



## The Sustainable Environmental Management For the city: Art and Policy

The case study is Sulaimaniyah city: Kanda Swra area

By: Civil engineer, Bushra Abdul Raheem Yass

**Key Words: Sustainable, Environmental management**

**Abstract:** Rapid technology and the increasing growth of the population led to the emergence of many environmental problems require a successful environmental management to deal with these problems and find solutions and remedies within the city plan. The research discussed this subject for **its importance** and its association with humans and his relationship with nature and its resources. **Research problem is:** The absence of the successful environmental urban management to achieve coherence and compatibility between the preservation of the natural, social environment and urban policies. **Hypothesis of the research is:** A good environmental management system for Sulaimaniyah city is important to create future development much healthier and controllable and richer in every aspect than nowadays.

**The study aims** to find a model for environmental management achieves coordination and integration between urban policies and preservation of natural, social environment for improving and raising of life quality of those who dwell and continued development without negative effects on the ecosystems, this differs from country to country according to its economic and social conditions. In **the theoretical part** of the research, some basic concepts has been displayed that are relevant to research, the environment and environmental management and its importance in the future development, Three examples has been displayed, local, regional and global about environmental management. **The practical part** focused on Sulaimaniyah city as a case study and discussed the most environmental problems, causes and solutions to get a set of conclusions and recommendation. Research depends on the **descriptive approach** adopted by collecting and analyzing data, as well as field visits and visits of the relevant offices to get information concerned search and the questionnaire form was allocated in the selected area, Kanda Swra as an example, it is one of many residential areas annexed to the urban center by updating & expanding master plan of Sulaimaniyah, 2009. They are, with rural characteristics and absence of the urban standards. **The research introduced three proposed alternatives** for sustainable environmental management for the city, workable, to achieve the desired goals of healthy environment, safe and sustainable.



## الإدارة البيئية المستدامة للمدينة: فن وسياسة

### مدينة السليمانية: منطقة كندا سورة

المهندسة بشرى عبد الرحيم ياس

الكلمات المفتاحية: الإدارة البيئية، الاستدامة، الإدارة البيئية

**ملخص البحث:** أدى التقدم التكنولوجي السريع والنمو السكاني المتزايد إلى ظهور مشاكل بيئية كثيرة تتطلب إدارة بيئية ناجحة للتعامل مع هذه المشاكل وإيجاد الحلول والمعالجات ضمن خطة المدينة. تناول البحث هذا الموضوع لأهميته وذلك لارتباطه بالإنسان وعلاقته مع الطبيعة ومواردها. المشكلة البحثية: هي غياب الإدارة البيئية الحضرية الناجحة التي تحقق الترابط والتوافق الإداري بين الحفاظ على البيئة الطبيعية، الاجتماعية، وسياسات التنمية المكانية الحضرية. تهدف الدراسة إلى إيجاد نموذج لإدارة بيئية تحقق التنسيق والتكامل بين سياسات التنمية المكانية الحضرية والحفاظ على البيئة من أجل تحسين مستوى ونوعية الحياة للسكان، ومن أجل تنمية مستمرة بدون آثار سلبية على الأنظمة البيئية، ويختلف هذا من بلد إلى آخر تبعاً لظروفه الاقتصادية والاجتماعية. لغرض الوصول إلى الأهداف المطلوبة، تم عرض بعض المفاهيم الأساسية التي لها صلة بالبحث حول البيئة والإدارة البيئية وأهميتها في التنمية المستقبلية في جانبه النظري، مع عرض ثلاثة أمثلة محلية وإقليمية وعالمية حول الإدارة البيئية، تناول الجزء العملي من البحث مدينة السليمانية كحالة دراسية والوقوف على أهم المشاكل البيئية، الأسباب والحلول، والخروج بمجموعة من الاستنتاجات والتوصيات. اعتمد البحث المنهج الوصفي من خلال جمع المعلومات عرضها وتحليلها بالإضافة إلى الزيارات الميدانية للاطلاع وجمع المعلومات وزيارة الدوائر المعنية وتوزيع استمارة الاستبانة في المنطقة السكنية المختارة كمثل وهي كندا سورة وهي واحدة من المناطق السكنية التي دخلت المركز الحضري بتحديث وتوسيع المخطط الأساس لمدينة السليمانية 2009، وهي تحمل صفات ريفية وتغيب عنها المعايير التخطيطية. توصل البحث إلى ثلاث بدائل مقترحة لإدارة بيئية مستدامة للمدينة قابلة للتطبيق لتحقيق الأهداف المطلوبة في بيئة صحية آمنة ومستدامة.

**INTRODUCTION:** Efficient and effective environmental management secrete group of benefits such as reducing pollution and waste risks and to avoid many of the problems that are harmful to human health and the environment as well as plus it reflects the good behavior of the individual in dealing with the environment and raise the reputation. Good management will help in improving the performance of companies and institutions and thus raise profits and reduce costs ,the rational use of natural resources ,reduce energy consumption and interest in the production of environmentally friendly clean material. Administration is efficient and the resulting environmental problems requires high processing cost in the payment of compensation and pick up the pieces.  
[http://ivythesis.typepad.com/term\\_paper\\_topics/2009/06/technology.html](http://ivythesis.typepad.com/term_paper_topics/2009/06/technology.html)

**Research Problem:** Absence the administrative coherence and compatibility between the preservation of the natural, social environment and urban policies.



**Hypothesis:** A good environmental management system for Sulaimaniyah city is important to create future development much healthier and controllable and richer in every aspects than nowadays.

**The study aims:** To find a model for environmental management achieves coordination and integration between urban policies, spatial development, and environment to achieve better quality of life and continued technological development without negative effects on the ecosystems, this differs from country to another according to its economic and social conditions.

**Methodology of the research:** Research depends on the descriptive and analytical approach concern the problem of the research.

**The importance of the research:** The research shows that the management of environment is an important issue to preserve health, it is related to humans and his relationship with nature and it sources. The research relates between the environmental urban management and spatial urban policies.

## **1- Concept of environment and urban management**

### **1-1 The environment**

The science of the relationships between organisms and their environments.

According to the United Nation Conference on the Human Environment 1972, it is defined as "Every Thing About The Man" [1]

### **1-2 The urban management**

Management is both art and science. It is the manner of controlling and managing of crisis, enterprises, factories, people who has business or have managerial capability and cleverness. [2] p.

168 <http://www.recruitireland.com/careercentre/news/rinews.asp?articleid=1111&z0>

### **2-2-Concept of environmental management**

It is the interaction between three types of environment, social, economic, cultural environment with the bio-physical one. It is the managing of all components, living and non-livings, (physical, biological, chemical). <http://www.authorstream.com/presentation/puneit-157002-environmental-managementeducation-ppt-powerpoint/> .

It is known as an environmental management plan which is a concept developed to put a framework dealing with the problems of environment and its impacts caused by process occur in the city as maintenance, using of chemicals, services, changing land uses also to strengthen the communication between departments and determining roles and



responsibilities and develop structure of required reports to the process. Submitted to Blue Mountain Hotel School on 2009-12-09. EAA is the environmental action agenda, it is a part of management action, and it can see the progress that has happened towards achieving set targets.

[http://www.cityofseattle.org/environment/Agenda\\_EMP.htm](http://www.cityofseattle.org/environment/Agenda_EMP.htm)

Environmental management is also can be defined as a document helps companies to develop a framework to deal with the problems of pollution and impacts. By environmental management plan, companies can control risks by the best purists then increasing efficiencies of production with low costs. Sites with high risks and mild operations need an environmental management <http://www.incompliance.co.za/consulting> like ISO law solves and controls the places that have ongoing pollution issues. [4] P.54

## **2-1 BACKGROUND OF ENVIRONMENTAL MANAGEMENT**

ISO 14001:- [5]

- International Organization for Standards was found in 1946 in Geneva, Switzerland
- It's key mission, is to promote trade by developing international voluntary consensus standards.
- ISO was built for encouraging organizations to systematically address the environmental impacts of their activities.

### **2-1-1 Requirements of ISO- 14001-Environmental management:**

There are many requirements set by ISO- 1400 as correspondence the environmental issues, evolution of environmental policy, development of goals and targets, legal and regulatory requirements must be established, application of a certain system including (training, controlling process, how to deal with emergencies), controlling and measuring the operational activities, examination and auditing of environment are of interest.

<http://www.ebah.com.br/iso14001-handbook-pdf-a11830.html>

### **2-1-2 ISO 14001... Legislation & Regulation is for:-**

- Air emission - Solid waste to land - Water
- Hazardous substance - other. [6] p. 301

## **2-2 TYPES OF ENVIRONMENTAL MANAGEMENT**

There are mainly three types of environmental management, each distributes into many branches having own impotency and effects: - [7] p.16

### **2-2-1 The Physical environment**

Includes physical things like soil, climatic factors

<http://www.quakersintheworld.org/uploads/articlePDFs>

/Final%20Peace%20curric%20resources%207%202011.pdf such as, moisture, pressure, wind speed, rainwater, heavy rain(precipitation) and sunbeam. As well as ,houses, roads, transport system, buildings, infrastructure..etc

Submitted to CSU, Long Beach on 2011-12-08

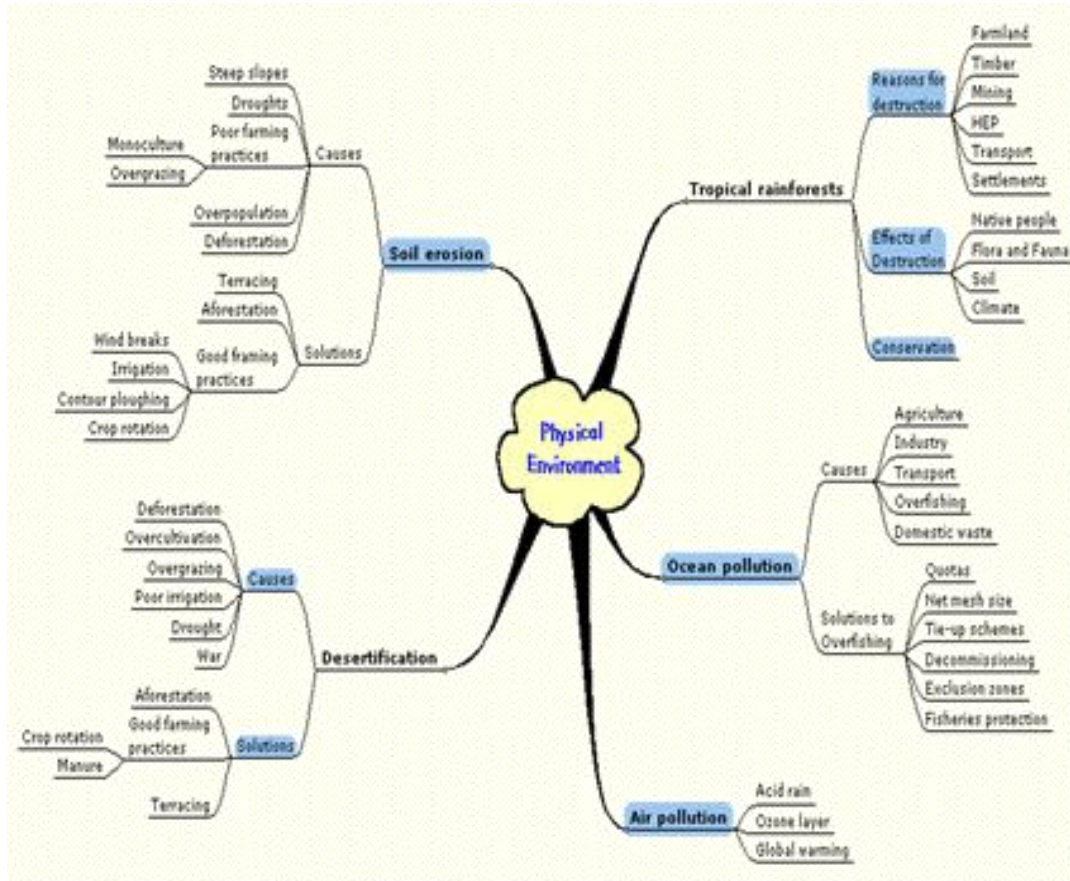


Fig. -1-Physical environment hierarchy [8]

Fig. -1 above shows the environment hierarchy (details on the drawing).

### The Importance of Physical Environment

It is answerable of residence of human beings because it includes residential space which needs land area, it includes soil which provides food and work for human beings, water as an important element for continuing of life, soil, water and air are provider of nutrient for human beings, environment is responsible of controlling weather and other climatic factors. [7] p. 16

[http://www.bukisa.com/articles/255515\\_types-of-environment](http://www.bukisa.com/articles/255515_types-of-environment)



### 2-2-2 Biotic environment and its importance

Biological or biotic means the living things so biotic environment is responsible of all living things on the earth, it includes human beings, micro- organics, plants animals each one depends on other, humans depend on plants as a food and for oxygen, plants depend on humans and animals for CO<sub>2</sub> gas. [7] p. 20

[http://www.bukisa.com/articles/255515\\_types-of-environment](http://www.bukisa.com/articles/255515_types-of-environment)

### 2-2-3 Social or cultural environment and its important

Is the environment which arise by humans through cultural, social and intellectual activities which involve the culture and life of all the historical, cultural, social and economic aspects of it involving human religion and involving people "are different in culture, religion and way of thinking and all his style in life. The rise of individual in society and its development depends on the degree of culture of the community in which he lives. [7] p. 27

[http://www.bukisa.com/articles/255515\\_types-of-environment](http://www.bukisa.com/articles/255515_types-of-environment)

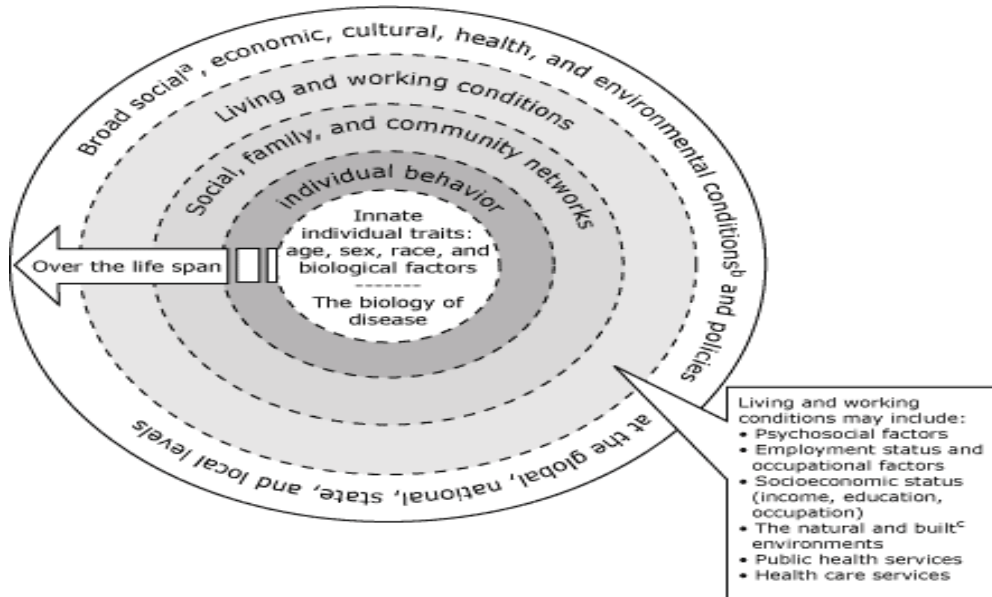


Figure -2- Socio-economic cycle

[9]

Fig.-2 above shows the socio economic cycle (details on the drawing)



## **2-3 IMPORTANCE OF ENVIRONMENTAL MANAGEMENT**

The environment is not a marginal issue for government officials nor is it a question of business, but is a kind of distinctive work that is the focus of attention at various levels. [10] p. 3

<http://www.questia.com/read/101433119/effective-environmental-management-principles-and>

International Chamber of Commerce "IIC" and the World Business Council "WBC" for sustainable development have advanced an environmental guidelines and standards and environmental issues for their members. [11] p. 291

<http://www.questia.com/read/101433119/effective-environmental-management-principles-and>

Education programs, cleaner production project, education programs and developing of leading for environmental management has much reflected on a good life conditions. In developed countries both public and private organizations have responded for using environmental management plan in their works and business manner and practices through moving towards better environmental applications as cleaner production analyzing of life circle and preparing public reports

<http://www.questia.com/read/101433119/effective-environmental-management-principles-and>, the organizations that haven't used Environmental management plan have not experienced the same range of benefits in their business. [12] p.84-85

### **2-3-1 The Importance of Environmental Management for future development**

More than one third of the nation's threatened and endangered live in wetlands which half of it are damaged by human. [13], p. 135

[http://www.ehow.com/about\\_5434664\\_importance-environmental-management.html](http://www.ehow.com/about_5434664_importance-environmental-management.html)

### **2-3-2 The importance of of environmental management for future development included:**

[14], p. 34-36

[http://www.ehow.com/about\\_5434664\\_importance-environmental-management.html](http://www.ehow.com/about_5434664_importance-environmental-management.html)

**1-Facts:** More than one- third of the nation's threatened and endangered species live in wet lands while half of these wet lands damaged by humans, this was reported by EPA ( US environmental Protection Agency).

**2- Effects:** The possibility of additional risks such as loss of food and housing in event that the management of the environment was weak or marred by neglect.

**3-Significance:** Protection of human health is one of the environmental management interests through a certain programs as the Department of Energy's Cleanup of Nuclear Waste Sites.



**4- Misconception:** The land and the wildlife will adapt with small and slow changes but it is so difficult that the wildlife species be recovered under the effect of large and quick changes may happen, so the belief that the earth and wildlife will restore its normal case, is wrong.

**5- Benefits:** Living in an environment with no serious impact and interest of the aesthetic value, is one of the benefits achieved by environmental management.

#### **2-4 Types of management used in environmental development**

There are three types of management that is used in environment development programs to control pollution and future expansion in the cities: [15] p. 443-447

**2-4-1 space management:** It is the evaluate and plan space usage. In order to reduce environmental pressures in the cities, an effective route for land use requires space management to maximize efficiency and decrease costs, includes:

- Density of buildings and mixture of uses.
- Building areas and commercial and industrial areas.
- Compensation of the land utilization for housing, industrial, commercial and traffic zones.

<http://www.archibus.com>.

**2-4-2 Spatio temporal management:** Is a basic part of the sustainable and long term stability development concept. In the cities, there are offices which decide standard policies as well as in business planning, urban and regional planning; it is called temporal management because the standards change with the unexpected events and developments that happen in the city, such as hazardous accidents.

**2-4-3 Process management:** Is the evaluation of public and private projects that is done in the city.

#### **2-5 Examples**

##### **2-5-1 Example 1:- Environmental management planning in UK**

**The Royal Commission**[16] p. 27 <http://www.rcep.org.uk/reports/26-urban/documents/urb-env-summary.pdf>

In the urban areas in UK, reviewing the effect of environmental management on the human health through four consultant studies, which are: Environmental influence on the housing green and the role of local authorities, planning and juristic issues. Members of this Commission and its Secretariat applied this system in this towns of UK (Belfast, Edinburgh, Ashford, Hull, Manchester, Glasgow





Milton Keynes, , Pound bury, Poole, Swansea, Southward) and the (Building Research Establishment at Watford BRE).

Mega cities which is defined as a metropolitan area with in excess of 10 million inhabitants, are expanded rapidly for example, in the urban areas in UK, 80% of population living there so there is an urban expansion, it is a new stage in the life of the country, which affect the style of life for decades coming. Figure -3- shows steps of environmental management improvement by Royal Commission UK.



Fig.-3- Cycle of Environmental management improvement [16] p. 27

The goal to apply this system in UK is to provide (healthy and prosperity). Urban areas provide good living environment, housing and opportunities but at the same time is the cause of the death of thousands of people every year an this is what witnessed in UK. Major issues include air pollute and mental health are all effecting health because of the historical background of UK in early 1800 when it went through industrialization. Lack of green spaces and housing of good quality and the toxic mission of vehicles are the main problems in UK. <http://www.rcep.org.uk/reports/26-urban/documents/urb-env-summary.pdf>

[16] p. 27

**2-5-1-1 Principles of Urban Environment Management Plan According to Royal Commission UK [16] p. 29**

Sustainable environment and healthy places in the cities and towns is the main interest of the government policy. They are made through:-





- 1- Limited urban management policies used as a guide for management.
- 2- It is necessary to be all the process of renewal and urban growth within environmental constraints and determinants.
- 3- Environment must be one of the interests of urban design, renewal and and administration.
- 4- Incentives is necessary to reduce the passive effects.
- 5- The urban environmental approach that is which taken in consideration, social, economic and physical factors.
- 6- Harnessing all the capabilities cognitive abilities and skills to reduce environment impact in order to achieve prosperity and preservation of human health.

#### **2-5-1-2 Putting these principles into practice:-**

To put these principles into practice, steps below have to be followed: [16] p. 32

1. Any environmental contract between the central government and the local authorities, civil community, private sector and voluntaries must be take part.
2. Set an environmental policy and its effects on human health.
3. Getting better environment execution of both existing and new building according to a certain program.
4. Interesting of natural environment as well as the green infrastructure through urban planning policies.
- 5- Cods for Sustainable Homes, utility pricing to reduce waste and trafficking in the urban city, under frame work of range of standards.
- 6-Suitable skills and information should be provided.

<http://www.rcep.org.uk/reports/26-urban/documents/urb-env-summary.pdf>

#### **2-5-2 Example 2: Iraq Reconstruction, Environmental Protection and Natural Resource**

**Management** [17] [http://198.65.138.161/wmd/library/news/iraq/2003/03-21\\_index.htm](http://198.65.138.161/wmd/library/news/iraq/2003/03-21_index.htm)

**USAID:** The U.S. Agency for International Development (USAID) is tied to environmental safeguarding and amended management to Iraq's retrieval

**USAID,** with other U.S agencies such as Men, for heading key environment issues of Iraq through putting the foundation for improving the management of water resources, Sewerage treatment and cleaning up rivers, improving and rehabilitating critical marshlands, waterways and rivers, reinforcement management of solid waste. <http://www.state.gov/g/oes/rls/fs/2003/19225.htm>



### 2-5-2-1 USAID planning for IRAQ's environmental management:

**1- Water Supply and Sanitation.** Lack of safe water and sanitation is the reasons that make five million people are at risk. Less than half of the rural population has access to potable water. In urban areas, destination of unpreserved and improved sewage into the Tigris River and waterways is very dangerous to environment and human health.

#### **Solution**

Carrying out a rapid assessment of water supply and sanitation infrastructure for population areas. Instant reparation for rehabilitation of water supply and sewerage and good treatment of sewage facilities.

**2- Improved soil and water resources management.** In Iraq, farmers lived under complex conditions and weak environment with few and old tools to deal with pests, lack of basic inputs, land degradation, salinization, problems in irrigation, recess of improving soil and water.

<http://www.state.gov/g/oes/rls/fs/2003/19225.htm>

#### **Solution**

Introducing suitable technologies for protection and environment management, repairing and rehabilitation of irrigation net works, improving water management of resources and land.

**3. Environmental Check** to assure that its aid for Iraq is suitable environmentally in field of humane and development.

**Solution** Applying the environment process to assure that its activities are specific and suitable and environmental safeguards are adopted and accomplish.

<http://www.state.gov/g/oes/rls/fs/2003/19225.htm>

### 2-5-2-2 The stages have to put into practice by Iraq government: – [18], p. 27-32

Stage 1: Commitment and establishing the baselines and follow the rules.

Stage 2: Ensuring acquiescence with lawful and requirements available.

Stage 3: Achieving objectives, targets, and application programs without any retard.

Stage 4: Accomplishment and putting practicability study of EM by state employees.

Submitted to Columbia Southern University on 2013-08-04

Stage 5: Checking, audit and management review by the professionals.

Stage 6: Selecting a plan or program which involved acknowledgement and professionals which has been chosen to direct this program. [http://www.environmental-mainstreaming.org/documents/EM%20Profile%20No%205%20-%20EMS%20\(6%20Oct%2009\).pdf](http://www.environmental-mainstreaming.org/documents/EM%20Profile%20No%205%20-%20EMS%20(6%20Oct%2009).pdf)





In addition to the above, there is the cost of investment of resources which include:

Analyzing environmental effects and improvement of options where it is required by technical resources, training of persons and consulting help if it was required.

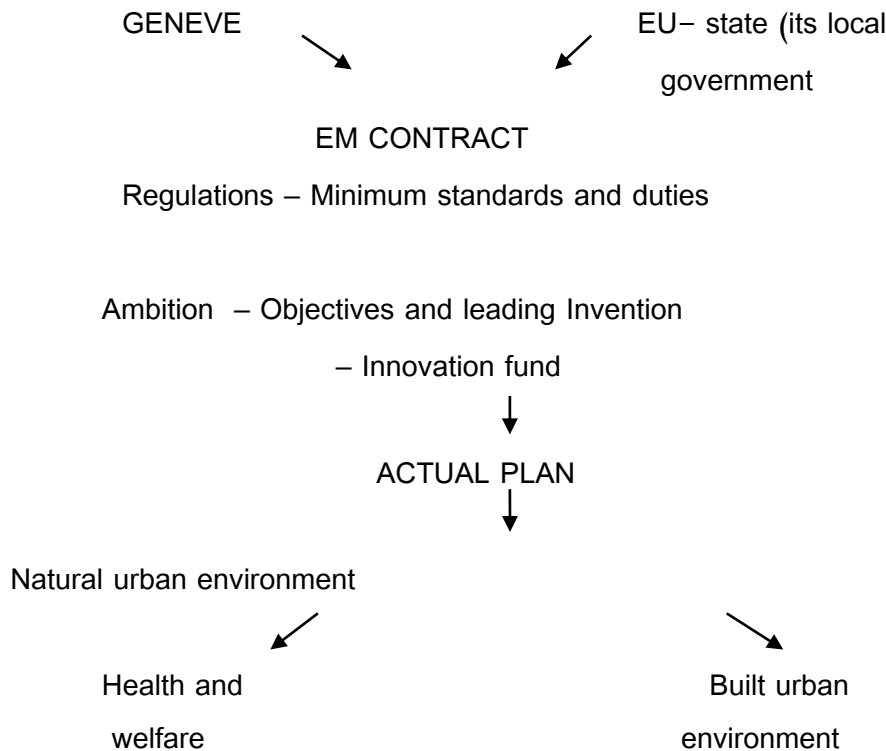
Submitted to Curtin University of Technology on 2014-05-09

**2-5-3 Example 3 Environmental management planning according to EU (European Union):**

The **European Union (EU)** is an economic and political union EU is an economic and political union some of EU regulations:

92/62 /EC includes criteria about density and size of population which needed for reporting. Modeling is an important technic to support all kinds of estimation using data analysis, data from EU network is compared with the results from a model by ESS or GIS programs called Dynamic Ozone Simulation. <http://www.ess.co.at/docs/papers/udm.pdf> [19]

**APPLING ENVIRONMENTAL MANAGEMENT CONTRACT BETWEEN GENEVE& AND EU-STATES**



<http://www.rcep.org.uk/reports/26-urban/documents/urb-env-summary.pdf>





### 3-The Practical Part: Sulaimaniyah as a case study

In this chapter we focused on the main problems of Sulaimaniyah City taking an example, residential area of KANDA SWRA.

The direction of wind in Sulaimanyah City, average wind speed is about (16 km per hour) towards the south-east in winter and towards the north-west in the summer and an average humidity is 42%.

[20], p. 5

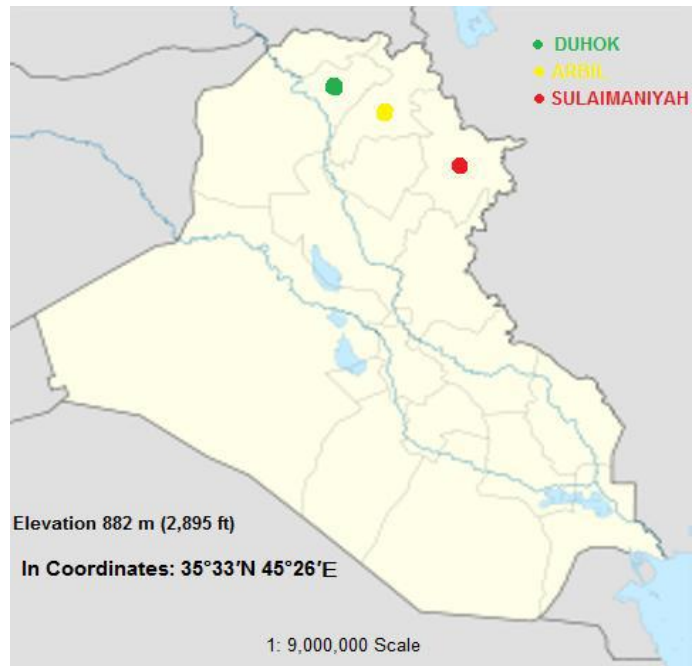


Fig.4: Sulaimaniyah Governorate

Fig.5: Location of Sulaimaniyah

Governarate With respect to Iraq

Source: Humanitarian Information Center for Iraq HIC 2003





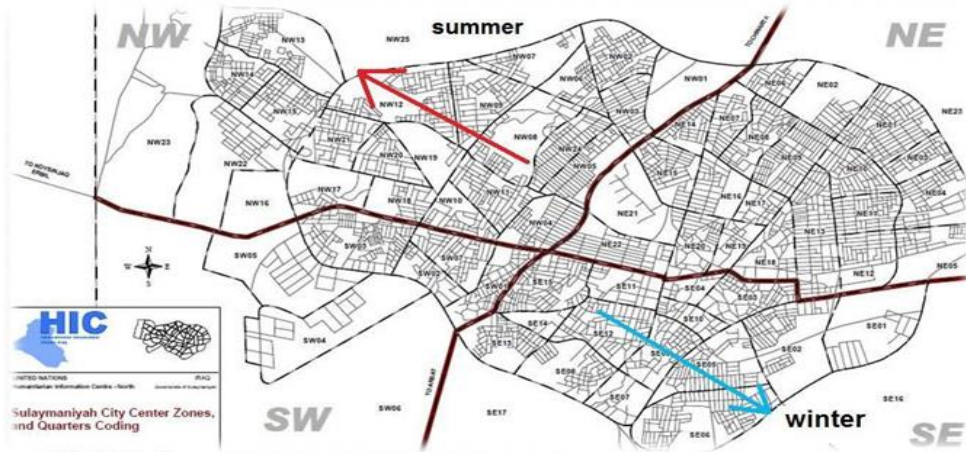


Fig 6: Sulaimaniyah regions and its wind directions

Source: Humanitarian Information Center for Iraq HIC 2003

Between years 1987 to 2011 about 48 000 families from villages moved to live in cities, this change inflicts significant damage to the agricultural sector and significant damage to the environmental, social, economic and some other aspects. [19] p. 4. Because of the great disparity in temperature between seasons where temperatures drop in most parts of the province to below zero degrees Celsius, especially in winter, while temperatures rise above forty degrees percentage in the summer it would be difficult for a lot of plants that grow in the large difference of temperatures are other reasons that make it difficult to increase green areas and afforestation is the rain stopped for more than three months in most cases, and high temperatures in this period that have been made to the concerned authorities in the Department of Environment and Agriculture and of municipal Directorate gardens great efforts to increase the percentage of green space within the city of Sulaimaniyah from 1% in 2007 to 4.5% in 2009. [20] p. 6

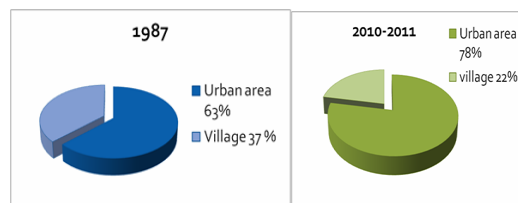


Fig. 7: Movement of people from village to city [19] p.5



### **3-1 Main environmental problems in Sulaimaniyah city in general:**

There are some main problems in the nature of Sulaimaniyah city, Air, Soil, Water and Noise as detailed below: – [20] p. 8-28

#### **3-1-1 The main sources of water in the city of Sulaymaniyah**

##### **1- Darbandikan and Dukan lake**

##### **Reasons affecting the deterioration of the water quality of Darbandikan lake:**

**A** – Tangro River into which waste water (sewage) of the city of Sulaymaniyah, villages and districts along the river (Halabja new, Armao, Syed Sadiq, Sa rao, khormal, Sirwan, arbat).

**B** – Wastewater generated from the laboratories of various industrial activities located in the Tangro area and along the riverbed.

**C** – Dumps waste collection to the city of Sulaymaniyah, near the River Tangro, as well as the collection of waste dumps in the district of Sayed Sadiq and other sites near the river.

**D** – Sirwan River, which flows from Iran, the hotbeds of pollution noted on the river. Citizens use the river water to wash their cars and trucks in the course of the river, causing pollution of river water flow by oils.

##### **2 – The most important sources of pollution qualitative in Dukan Lake: –**

**A** – Sewage to the districts, counties and residential complexes along the tributaries of the lake (Jawarta, Qlachoalan, Maot, Carisah, Qlaadiza, Singha serr, Saroachawa Rania, ChwarKorna, Haji awa, Dukan Sarawa).

**B** – Dumps for waste collection districts, counties and residential complexes along the tributaries of the lake.

**C** – The Little Zab River pollution fuel (oil, gas, Kazoel) as a result of impaired souls using the river to smuggle and transport containers filled with fuel using the runoff.

##### **2. Springs:–**

There is dozens of natural springs within the city of Sulaymaniyah, which comes from underground water influenced by surface water, rain, snow, seasonal. The decrease of spring water has also caused by climate changes in recent years such as the lack of rain and snow has decreased the rate of water flow which led to the citizens to drill deep wells to provide water for their needs.

##### **3-wells:–**

There is within the city of Sulaimaniyah, 27 water wells and more of these wells are used directly or indirectly to provide drinking water for the citizens. Tanker trucks also transfer water from these wells



to the needed areas served and also these well waters are transferred by water distribution networks.

### 3-1-2 Air Pollution in Sulaimaniyah city

The province of Sulaimaniyah has poor environmental conditions because of the climate and conditions of the city, and despite the development taking place at various levels, the increasing number of projects, provide different services, the presence of green spaces and parks, but problems and negative situations still exist, causing bad effects on the overall environmental pollution in general specially effecting the air quality.

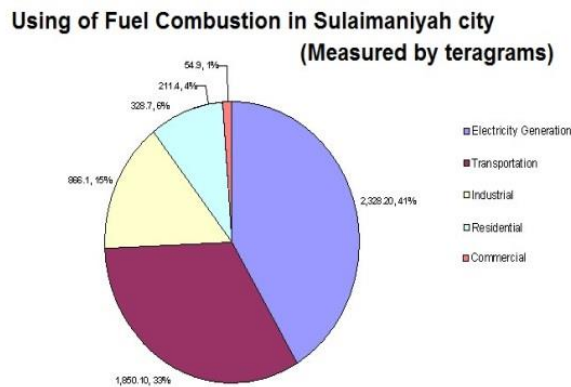


Fig 8: Using of Fuel Combustion In Sulaimaniyah City [21]

### 3-1-3 Noise Pollution in Sulaimaniyah city:-

Increasing noise pollution depends on the activity of commercial traffic and the increasing number of cars, the noise has bad effects on human health.

#### Sources of noise pollution

- 1 – Increased use of electric power generators in residential and commercial areas.
- 2 – Activity mixing within residential and commercial zones.
- 3 – Increasing numbers of cars, trucks and construction vehicles (traffic noise).
- 4 – Private car use and the spread of heavy machinery in residential areas.
- 5 – Construction and building projects.



### **3-1-4 Waste Pollution in Sulaimaniyah city:-**

The collection of solid waste comes from different sources of waste such as commercial, industrial and residential. The collection process at the level of households and other sectors are the result of activities of everyday such as, plastic bags are bought by the citizens which later the waste is placed in front of homes and places of business. Then carried away by large container vehicles by timetable specified by the Directorate of the Municipality.

The amount of waste per day, according to the report issued by the mayor of Sulaimaniyah for the year 2009 ,the volume of solid waste produced by the city of Sulaimaniyah which reached 499,443 tons over the year, an average of 1370 tons per day. After collection waste, is transferred to southeast city of Sulaimaniya, known as area (Tangro) without any kind of treatment except for furnishing and scattering and small amount of dust.

Although there are scientific methods for treatment of solid waste that are harmless to the environment (globally), but the only way to get rid of waste in all cities of Iraq including Sulaimanyah is the landfill method.

According to the environmental legislation of Iraq to landfill sites; landfill used for disposal the waste is not appropriate and it's agent environmental requirements. The waste is a mixture of different components of organic materials and inorganic pieces of metal, plastic, wood and plastic bottles, batteries and chemicals..etc., Sorting and no classification of the components of waste at the level of residential areas nor at the level of commercial, industrial, medical, and public sector except for some few cases of some types of waste such as sorting bottles of soft drinks and metal, especially aluminum, where fused in some small factories. There are many factors affecting these problems to born due to a poor or lack of an environmental management program.

### **3-2 Kinda Swra area**

Kinda Swra area is located in the south-west of Sulaymaniyah, and has an area of 0.5 square kilometers (495 527 095) square meters. Geographic coordinates:

E = 535234.9043 N = 393602.375, Figure (9) shows the location of the study area on the master plan of the city of Sulaimaniya. The number of housing units in the study area (1362) housing units, ranging in size between (100 and 102 150 217 to 300) square meters and population of (6810) people. [22]



Style building is of the Mass type as residential units collected and with varying sizes. Housing units were constructed without regulatory compliance and instructions for building, the problem of tissue distorted, either in terms of services, roads not paved and there are no sidewalks and sewers open hails from the city and penetrate this region, causing polluted visually" In addition to odors. In terms of the services there is a primary school and a mosque and clinic, there are no green areas.

#### **Questionnaire Form:–**

Form was designed after be divided into several areas: Axis of personal information, the axis of the housing environment, the social aspects, aspects of service and the axis of planning alternatives (processors). It was taking a sample of 5%, forms has been delivered by the population.

–From the analysis, we find that the proportion of the unemployed accounted for 28%, which is not insignificant, so the job creation necessary for those unemployed and raise the income of those where it formed income category (400,000 to 600,000) thousand Iraqi Dinars, make up 76%. An age (31–40 years) make up 47% of the sample, as well as age (41–50 years) make up 28% either (51–60 years) make up 8% this indicator, that the region has a good percentage of people able to work in the event of providing opportunities work for them.

–The percentage of tenants constitute 12% of the sample they are from low–income who go to these areas searching for a low rent versus rising rents and the price of land in the city center.

–The level of education is the index guide on the skill level and the consequent income family has its social and economic connotations, a literacy rate formed 20% of the sample and the elementary or who known reading and writing make up 48%.

–An analysis of the questionnaire forms that a large proportion of the inhabitants make up 88% of the sample are originally from outside of the city and is an indication of immigration, through interviews with a number of occupants and dialogue with them shows that most of them are from another area due to migration.

Usually If regression from different areas outside of the city, these families are not eligible to create a social coherent center, if either a majority of their decline outside the city and region with converged customs and traditions, it helps to create a center of social cohesive.

– Safety and security is available, because the area is under the control of law and visits police patrols to the area, according to sayings 100% of occupants who were interviewed.





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### **Aspects of service:**

- The passage of open sewers of the city through the study area need to transfer to the stream box and laying regular sewage net-work , this in turn prevents the people from littering.
- Through field visits to the area, noted that the streets unregulated and tiled, so it requires a refined and tiling.
- In terms of electricity, the region with the national power grid, as well as civil generators in the case of the power outages and this is a good indicator.
- There is a drinking water network extended to the region.

### **Housing environment:**

- Medium case construction accounted for 62%, the highest rate and the proportion of housing units built by block accounted for 100% because of the low price of this material and the speed of construction, as well as the cost man-power is usually less.
- In terms of the number of bedrooms, the number of two members constitute the highest percentage is 70% either three rooms constitute 18% and the one-room form the lowest rate which is 12% compared with the number of individuals living in the house, the number of individuals (4-6) individual make up the top 68% this shows that the overcrowding in the housing unit is acceptable, units numbering more than 10 constitute 5%, the lowest percentage.
- The development of the area and to improve the conditions of occupants is the desire of 100% of the residents of this area.

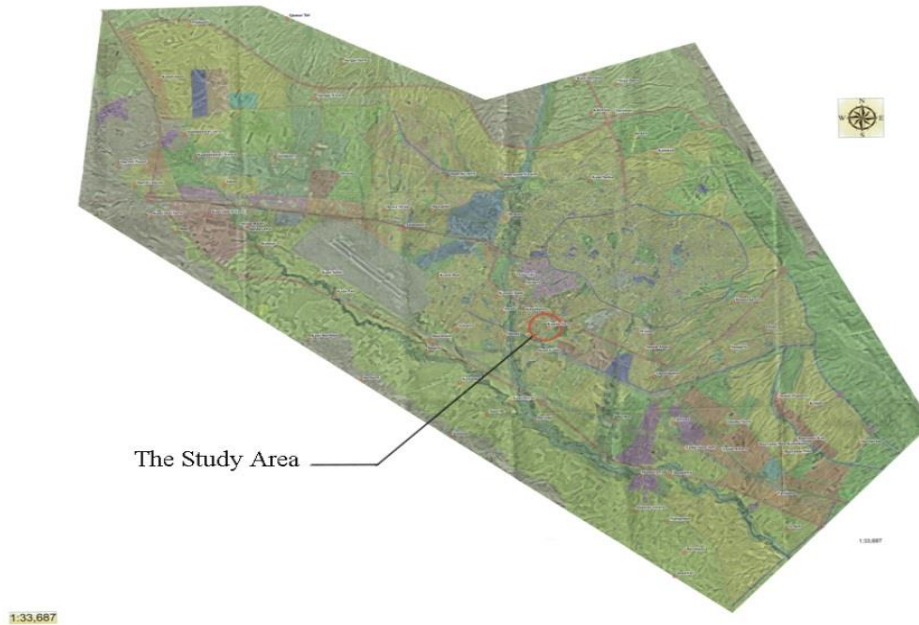


Fig.9: The master plan of sulaimaniyah and location of the study area

Source: Directory of Sulaimaniyah city, master plan department

### **Conclusions:**

#### **The research educed a set of conclusions:**

##### **1– Water problems:**

- Due to the fast expansion and the increase of population in the city which is about there is lack of water problems in some residential areas around the city.
- The poor efficiency of the water supply network in most areas of the province and small number of processing drinking water projects.
- Lack of experience working in the water treatment chlorination stations.
- Sewage system sewerage distribution is old in the city.

##### **3– Air pollution**

- The climate and conditions of the city is changed a lot in a short period.
- The increasing of the car number leads to an increase in the proportion of gases into the environment, comparing the number of cars in different years. The number of vehicles is rising dramatically in the city.



#### 4- Noise pollution

- Increased use of electric power generators in residential and commercial areas.
- Activity mixing within residential and commercial zones.
- Increasing numbers of cars, trucks and construction vehicles (traffic noise).
- Increasing private car use.

#### 5- Waste problems

- Some waste locations are near the site to residential areas which spreads the negative effect on the soils, water ground and inhabitants around it.
- Because of poor waste treatments in the industrial zone of the city of Sulaimaniyah, large number of workers who collect the waste suffer from the negative effects of the waste when handling it.

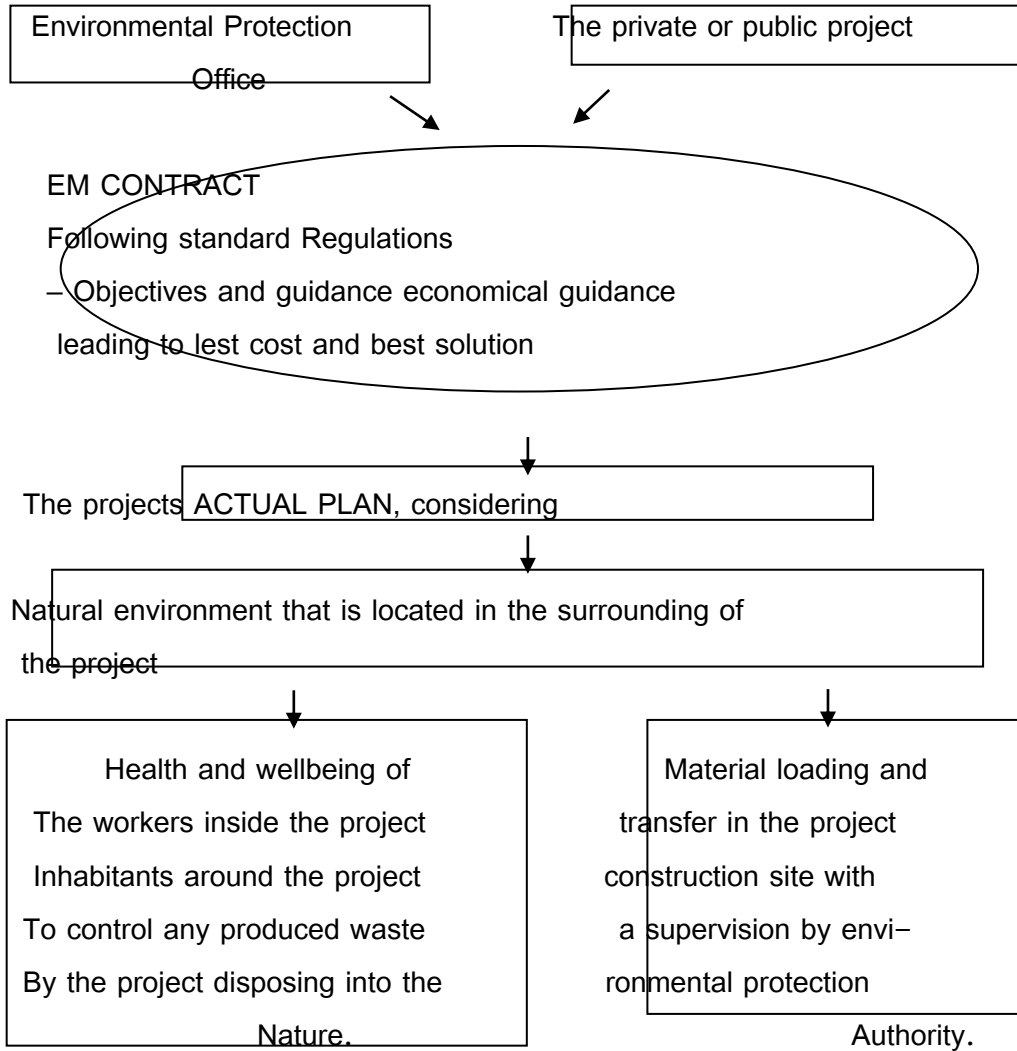
### PROPOSALS

To control environmental management, four steps are followed:-



#### Proposal 1. Making an environmental contract

Creating a contract document between the owner of project and the environmental protection office, ensuring maximum safety, wellbeing and healthy for coming project.



**Proposal 2. Changing personal behavior**

The proposal behavior for the future development is as important as the proposal of creating a contract between the environmental protection office and the coming projects. To reach the zero waste programs in the future, a future household consists of:-





-use eco-energy wind  
Energy to produce needed  
Electricity per household



- an eco- house by  
using solar panels  
on the top of the  
House to produce  
Worm water.

Using eco-car which does-  
Not need fuel and has zero  
Smog production.

final step to reach  
goal of zero waste  
Is recycling.

### **Proposal 3. Controlling the city by management cycle**

Another proposal for building an environmental management is management cycle dividing the city into three parts to control the environment of the city and future development using type 1 and type 2 of management explained in page 7:-.

1- Space management: - In order to reduce environmental pressures in the city of Sulaimanyah is the most effective land use control and future development:

- Density of buildings and mixture of uses.
- Renewal of building areas as well as commercial and industrial areas.
- Distribution of the land utilization for housing, industrial, commercial, and traffic zones.

2- Spatiotemporal management:- Because of the standards changed with unexpected events and developments that happens in the city, such as hazardous accidents, there should be a spatio-temporal management.

### **Recommendation:**

#### **First: - Recommendations relating to the study area**

- Determine the boundaries of Kinda Swra area.
- Refine the streets in the area and remove the housing units that is out of age that stand in front of this discipline and to compensate owners.
- Planning spaces and turn them into green areas and areas of specialty services to and secretion of the other section to organized plots where infrastructure must be available.
- Providing education and health services required by the planning standards.
- Provide recreational centers for the occupants.
- Improved infrastructure and convert open sewers in the area to stream box.
- To provide jobs for the unemployed population.







–People's participation in decision–making related to their living environment which is essential for sustainable development.

### **Second:– General recommendations relating to the Sulaimaniyah city**

#### **Water problem in Sulaimaniyah city:**

- 1– Choosing more appropriate method for handling waste collection into the land by using modern methods of waste treatment so it can't effect the underground water sources.
- 2 – Providing specialized environmental laboratories to analyze and control the quality of water and water sources.
- 3 – Increase the efficiency of drinking water projects in the city and villages because
- 4 – To provide more professional workers and increase spears of mechanical parts of cleaning water
- 5 – Develop programs to follow up water resources and visits them frequently.
- 6 – Because of the increase of population, increasing the number of drinking water projects to meet the needs of citizens.
- 7 – Create more active discussions and statistical study in Sulaimaniyah to collect database of water problems interviewing the inhabitants in the province.
- 10– Expansion of sewer systems across the provinces that have been neglected due to the fast growth such as Kanda Swra.

#### **Noise pollution in Sulaimaniyah city:**

- 1 – Create a provision department of devices to measure the intensity of noise and personnel training in their use.
- 2 – The relocation of places for craft industries away from residential and commercial areas within the block or in a special industrial zones.
- 3 – Create a special road only for heavy load trading and construction vehicles to use, this changes are made by the professional workers inside the departments of traffic control.
- 4 – Raising campaigns to increase awareness of citizens not to issue loud voices “horns” and causing panic and ear damage to the others, especially when driving cars, by putting penalty for those who use horns while driving.
- 5 – To surround the construction sites by fences to reduce the severity of the voices coming from construction.

#### **Solid waste pollution in Sulaimaniyah city:**

- 1 – A comprehensive survey of all types of solid waste in terms of quantity and quality for all of districts and areas starting from the center of the city.
- 2 – To find appropriate solutions in how to handle the waste (landfill, recycling, reuse... etc.



3 – Work to find other places where the landfill is more appropriate than existing sites in terms of environmental determinants, especially for the current sensitive sites such as Tanjaro.

4 – An awareness-raising campaigns to increase citizens' awareness to reduce the amount of waste produced.

5– **Sorting and classification** of the components of waste at the level of residential areas and at the level of commercial, industrial, medical, and public sector.

So the research reached to its objective which is to find suitable environmental management plan for co-ordination for the future development.

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