technologies in the field of work and also no integrated database. Through the indicator, it will be measured the growth and education of a particular department by doing some tables and charts
Level	City, national urban.

Source: Researcher, 2016.

Goal 5: Promote Urban Sprawl Energy

Table 14: Indicator 5.1: Urban Deformation.

Theoretical bases	Description Goal 5: Promote Urban Sprawl Energy
Rationale	There is a close relationship between urban sprawling and urban deformity, due to the lack of radical solutions to urban sprawl, several problems emerged. Moreover, additional issues arise as the complicated deformation patterns associated with the underlying geological conditions.
Definition	**This indicator is measured by the Geographic Information System (GIS) for investigating deformations occurring in urban areas.**
Methodology	Data from the Urban Observatory and the Urban Planning, Housing and Utilities Authority. It will do that by Qualitative evaluation of spatial distribution and temporal evolution of deformation which will conducted by joint analyses of deformation measurements and local geological data.
Gender	Citizens and the government
Comments and Limitations	This indicator allows the detection and analysis of displacements of single structures and buildings in the investigated zone. Conventional methods to monitor deformation including layer wise mark, spirit leveling, and Global Position System (GPS), are based on point-by-point observations, and are labor-intensive and time consuming, especially for large linear facilities like roads and bridges.
Level	City, national urban.

Source: Researcher, 2016.

Table 15: Indicator 5.2: Urbanised Surfaces Outside Urban Areas

Theoretical bases	Description Goal 5: Promote Urban Sprawl Energy
Rationale	Urbanised surfaces refer to new projects and investments. The main aim of that indicator is monitoring for land-use changes and to early detect actualization requirements in land-use plans. The indicator supposes that the sum of actions of urban developers – including social public housing and infrastructure – is an indication about trends of future urban development.
Definition	**Percentage of area for new urbanised surfaces outside urban areas per year.**
Methodology	Monitoring public and private investments using a GIS based system.
Gender	Private and public sector.
Comments and Limitations	This indicator is just able to check the current actions of real estate developers and therefore has no predictive ability, but it offers the possibility of identifying the changes once they have occurred. Moreover, the system assumes a scenario of free market, where the decisions are oriented by land prices. Despite these shortcomings, the indicator is a good basis for monitoring urban development in the region.
Level	City, national urban.

Source: Researcher, 2016.

Table 16: Indicator 5.3: Sound Urbanization.

Theoretical bases	Description Goal 5: Promote Urban Sprawl Energy
Rationale	Urbanisation has been used as an excuse for "construction expansion", creating heaps of good-looking gross domestic product figures while bringing no substantial improvements in people's lives. The country should pursue a new type of urbanization that helps rural migrant workers become urban residents and focuses on the quality of life in cities, instead of just expanding the size of cities.
Definition	**The resulting value of urbanization to strengthen urban development.**
Methodology	Data from Urban Planning Authority.
Gender	Private and public sector.
Comments and Limitations	Without sweeping reforms to the system, any urbanisation effort will fall into the urban expansion model of the past. To local governments, lifting the lid on the restrictions imposed by rural means that more money must be injected into the building of an expanded public welfare network. Yet how to ensure its implementation will require well-conceived policy designs and follow-up measures from the central authorities.
Level	City, national urban.

Source: Researcher, 2016.

Goal 6: Ensure Renewable Resources Energy

Table 17: Indicator 6.1: Coastal Process.

Theoretical bases	Description Goal 6: Ensure Renewable Resources Energy
Rationale	In view of the high prices of fuel from oil and natural gas to unprecedented levels, and the possibility of rising in the light of increasing global demand for energy, and the depletion of some oil reserves. The search for alternative sources of renewable and environmentally clean energy has become a concern for industrialized countries and new markets. Egypt has a special nature and has a good located on the Mediterranean Sea and the Red Sea, where there are many coastal process that can be used, for example, wind power and electricity generation. The aim is to promote natural resources and the concept of sustainability.
Definition	**Percentage of electricity generation using renewable energy to generate electricity with nonrenewable energy.** 1- Is the wave energy generated by the coastal process used to generate electricity? ☐ YES ☐ NO 2- Are citizens aware of the concept of sustainability and clean renewable energy? ☐ YES ☐ NO 3- Is there a trend from the state to promote and use renewable energy? ☐ YES ☐ NO 4- Is the nature of the waves in Egypt suitable in this regard? ☐ YES ☐ NO 5- Are there trials and research to promote the use of clean renewable energy? ☐ YES ☐ NO
Methodology	Data and studies from Ministry of Water Resources and Irrigation and Ministry of State for Environmental Affairs.
Gender	Private and public sector.
Comments and Limitations	This new technology still needs concrete investment, from government and private companies. There are no specific expectations of their availability on a large scale. It feared that the cost of connecting marine generators to the public electricity grid may be high, and generators may not provide energy when they are needed and may cause problems for life and the marine environment.
Level	City, national urban.

Table 18: Indicator 6.2: Using of Alternative Technology for Transport.

Theoretical bases	Description Goal 6: Ensure Renewable Resources Energy
Rationale	Urban crawling has led citizens to live outside the city, thus using transportation daily. This use led to a shortage of natural resources accompanied by the emergence of environmental problems, so it was necessary to find alternative solutions such as the use of alternative transport technology. Conventional transportation technologies usually involve the use of fossil fuels for vehicle propulsion. Rising fuel prices are causing mainstream awareness and interest in alternative transportation technology. For example, Two promising technologies for alternative] technology for transport which are electric vehicles and fuel cell vehicles.
Definition	**The ratio of alternative technology for transport which has been used in the city.**
Methodology	Transportation sector, experts from science, industry and stakeholder organisations.
Gender	Citizens and governments (personal mobility - public transportation).
Comments and Limitations	The development of transportation will lead dramatically extended the range of human activities and saving the natural resources.
Level	City, national urban.

Source: Researcher, 2016.

Table 19: Indicator 6.3: Sun Solar (PV).

Theoretical bases	Description Goal 6: Ensure Renewable Resources Energy
Rationale	Egypt is at the heart of the global solar belt, thus it considers one of the world's richest countries in solar energy. The Ministry of Electricity and Energy conducted several studies to determine the characteristics of radiation in Egypt, which resulted in updating the data available from the meteorological station and adding some new stations and advanced measuring equipment. As a result, the sun can be used to generate electricity and promote the concept of sustainability.
Definition	**It can be calculated by several way such as:** - **Per capita electricity generated by solar energy.** - **The number of individuals who using solar energy to the total number of individuals in the city.** - **Percentage of electricity generated from solar energy to electricity generated by ordinary methods.** It should do several studies from Ministry of Electricity and Energy to collect all data which needed in that indicator.
Methodology	A methodology to predict city level PV installed capacity by combining physical capacity and socio-economic factors. Also collect data from the Ministry of Electricity and Energy.
Gender	Citizens and government.
Comments and Limitations	Solar thermal includes solar heating for domestic and general purposes such as hospitals, in industrial processes for low and medium temperatures. Finally, use solar thermal energy to generate electricity. But it is expensive and requires a large budget.
Level	City, national urban.

Source: Researcher, 2016.

Table 20: Indicator 6.4: Recycling Rate.

Theoretical bases	Description Goal 6: Ensure Renewable Resources Energy
Rationale	Egypt is considered the richest country in the world by the daily waste. Therefore, it is necessary to take advantage of this. The concept of recycling is not collecting and sorting organic waste, but it includes the recycling and reuse of building materials. On the other hand, waste can be used to produce electricity.
Definition	**Rate and percentage of products resulting from the recycling process.**
Methodology	Data from the Ministry of Environment.
Gender	The Ministry of Environment and citizens.
Comments and Limitations	Egypt annually produces 27 million tonnes of waste. It is necessary to get rid of it with spending 30 billion pounds every five years by burying it in private landfills. This is why the project for the transfer of waste for electric power is a friendly project for the environment, especially if we know that the percentage of emissions reaches zero% Only 4.5% of the wastes remains after burning.
Level	City, national urban.

Source: Researcher, 2016.