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An Analytical Study to Assess the Effectiveness of the Selection of Industrial Sites in Egypt through Egypt's Vision 2030 "Case Study of Beni Suef Governorate"

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ABSTRACT: Industry industrially developed countries have tended to localize their green industries and have left environmentally polluting industries to developing countries, as the more technological advances in the industry, the more we will move towards sustainability where green industries are.

The research examines Egypt's Vision 2030, which emanates from the Sustainable Development Goals (SDGs) set by the United Nations-UNDP in 2015, where this research covers the seventh, eighth, ninth, eleventh and twelve goals of the Sustainable Development Goals, Then the innovation wave experienced by Beni Suef Governorate and its industrial sites are studied and personal interviews are conducted with officials of the Industrial Zones Department in Beni Suef Governorate as well as with the Industrial Development Authority and the Department of Environmental Affairs to learn how to reduce the environmental footprint of factories ,In order to reach the effectiveness of the selection of industrial and industrial sites in Beni Suef Governorate with Egypt's Vision 2030.

The research has concluded that the city of Beni Suef is currently going through the first and second wave of innovation, that is, that it is localized by environmentally polluting industries, and is settled on the outskirts of the governorate away from residential communities and the environmental impact of factories is evaluated for each factory separately by the Department of Environmental Affairs.

The research recommends the need to go to the green industry in its comprehensive concept so that the physical exchange between industries at the level of the industrial zone by transforming them into industrial and environmental gardens then at the level of the city and then the province and then the region and then the state as a whole and the introduction of new green industries such as new and renewable energy and electronic industries etc. which helps the industry to compete globally.

This research is aimed at decision makers to reconsider the orientation to the application of green industries in Egypt in general and in Beni Suef Governorate in particular in line with Egypt's Vision 2030 and the Sustainable Development Goals.

KEYWORDS: Sustainable Development Goals - Egypt's Vision 2030 - Green Industries"

I. INTRODUCTION

Industry, innovation and infrastructure are the ninth goal of the Sustainable Development Goals (SDGs) from which Egypt's Vision 2030 emerges, as according to the economic axis of Egypt's Vision 2030, the Egyptian economy should be a disciplined market economy characterized by stable macroeconomic conditions.

It is able to achieve sustainable inclusive growth, characterized by competitiveness and diversity and depends on knowledge to become an active player in the global economy, and able to adapt to global changes by creating a supportive climate to achieve sustainable inclusive growth based on knowledge, competitiveness and diversity that allows maximizing added value and providing decent and productive job opportunities. Hence, the research is concerned with the study of the spatial sites of polluting industries.

As well as how to reduce the environmental footprint and what are the most appropriate ways to localize these industries to preserve the environment.

A-Sustainable Development Goals (SDGs):In 2015, all UN Member States adopted the Sustainable Development Goals (SDGs), also known as the Global Goals, as a global call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030, The SDGs are seventeen integrated goals, that is, they recognize that action in one area will affect results in others, and that development must balance social, economic and environmental sustainability¹:-

1- Eradication of poverty. 2- Total eradication of hunger. 3- Good health and well-being. 4- Quality education. 5- Gender equality. 6- Clean water and hygiene. 7- Clean and affordable energy. 8- Decent work and economic growth. 9- Industry, innovation and infrastructure. 10. Reduce inequalities. 11. Sustainable cities and communities. 12. Responsible consumption and production. 13. Climate action. 14- Life underwater. 15. Life in righteousness. 16. Peace, justice and strong institutions. 17. Partnerships to achieve the goals.

B-Egypt's Vision 2030: Egypt's Vision 2030 stems from the Sustainable Development Goals (SDGs) for the three dimensions of sustainable development: the economic dimension, the social dimension, and the environmental dimension. Egypt's Vision 2030 focuses on improving the quality of life of the Egyptian citizen, To improve his standard of living in various aspects of life by emphasizing the consolidation of the principles of justice, social integration and the participation of all citizens in political and social life. This comes along with achieving high, inclusive and sustainable economic growth and promoting investment in people and building their creativity by inducing increased knowledge, innovation and scientific research in all fields. Egypt's Vision 2030 gives importance to addressing the impacts of climate change through an integrated and sustainable ecosystem that enhances resilience and resilience to natural hazards. The vision also focuses on the governance of state and community institutions through administrative reform, establishing transparency, supporting monitoring and evaluation systems and empowering local administrations. All these desired goals come within the framework of ensuring Egyptian peace and security and enhancing Egyptian leadership regionally and internationally.²

C-Green Industry: There are several international concepts of green industries and the following are listed as the most important of them .

└ Green industry is defined according to the United Nations Organization for Industry and Development (UNIDO): They are economies that strive to achieve a more sustainable path of growth, through green public investments and the implementation of initiatives that encourage environmentally responsible private investments.³

└ Definition of the Thai Ministry of Industry: It is an industry that is committed to environmentally friendly entrepreneurship by focusing on continuous development and improvement in the production process and environmental management.

└ Definition of the U.S. Department of Commerce's Sustainable Industrialization Initiative: It is a production process that uses processes by which environmental impacts are minimized and energy and natural resource conservation, is safe for employees, consumers and communities and is economically sound.⁵

D- Innovation Waves: The industry has gone through four industrial revolutions, each of which had innovative waves that distinguish it from the previous revolution, and Egypt has now reached the manufacture of the fourth wave, and the first wave is represented in the industries (extraction of mineral ores - extraction and processing of coal - exploitation of mines and quarries - plant and animal production - foodstuffs, drinks and tobacco - building materials, ceramics, Chinese and refractories), The industries of the second wave include (basic metal - yarn, textiles, clothing and leather - wood and its products - paper products, printing and publishing). The industries of the third wave include industries (basic chemicals - production and distribution of lighting and power electricity - other manufacturing industries) and include the industries of the fourth wave (engineering and electronic industries - petroleum and refining and its products and natural gas).⁶

There are measurement indicators for innovation waves, namely:⁷

- └ Relative distribution of industrial labour to the industries of each innovation wave.
- └ Relative distribution of the value or volume of industrial production on the industries of each innovation wave.
- └ The relative distribution of industrial production heads of the industries of each innovation wave.
- └ The relative distribution of industrial facilities on the industries of each innovation wave, as this measure is the most realistic because it reflects the real power that attracted the industry to settle in the city.

II. RELATED WORK

2- Types of green industries

Green industries are divided into greening of industries and new green industries as follows a list of each of them:-

2-1 Greening Industries

Greening existing industries through the application of ecology has emerged as a result of the loss of biodiversity in many environments and the rapid consumption of energy and natural resources. The concepts of waste recycling and reuse [Recycle, Reuse] have emerged, with studies proving that too many materials are involved in industrial processes [manufacturing industries in particular] They do not turn into products and an estimated 40% to 60% of natural raw materials and energy sources are converted to residues that pollute the environment.⁸ The environmental impacts of

processes and products are reduced through (more efficient use of resources - phasing out toxic substances - replacing fossil fuels with renewable energy - taking increased product responsibility - reducing overall risks).

Greening industries has become a key determinant of economic competitiveness and sustainable growth. Since resource inputs represent an important cost of production for industries, improving efficiency gives industries a competitive advantage. So, greening industries also plays a role in alleviating poverty, by promoting it with energy, health, safety and job security and reducing costs by increasing productivity.⁹ There are three levels of greening of industries, starting at the level of companies (factories) and then at the level of the industrial zone until ending with a global environmental network and a set of alliances. **The following is an account of the three levels:**

- A. **Greening the industry at the company level:** Industries at the company level are greened by following a set of policies and tools that help achieve the goal of this approach such as (cleaner production, environmentally friendly technology, and resource efficiency) where they can achieve significant operational savings besides improving the environmental performance of companies, and the grouping of companies leads to economic benefits resulting from shared access to information, networks of suppliers, distributors, markets and resources.¹⁰ It also generates some benefits for industries and companies that are able to recycle water and waste as industries can be involved in generating electricity from steam and benefiting from industrial gas emissions and waste reprocessing as these practices also reduce the completion of demand for energy and raw materials and reduce costs and overall levels of waste.¹¹ Each company seeks to greened its industry by applying one of the environmental management systems, the most famous of which is the ISO 14000 range. It will be explained by.
- B. **Intermediate Level (Environmental Industrial Parks):** It is considered to be the concept arising from the application of environmental regulations to manufacturing systems where industries that are environmentally interconnected between their wastes are localized so that the waste of one industry is the raw material of another industry in a closed circle in which there is almost no waste. The provision of these parks is a catalyst for real estate development projects for all the principles and ideas of the industrial environment such as industrial symbiosis as it encourages sustainable design of the environment (Roberts, 2004), and it was stressed that the environmental industrial park will be more efficient and effective if there is a conglomerate or grouping of companies or institutions in order to provide a large volume of waste that we can benefit from as a resource. Just as proximity between enterprises provides economies of scale (external factors) we can reduce operating and production costs and also encourage innovation and competition between companies.¹¹
- C. **Environmental Industrial Grid System:** Environmental industrial networks represent the third level of greening industries and express the macro level that has strategic links or alliances with other eco-industrial parks throughout urban areas or global network structures. Manufacturing industries seek to create alliances and companies to encourage exchange through networks, whether it is the exchange of materials, energy, products, waste or even knowledge.
These alliances enable regional companies in different clusters to provide sources of raw materials used in the production process at prices lower than those of virgin materials, as they are not just a waste disposal system or the market but can be designed to encourage symbiosis between industries dealing in waste or recycled products, this symbiosis can lead to the creation of new industries that help diversify industries within the existing industrial park.¹¹

2-2. New green industries

The new green industries represent the group of industries that provide environmental goods and services, the green industry is a growing and diversified sector covering all types of services and technologies aimed at contributing to reducing environmental or negative impacts or addressing the consequences of all forms of pollution. This includes material recovery and waste management as well as companies that transport waste. Other examples include engineering companies specialized in wastewater treatment, air pollution control devices and waste treatment equipment, as well as environmental and energy consultants as well as solution providers. A key part of the sector is the monitoring, measurement and analysis of suppliers, and new green industries also include companies that manufacture and install new and renewable energy equipment and companies that develop and produce clean technologies.¹²

3- Green Industry Objectives

The main objective of the green industry is to promote sustainable development on Global, regional and local level. The following is an account of the green industry's goals.

3-1- achieving economic development rates that are close to the rates of the starting stage, especially for developing countries. As developing countries in the start-up phase increase their rate of consumption of resources, especially energy, and since the starting stage is one of the long stages in development, so it is necessary to reduce the loss of

natural resources and reduce production costs so that development is not met with economic problems and economic stagnation.¹¹

3-2 Enhancing competitiveness in local and international markets.

3-3 Reduce production costs by taking advantage of the forces of agglomeration on site and exchanging waste among themselves by reducing waste production and thus disposal costs.

3-4 Reduce all negative impacts on the environment.

3-5 Tendency to reuse, recycling and retrieval of materials.

3-6 Reduce energy use and guidance for clean and renewable energy.

III. METHODOLOGY

This research clearly aims to evaluate the effectiveness of the selection of industrial sites in Mas by activating the strategy of green industries that appeals to Egypt's Vision 2030 applied to the governorate of Beni Suef, where the polluting industries endemic to Beni Suef governorate are monitored and identify the sites of their localization, then the suitability of these sites for localization of such industries and how to greening these industries is analyzed, using the inductive approach, then follows the analytical, deductive and comparative approach.

IV. EXPERIMENTAL RESULTS

Figure No. (1) shows the distribution of industrial zones in Beni Suef Governorate

Table no. 1: Analysis of Indicators for Measuring the Innovation Wave in Beni Suef.

4- Analyze the effectiveness of the selection of industrial sites and industry in line with Egypt's Vision 2030 and the Sustainable Development Goals.

This is done through the study of the spatial sites of the industry in Beni Suef governorate and the extent of its impact on residential communities, as well as studying the mechanism of reducing the environmental footprint of industries in the city of Beni Suef.

4.1 Study of the spatial sites of industry in Beni Suef Governorate.

Beni Suef Governorate contains eight industrial zones distributed as follows: 7 industrial zones with a variety of industries between medium, light industries and heavy industries on the eastern axis, Kom Abu Radi Zone on the western axis of the Nile River and map No. 1 shows the distribution of industrial zones in Beni Suef Governorate.

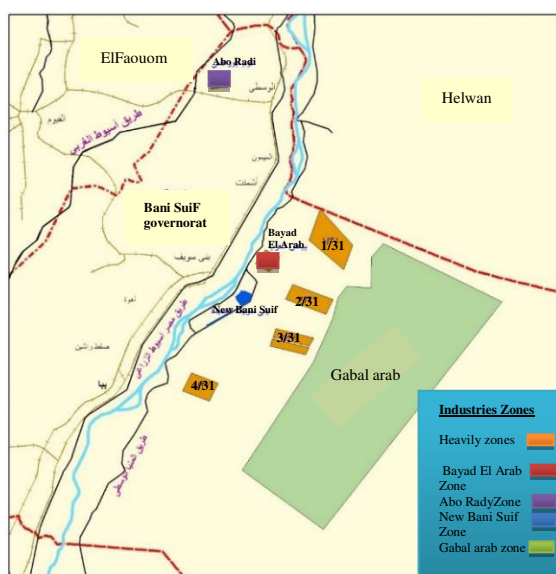


Figure No. (1) shows the distribution of industrial zones in Beni Suef Governorate

Source / Industrial Development Authority, 2022

A study of the map of the distribution of industrial zones in Beni Suef governorate showed that 4 heavy industries areas (environmentally polluting industries) were allocated in the city, namely the area of 1/31, 2/31, 3/31, 4/31, in addition to the area of extraction of the marble quarry (Jabal Ghorab), all of which are located on the eastern axis of the Nile River and are 1 km away from the road "Karimat".

As for light and medium industries, there are 2 industrial zones on the eastern axis of Bayad al-Arab area and located far from urban and residential communities, it is 1.5 km from the central Minya road and the medium and light industries area of the Housing and Development Authority is located inside the new city of Beni Suef near the residential communities and is separated by an agricultural fabric and a road 50 m wide from the residential communities.¹³

4.2 Study of the mechanism of reducing the environmental footprint of industries in Beni Suef Governorate.

Before starting to identify the mechanism that factories are doing to reduce their environmental footprint, you must first get acquainted with the concept of the environmental footprint and then identify the innovative wave that the city of Beni Suef is going through:

4-2-1- Environmental Footprint

A state to produce all the resources it consumes and to absorb all the waste it produces.

The Organisation for Economic Co-operation and Development (OECD) defined it as an estimate of the environmentally productive area needed to meet the needs of a particular country of known size.¹⁴

The environmental footprint is calculated as follows:

Environmental footprint – biological capacity = environmental deficit.

Where biological capacity = area * biological production capacity.

Environmental footprint = number of people * consumption per capita * resource and waste density.

4-2-2 The innovation wave experienced by Beni Suef Governorate

Beni Suef Governorate contains quarrying and agricultural resources, which makes it a leader in the first and second wave industries, as these industries are considered value-added industries. We find that the governorate of Beni Suef contains 4 cement factories other than quarrying industries and others, which are polluting industries and are classified as first-wave industries, which calls for the need to pay attention to the greening of these industries.

In order to reach the industrial innovation wave that Beni Suef Governorate is going through, the endemic industries in Beni Suef Governorate are studied and the measurement indicators are applied to them as shown in Table 1, it turns out that Beni Suef Governorate is a pioneer in the manufacture of the first and second wave and that it is heading towards the fourth wave due to the city's privileged location and proximity to the Greater Cairo Region and the port of Sokhna.

Table no. 1
Analysis of Indicators for Measuring the Innovation Wave in Beni Suef.

| Innovation Waves | Employment % | Facilities % | Production % | Capital % |
|------------------|--------------|--------------|--------------|-----------|
| First | 42 | 39 | 32 | 42 |
| The second | 31 | 29 | 11 | 9 |
| The third | 9 | 18 | 7 | 5 |
| Fourthly | 18 | 14 | 50 | 44 |
| Total | 100 | 100 | 100 | 100 |

Source/Researcher from data collection Industrial Development Authority, 2018

Through official interviews with officials of the departments of industrial zones as well as officials of the Environment Department of the Industrial Development Authority in charge of managing and exploiting industrial zones, it was found that factories prepare an environmental study to assess the environmental impact of them separately, i.e. the industry is greened at the factory level only.

EIA is defined as an organizational process through which all the expected environmental impacts of any proposed projects, plans, programs, legislation or legal procedures related to one of the different elements of the environment are identified and evaluated, including natural-chemical, biological, cultural or socio-economic elements.

The purpose of the application of the EIA process is to ensure that any proposed development activities, programmes or plans are environmentally viable and ensure sustainability and are considered one of the planning tools and are used to anticipate, analyse and crystallize the important environmental impacts of any proposal and to provide data and information that are relevant at the decision-making stage. In addition to the fact that the environmental impact

assessment process of projects can reduce the negative and adverse effects on the environment, it helps in the efficient and sustainable employment and exploitation of resources and maximizes the benefits of proposed development projects.¹⁵

For example, filters are installed in the case of industries that result in harmful emissions such as fumes and afforestation to reduce global warming caused by carbon dioxide gas, as well as the establishment of treatment units inside the plant to treat industrial drainage that does not conform to specifications, while factories that result in hazardous waste contract with a concerned authority to transport hazardous waste and bury it in the landfills allocated to it.

The plant performs environmental management and environmental management balances the potential for future growth and the preservation and long-term improvement of the quality of life. It is based on; the development of future policies and objectives, the identification of environmental problems, the identification of their negative and positive effects, and the development of plans to avoid these negative effects or mitigate their impact.¹⁶

There are many internationally recognized methodologies that can be used to apply environmental management systems, perhaps the most famous of which is the ISO 14000 system collection, which has achieved a global spread from being a guide and a general methodology for the design of environmental management systems in general, whether at the level of industrial facilities, private institutions or urban agglomerations, which is not available to many other existing systems that are characterized by specificity both in terms of application areas and in terms of spatial pronunciation.

Hence the question of **what is ISO and Environmental Management**.

□ ISO and Environmental Management Organization:

The International Organization for Standardization (ISO) was established in February 1947 and is headquartered in Geneva. It has been termed ISO for an ancient Greek word in an equal sense. ISO is the largest standardization organization in the world. It is a non-governmental organization, consisting of a network of standardization institutes in 157 countries. The organization was established with the aim of Facilitate international cooperation and industrial standardization. The ISO 14,000 family provides a range of management tools that enable an organization to control its environmental aspects and improve its environmental performance.¹⁷

These tools can provide significant economic benefits, including:¹⁸

- Reduce the use of raw materials and resources.
- Reduce energy consumption.
- Improve performance effectiveness.
- Reduce waste production and thus disposal costs.
- Utilization of recovered resources (guided resources and recycled waste).

ISO 14001 is a roadmap and action plan that enables any organization or department to design its own environmental management system, so that each designed system is unique and can only be applied within the organization or department that designed it. This is known as "Tailor-Made Solutions". Within ISO 14001, system design may require external assistance from some experts specializing in the design of environmental management systems.

However, it should be noted that the actual design of the system is an internal process that must be carried out by employees within the organization or management seeking to obtain the ISO 14001 system because they are the best able to recognize the nature of their circumstances and problems and the priorities of their solutions.¹⁹

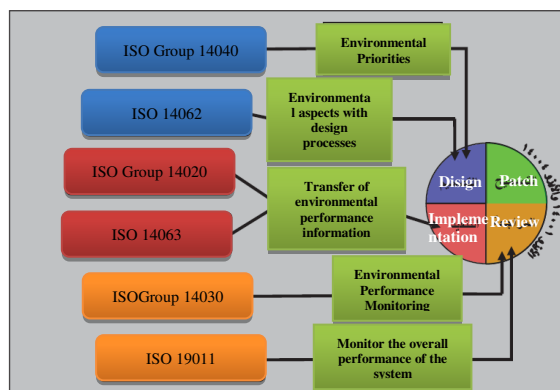


Figure No. (2): ISO 14000 Model

Source: Abdel Moneim Ahmed Al-Fiqi, 2008

From the foregoing, it is clear that each factory manages the environment of its factory separately using ISO systems, as the mechanism of reducing the environmental footprint in Beni Suef Governorate by greening the industry at the level of the company (factory).

└ **In accordance with the Sustainable Development Goals (SDGs), which emanate from Egypt's Vision 2030, we find that:**

By applying green industries in Beni Suef governorate, this will achieve some of the goals of sustainable development, including the seventh goal, which is clean and affordable energy, by moving towards the manufacture of new and renewable energy such as solar cells, which reduces the pressure on electricity sources and thus reduces its price. As well as new green job opportunities, Goal Ninth is industry, innovation and infrastructure. This is due to the sustainability of the industry and its competitiveness at the global level, and the goal of eleven sustainable cities and communities due to the trend towards new green industries and the localization of polluting industries outside the urban space with greening, and the twelve goal of responsible consumption and production and this goal of green industries.

V. CONCLUSION

7- Results

- 1- The environmental footprint of Beni Suef Governorate resulting from the industry is reduced by greening industries at the level of the company (factory) only.
- 2- The state has not moved to apply green industries in Beni Suef governorate and transform industrial zones into eco industrial parks like some developing and developed countries.
- 3 - Heavy industries are localized on the outskirts of the governorate away from residential communities.
- 4 - Medium and light industries are localized near residential communities, as is the case of the city of Beni Suef, where it is considered an economic base.
- 5 - The exchange of waste between factories achieves savings in cost and time and this is the basic idea based on industrial zones (industrial clusters) with the disagreement here that the exchange will be between the waste of factories i.e. the waste of one industry is a raw material for another industry.
- 6- The ISO 14001 system represents a roadmap and action plan that enables any organization or department to design an environmental management system.
- 7- Each company seeks to obtain ISO certification to enable it to export as well as competition.

8- Recommendations

- 1- The research recommends the need to go to green industries, whether by greening the industry or by introducing new green industries to achieve some of the sustainable development goals.
- 2 - Retain value-added industries even if they are polluting industries in the governorate because of their comparative advantage that makes them have a competitive advantage.
- 3 - Focus on attracting the industries of the fourth wave in the governorate because they are considered more sustainable than the first and second waves and thus gradually shift towards the new green industries represented in electronic industries, new and renewable energy and modern technology industries.
- 4 - Integration with the strategic plan of Beni Suef Governorate so that the sites of these industries become economic bases for the cities and urban communities to be established in the governorate in accordance with the urban development plan of the state by exiting the narrow valley to the desert back.
- 5 - Attention to the road network and infrastructure in the province and the establishment of logistical zones.

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