Environmental resilience and physical structure of Bazian City

Marwa Alaa Abbas¹, Mustafa Abduljalil Ebraheem²

Urban and Regional Planning Center, University of Baghdad, Iraq

Marwa94alaa@gmail.com¹, Dr.mustafa.a.jalil@irup.uobaghdad.edu.iq²

Abstract. The ability of an organism or system to restore form and position elastically following a disturbance or interruption of any type is the true meaning of resilience. How often does the term "resilience" appear in regional or metropolitan contexts to allude to a local socio-economic system's ability to rebound from a shock or disruption? Resilience can be characterized in a variety of ways. Another term is buffer capacity, which refers to a system's ability to absorb disturbances and the quantity of disturbance before the system's structure is altered by modifying the variables and processes that influence behavior. The study concludes that industrial activities affect the city in general and the city's environment in particular through the pollutants caused by these activities. In order to develop planning solutions to address any change in the city under the concept of environmental resilience, the researchers paid attention to this aspect, which provides treatments, solutions, and suggestions in order to preserve the city from crises and Industrial activities that negatively affect the environment of the city, that the city of Bazian contains industrial factories for the manufacture of cement and bricks because it is rich in raw materials. Of the importance of industrial activities that contribute to the production of an economic resource for the region, but there are deficiencies in the ecological systems that maintain the direct impact of these industries on the environment, the insufficiency of regulations and legislation within the framework of industrial determinants.

Keywords: Resilience, Environmental, Risk, Factors

1. Introduction

Industrial activities such as cement factories and factories in the city of Bazian directly affect the environment and its components such as water, air, and soil, and all of this negatively affects the city and then the population. planners focusing on putting the development of planning systems, processors, and solutions within the concept of city resilience, which is a force to face risks and crises in order to keep cities with a sustainable environment

2. Research Methodology

The research methodology includes the aspects described within the following:
The research problem: Industrial facilities that negatively affect the environment and the population, with a lack of awareness of the need for ecological systems to solve environmental problems.
Research hypothesis: Enhancing the ecological elements within the framework of dynamic planning outside the cities achieves the environmental resilience of cities and absorbs the negative impacts resulting from industrial facilities. The goal of the research: Reorganization and introduction of ecosystems in order to create a sustainable environment in the Regional of the city of Bazian city and reducing the damage caused by industrial pollutants, and protect the city through the development of environmental planning solutions that protect the city within a sustainable ecosystem.

2.1 The First Part/ Theoretical Side

Resilience is one of the modern concepts that have emerged in the writings and practices related to many fields such as psychology, physics, the environment, and urban organization, especially after the frequency of natural disasters such as floods, earthquakes, and hurricanes, as well as the economic downturn and terrorist incidents that affected many regions and societies, in addition to the increasing uncertainty that makes it difficult to predict the future. It is one of the words used widely when talking about the interrelationships between ecosystems, social and urban systems. When the world becomes less predictable, how can regions and cities face how to treat change. A discussion about resilience may help decision-makers, residents, and other stakeholders involved in urban and regional development find an appropriate solution. Resilient has its roots in the Latin word resilio, meaning regression, and several language dictionaries have been used to identify the linguistic meaning, as follows: (Al Muda, 2019, p230).

The idea of resilience, or its topic, can refer to an entity's or system's ability to return to its original form and position after a disturbance or disruption of some kind. The ability of a local socio-economic system to recover from a shock or disruption is commonly referred to by the term in regional or urban applications. (Simmie & Martin, 2010, p28)

More definitions can also be used to clarify the concept. Buffer capacity is one of these definitions; the ability of the system to realize disturbances or the quantity of disturbance that is absorbed before the system alters its structure by altering the variables and processes that influence behavior (Holling et al., 1995).

This is a stark contrast to other definitions of resilience, which focus on the speed of recovery and the difference between resilience and resistance in terms of how much disruption is genuinely reflected in an individual's experience. (Neil, 2014, p349 in original)

As a system property, it is essentially vital. It refers to the amount of change or disturbance that a system can withstand without changing into an alternate state that has distinct structural and functional qualities and provides different bundles of ecosystem services that benefit people. (Alliance, 2010, p5)

Parallel concepts and goals and urban aspirations have evolved alongside (and at times replaced) sustainability as an essential parallel concept and aim. It resonates well as a goal given the current and potential impacts (both immediate and long-term) of global climate change; an increasingly volatile climate; the already serious range of disasters and hazards faced by cities around the world; global resource conflicts and constraints; the long-term decline in global oil supply; and a global economic system that appears increasingly susceptible to vicissitudes and flux. (Beatley & Newman, 2013, p32)

The ability of cities to function, that the people who live and work in cities – notably the poor and vulnerable – survive and prosper no matter what stressors or shocks they meet. This is a definition of the capacity of cities. In the 1970s, "resilience" was used to describe a system's ability to withstand or recover from an interruption or disturbance.
It is relevant to cities since they are complicated systems that have to adjust to new conditions constantly. The concept of a resilient city becomes theoretically relevant when long-term stressors or rapid shocks threaten widespread disruption or system failure. When it comes to coping with disruptions, the concept of resilience does not consider the fundamental power dynamics in the city. (ARUP, 2014, p3)

3. Resilience propositions included two levels of resilience measurement:

The first level is engineering resilience, which is determined by resisting the variables sweeping the system.

The second level is ecological resilience, which is determined by understanding the size of the variables that sweep the system before changing its structure. Contemporary urban propositions in the nineties of the last century focused on the second level to measure flexibility in urban planning and design aspects. The urban resilience characteristic includes a wide range of methods that enable absorbing disturbances. Furthermore, adaptation to it and urban studies unite in this field is between the studies that seek to make a radical change in the form of the sudden change that occurs to the city and the studies that focus on restoring the city after the change occurs to it. Some studies have presented a detailed concept of resilience in the urban sphere by presenting the resilience of the urban form, or what is known in the literature as the urban resilience form, as some general features have been identified by relying on the definition of resilience. (Noor, 2020, p292-293)

Acknowledgments section immediately following the last numbered section of the paper.

### Fig (1) Explain the concept of resilience and it is levels of measurement

#### Resource:
The researcher depends on the source Noor Atyia Dakhla, 2020, p292-293

3.1 Resilience and environment

There is an agreement in the literature that Crawford (Buzz) Hollings first introduced the concept of resilience to ecology and the environment. He promoted systems theory and modeling and is credited with introducing ecological economics, the adaptive cycle, anarchy (understanding transformations in human and natural systems), and resilience to ecology and evolution. (McAslan, 2010, p2)
A system’s ability to adapt to changes in its environment is the focus of ecological resilience. In this example, resilience refers to the degree of the disturbance that can be absorbed before the system changes its structure and function and is formed by a new set of processes. According to some authors, this definition allows for a considerably broader range of evolutionary possibilities, although the concept of ecological resilience is not without its drawbacks. A system’s ability to withstand a large-scale disturbance is a measure of how resilient it is. (Simmie & Martin, 2010, p29-30)

As a result of this paradox, the idea of ‘adaptive cycles,’ a model that posits a four-phase process of constant adjustment in biological, social, and environmental systems, has been proposed as a solution. The three dimensions of transformation are distinct in each phase:

1. "The potential of accumulated resources available to the system."
2. "The internal connectedness of system actors or components."
3. "Resilience, a measure of system vulnerability to shocks disturbances and stresses, with high resilience associated with phases of creative and flexible response." (Simmie & Martin, 2010, p33)

3.2 Resilient city

Resilience is the ability of a system, entity, community, or person to adapt to a variety of changing circumstances and withstand shocks preserving at the same time the essential functions in the absence of a specific, internationally accepted definition at present, we can generally say that the city is the spatial meeting point of multiple social, economic and technological systems, and therefore the resilience of the city depends on the ability of these interconnected systems to adapt, endure and preserve to essential services in the face of many risks and shocks. (GFDRR, 2019, p7) The town of Bazian is located in the direction (35 43, 35 27) N and (44 58, 45 18) E also in southwest of Sulaimanya city, one of Iraqi district it is 35 km away from Sulaimanyah and (80 km) from Kirkuk city. It is called (Hawzy Bazian) because it is surrounded by mountain ranges, starting from Baranan Mountain and ending with Tokma Mountain, then from Tokma to Darbandi Bazian towards the west. It is a chain of mountains called Kuna Gurg. From Darbandi Bazian till Darbandi Basara is known as Hanjira Mountain. From (1927), Bazian became a town that is composed of (58) villages, in which (40) of the villages are civilized, and the other (18) are uncivilized. See maps (1), (2), (3)
Maps (1) Show the location of Bazian from Iraq Author depending on the municipality of Sulaymaniyah

Map (2) Show the distance from Bazian to Sulaymaniyah city Author depending on the municipality of Sulaymaniyah
Industrial activity is one of the most important economic activities and the important activity on which it depends. Regions and countries build their economies because this activity has the potential to develop reality. The economic, social, and urban industries and the cement industry are among the essential branches of the construction industry. It has developed significantly due to the expansion of housing projects and reconstruction programs, and among the factors that helped.

The establishment and development of the cement industry in Iraq is the availability of raw materials needed by this industry. In large quantities and suitable types, the main economic activity in the Bazian region is the activity. The industrial sector, which is a magnet for the population and employment. On Map (4) it can show the industrial facilities and the buffering around it measuring with different distances according to environment determinants:

Map (3) Show Bazian Districts

Map (4) Show Industrial facilities and industrial Buffering Author depending on the municipality of Sulaymaniyah
In this research, we focus on industries as being within the framework of the objective and study how it can be the effect on the Environmental elements of Bazian city; also, we can show the buffering zone of these industrial facilities within meter unit the higher distance equal 8000 meters and the lower distance 1000 meter around each one. Also, Bazian is a mountainous region rich in raw materials used in the cement industry, especially lime, the primary material from which cement is made. They are widely available, so a large number of these projects have been established near these mountains. These are considered an industrial area for cement, in addition to that, there is groundwater in huge quantities, which can It is used in the cement industry and these projects have been implemented. Their production goes to the local market (Mass factory, Bazian factory, Delta factory). We believe that there should be the development of the industrial sector, including providing support for cement production projects and other factories and seeking to make the city of Bazian a region. An industrial complement to the industrial city of Arbat, as they are located on the Sulaymaniyah / Kirkuk Road, which is far away from Bazian, 41 km.

This factory started operating in 2007, and it produces the following:
- Ordinary Portland Cement (OPC).
- Portland Limestone Cement (CEM II).
- Sulphate Resistant Cement (SRC).
- Karasta (CMII).
- High early strength cement (HESC). Road planning contributes to the strengthening of regional links between the city and other cities and the promotion of industrial activities.

Bazian district center is located on the regional road line that connects the center of Sulaymaniyah and the center of Kirkuk, to pass the highway that connects the center of the city of Sulaymaniyah and Sarcinar district and passes through a district Bazian and Chamchamal District Center. See Map (5) it can show the classify of the Roads.
From all the maps that show Bazian, we can summarize that Bazian is a district (belonging to the Sulaymaniyah in the Kurdistan Region - Iraq, located at a distance of 12 km west of the city center of Sulaymaniyah, its center is located on the regional road line that connects the center of Sulaymaniyah and the center of Kirkuk city. It is hoped that it will constitute a significant advantage for the city of Sulaymaniyah, as it has regional services such as the regional road and multiple industrial activities, so it is a source for many jobs in the industrial sector. By establishing a clean industrial activity free of pollutants, by controlling on the spread of extractive and construction industries and the start of establishing industries that interact with the environment with non-polluting, such as the food and electronic industries, which in total make Bazian economic development in the Regional site.

It can summarize the most important environmental indicators that the researcher reached for the site area (Bazian) city.
4. RECOMMENDATIONS

The process of achieving environmental sustainability under resilience goals requires raising awareness and the importance of strengthening ecosystems when establishing heavy industries that affect the environment. Surrounding the city with a green belt within the concept of green architecture that works to reduce and absorb air pollutants, pay attention to awareness, impose local laws and control in the management of factory waste and impose taxes in case of environmental infringement, enhance the elements of environmental sustainability through the development and maintenance of the transport system as the central element in the success of industrial activities with complete isolation of the city and urban land uses from industrial activities.

REFERENCES

[1] ABD-AL HAFID ALMUDA, 2019, the resilience city concept and the importance of application to Libyan cities, p230-231,233,234,243.
[2]
[3] SIMMIE&MARTIN, 2010, the economic resilience of regions: towards an evolutionary approach, p28-29-30-33.
[4] W. NEIL ADGER, 2014, Social and ecological resilience: are they related?, p349
[5] ARUP, 2014, City Resilience Framework, The Rockefeller Foundation & ARUP, p3.
[6] NOOR ATYIA DAKHAL, 2020, The concept of resilience in the schematic standard, p292-293.
[7] GFDRR, 2019, Regional conference for the resilience of urban areas in the Middle East and North Africa, in Lebanon, p7.
[8] BEATLEY& NEWMAN, 2013, Biophilic Cities Are Sustainable, Resilient Cities, p32.
[9] GFDRR, 2019, Regional conference for the resilience of urban areas in the Middle
[10] AID, 2012, Building Urban Resilience: Principles, Tools and Practice, AID Australian, p8-9.
[11] BUSHRA HUSSEIN, 2016, The possibility of applying the requirements of the environmental
management system and their impact on the performance of operations, p30-31.
[12] BERNHARD MULLER, 2010, German Annual of Spatial Research and Policy, P121-122-123.
[13] ALBERTI & MARZLUFF, 2004, Ecological resilience in urban ecosystems: Linking urban
patterns to human and ecological functions, p246.
[14] SIMEON, Measure for Resilience 2012 Report on the Ecological Footprint of the Philippines,
p7-9.
[15] LAFFTA & AL-RAWI, 2018, Planning of Sustainable Industrial Zones and Means of
Achieving them in Iraq, p265.
[16] NAWAF ABU SHAMALLA, 2017, Modern industrial policies in the experiences of
developed and emerging countries, p19-20.
[17] CELIAN COLON, 2017, Modeling economic resilience, p28.
[18] ADB, 2014, Urban climate change resilience, p7-8