SUSTAINABLE AND RESILIENT URBAN DEVELOPMENT STRATEGIES IN POST-WAR CITIES

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ABSTRACT

SUSTAINABLE AND RESILIENT URBAN DEVELOPMENT STRATEGIES IN POST-WAR CITIES

The main challenge for the 21st century is to implement sustainable urban development strategies to deal with the so, economic, and environmental problems. In developed countries, the more cities invest in amenities and basic infrastructure the more they attract investment and private activities. However, in the post-war cities, the situation is more complex as rapid urbanization faces a lack of resources, insufficient infrastructure, and often brutal changes in social and political structures. This increased demand to provide infrastructure and create jobs without much of the economic and social resources requires keeping urban planning and management flexible and ready to adapt to new sustainable and resilient strategies. Urban resilience can prevent and "resist" some environmental and social matters, natural or man-made disasters, physical, social, and economic degradation phenomena in the proper way. Integrating both resilience and sustainability into urban planning requires tools that capture, quantify, and visualize how stakeholders' preferences, social relations and political influence interact to affect urban vulnerabilities. Moreover, if this concept was utilized properly in post-war cities –like the city of Aleppo in Syria which was greatly affected by the civil war in 2011- it can help the urban capability cope more effectively with the various past and possible crises. This requires the understanding of the strengths and weaknesses of cities, social capital, and governance capacity. Proposing sustainable and resilient urban development strategies for Aleppo might also provide lessons for other post-war cities facing similar problems.

ÖZET

SAVAŞ SONRASI ŞEHİRLERDE SÜRDÜRÜLEBİLİR VE DAYANIKLI KENTSEL GELIŞTIRME STRATEJİLERİ

Yirmi birinci yüzyıl şehirlerindeki en temel zorluk; sosyal, ekonomik ve çevresel sorunlarla başa çıkabilmek adına sürdürülebilir kentsel kalkınma stratejilerinin uygulanmasıdır. Gelişmiş ülkelerdeki şehirler, tesisler ve temel altyapıya ne kadar çok yatırım yaparsa yatırım ve özel faaliyetleri de o ölçüde çekmektedir. Bununla birlikte, savaş sonrası şehirlerde hızlı kentleşmenin; kaynak eksikliği, yetersiz altyapı ve sosyal ve siyasi yapıda meydana gelen zorunlu değişikliklerle karşı karşıya kalması sebebiyle durum daha karmaşık bir hale gelmektedir. Ekonomik ve sosyal kaynakların çoğu olmaksızın altyapı sağlama ve istihdam yaratma isteğindeki bu artış, kentsel planlama ve yönetimi esnek tutmayı, yeni sürdürülebilir ve dayanıklı stratejilere uyum sağlamaya hazır olmasını gerektirmektedir. Kentsel dayanıklılık; bazı çevresel ve sosyal unsurlara, doğal veya insan yapımı felaketlere, fiziksel, sosyal ve ekonomik bozulma olaylarını uygun bir biçimde engelleyebilir ve bunlara "dayanabilir". Kentsel planlamaya hem dayanıklılığı hem de sürdürülebilirliği dahil etmek; paydaşların tercih, sosyal ilişkiler ve siyasi etkisinin kentsel kırılganlıkları etkileme yönünden nasıl etkileşime girdiğini ele alan, ölçen ve görselleştiren araçlar gerektirmektedir. Bunlara ek olarak; eğer bu konsept, tıpkı 2011 yılında yaşanan iç savaştan yüksek derecede etkilenen Suriye'nin Halep kenti gibi bir savaş sonrası şehirde kullanılsa kentsel kapasiteye, çeşitli geçmiş ve olası krizlerle çok daha etkili bir şekilde başa çıkmak adına yardımcı olabilir. Bu, şehirlerin güçlü ve zayıf yönlerini, sosyal sermayesini ve yönetim kapasitesini anlamayı gerektirmektedir. Halep için sürdürülebilir ve dayanıklı kentsel kalkınma stratejilerinin tasarlanması ayrıca, benzer sorunlarla karşı karşıya kalan diğer savaş sonrası şehirler için ders alınası nitelikle olabilir.

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LIST OF ABBREVIATIONS

WCED	World commission on environment and development
ICMA	International capital market association
UN	United nations
SDG	Sustainable development goals
MDG	Millennium development goals
SES	Socio-ecological system
UNISDR	United nations international strategy for disaster reduction secretariat
UN-Habitat	United nations human settlement program
HFA	Hyogo framework for action
MCRC	Making cities resilient campaign
UNESCO	United nations educational, scientific, and cultural organization
100RC	100 Resilient cities
NGO	Non-governmental organization
ISESCO	Islamic educational scientific and cultural organization
UNDG	United nations development group
IFRC	International federation of red cross and red crescent
CDS	City development strategy
UNITAR	United nations institute for training and research
UNOSAT	United nations satellite center
UNDP	United nations development program
EDL	Economic development and livelihood
DRR	Disaster risk reduction

1. INTRODUCTION

1.1. AIM OF THE THESIS

Every city faces disasters, whether it is a developed or a developing city. However, some cities have more vulnerabilities than others, which results in higher damage after facing sudden natural or man-made disasters. In cities exposed to war circumstances, the administrative, economic, environmental, and social vulnerabilities can fuel the war. Therefore, post-war cities can become the most prone to collapse again in future risk conditions, such as the city of Aleppo in Syria. When sudden disasters meet the vulnerabilities in the governance, economic, environmental, and social components of the city, it can result in a catastrophic impact that is difficult to overcome. Investing in disaster risk reduction and sustainable systems can assist cities to better understand, recover from, and adapt to disturbances and therefore become more resilient. This research may provide the needed analysis to acknowledge the vulnerabilities that threaten the post-war urban development in Aleppo. It aims to provide resources that help post-war cities -such as the city of Aleppo- integrate resilient and sustainable strategies into post-war development, therefore, improving the recovery process in the present, and adapting to sudden changes in the future.

1.2. SCOPE OF THE THESIS

Because in a time where war and fighting over power are tearing apart human beings and cities, threatening our heritage from the past and shaping the future of our upcoming generations, this research may guide post-war cities, such as the city of Aleppo, after recovering from crisis, to become more sustainable and resilient. It identifies the points of the defect in past and current development strategies and seeks to introduce sustainability and resilience as key elements for urban development in post-war cities. The first chapter is an introduction to the thesis, explaining the aim, scope, and methodology used to conduct this study. The second chapter explains the origins of sustainability and reviews the pillars and goals of sustainable development. In the third chapter, urban resilience is discussed in depth; the origins of the term and how to make cities and heritage communities resilient.

Then, the urban development in Syria is analyzed in the fourth chapter. The fifth chapter introduces the city of Aleppo as a post-war city and the case study of the thesis. It reviews the city before, during, and after the war; it explains the vulnerabilities that contributed to the war; highlights the resilient practices of citizens during the war, and shows the damage assessment after the war. In chapter six, the data from the interviews conducted within the scope of this study are presented. Therefore, the points of the defect in the current rehabilitation of Aleppo city are determined and discussed. Finally, the seventh chapter suggests adopting sustainable and resilient strategies as a key to reviving post-war cities.

1.3. METHODOLOGY OF THE THESIS

The literature review for this research was based on data from journals, books, and articles about sustainability and urban resilience. News reports, articles, and reliable internet recourses were depended on to build a database about the situation in the city of Aleppo in the periods before, during, and after the war. This research was conducted using qualitative research methodology in order to obtain data from participants without limiting their responses. Within the scope of this study, semi-structured online interviews were conducted and the sample members of the study were chosen purposively based on their knowledge of the subject, their relationships, and expertise. The sample included stakeholders, architects, and members of non-governmental organizations. Furthermore, the interviews were conducted online due to the limited access to Aleppo and the critical political status of the situation in the city, this allowed the interviewees to be more confident and contribute easily to the research. However, some of their names and titles were not mentioned in this research to protect their confidentiality. The interviewees were asked about the current rehabilitation measures and development projects in Aleppo after the war, the challenges facing the city, the governmental and local community efforts, the international contributions, and whether the current plans are consistent with resilience thinking to overcome current and future crises. Thematic content analysis was used to analyze information, and the data was coded to describe the ongoing development in three main areas: the old Souq, residential areas, and the local community. After conducting eight interviews, the data became repetitive indicating that a point of saturation was reached. Finally, a method of evaluation was chosen to understand the thinking approach of post-war development in Aleppo. The information was presented and analyzed to explain the challenges of the development, and suggestions

were made to address these challenges. This analysis may assist Aleppo's ongoing rehabilitation and guide the city to understand and consider resilience and sustainability as important components of urban development. Incorporating such concepts into post-war development in Aleppo may help the city recover from past crises and adapt more effectively to sudden future changes.

2. URBAN SUSTAINABILITY

2.1. THE ORIGINS OF SUSTAINABILITY

Sustainability is a “concern for the future of our resources”. Although the concept has existed for a long time, the word itself is a contemporary invention. It originated in Germany as Nachhaltigkeit defined as “sustained yield”. Appearing in the context of “never harvesting more than the forest can regenerate” for the first time in 1713 in a published forestry handbook more than 250 years before the Brundtland Report [1]. When ecology became a field, the word "sustainability" was deeply defined and used. It was included in all biological systems instead of only forests. ecological sustainability is when an ecosystem is biodiverse and can retain its functions across time. In the latter half of the twentieth century, there was yet another change in definition. Throughout this century, there has been an increasing awareness of our resource overuse and reliance on fossil fuels. In the 1980s the word "sustainability" became more recurrent referring to the lasting sustainability of human life on the planet [2].

The World Commission on Environment and Development (WCED) released a report called (Our Common Future) in 1987. It was later named the "Brundtland Report" and provided guiding concepts for what we now consider sustainable development. The Brundtland Report's fundamental concern was meeting the world's nations' goals for a better life with limited natural resources without degrading the environment, and sustainable development seemed to be the solution, it was defined by the Commission as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” As a result, it may be said that The Brundtland Report popularized the concept of sustainability and helped it gain universal acknowledgment [3].

Sustainability has increasingly been conceived in three dimensions after the Brundtland report was released: environmental, economic, and social. Later, A conference titled "Planning Sustainable Communities: The Future is Now" was held at the 1994 ICMA Annual Conference, providing a worldwide platform for exploring the importance of sustainable communities in optimizing our future [4]. The bellow figure shows the timeline of the concept of sustainability (Figure 2.1).

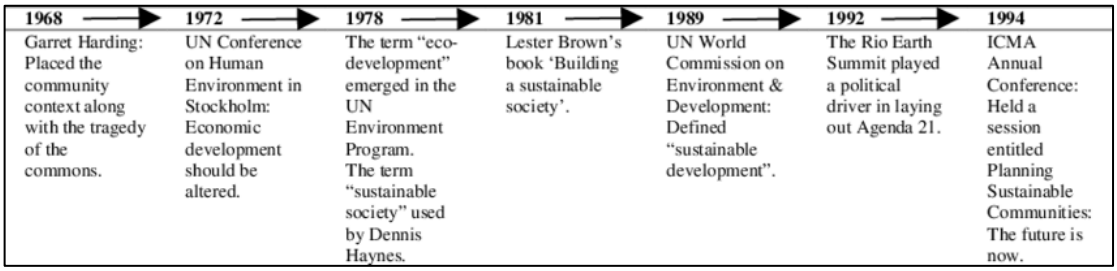

Figure 2.1. Timeline showing the evolution of the concept of sustainability [4].

Sustainable development as described in the Rio[1] conference in 2012 is "a development which provides the current needs without compromising the ability of future generations in achieving their needs and demands." Its main goal is the stability of the economy and environment in the long run; this goal is met when addressing and integrating economic, environmental, and social issues during the decision-making process [5].

Additionally, social sustainability assures that capital, population, and technology are configured to secure everyone's living, to make a society sustainable according to Herman Daly's conditions in 1991, the society's renewable resources must not exceed its rate of regeneration, its use of unrenewable resources should not exceed its developed sustainable renewable substitutes, and the pollution emissions within it should not exceed the assimilative capacity of the environment. Therefore, the concept of sustainable development through its evolvement had an agreement that it should integrate the environment and the economy, and to a shorter extent, the social dimensions [6].

2.2. URBAN SUSTAINABILITY

The aim of urban sustainability is to encourage, assist and enable the well-being of people while using natural resources efficiently, and producing waste without harming the livability of an area, this is achieved by social amenities, economic opportunity, and health, in order to meet the local, regional, and global capacities of ecosystems [7]. Cities are the heart of sustainable development as they contain social and economic mobility, however, they can also become centers for debility, inequality, and environmental degradation when they do

[1] Rio Declaration was a short document produced at the 1992 United Nations "Conference on Environment and Development" (UNCED) intended to guide countries in future sustainable development.

not provide the needs of life for their inhabitants. As complex of a system as cities can be, urban sustainability implies the strength of a city, the quality of life of its inhabitants, and the ability of its environment to support the activities within it. Therefore, to implement a multiscale concept such as urban sustainability, there is a need for robust leadership, society involvement, and regional partnerships as well as Top-down and Down- Top interactions among governmental levels [8].

2.3. SUSTAINABLE DEVELOPMENT

The United Nations organized the Brundtland commission in 1987 including representatives from both developed and developing nations, aiming to raise awareness of the international community on long-term environmental strategies. Its main idea is suggesting that the development in the present should not come at the expense of future development [9].

This report emphasized that countries could reach their full potential while enhancing the base of their resources, and that it is possible that development does not interfere with economic growth, social equity, and environmental maintenance. Governments, businesses, institutions, and civil society became aware of the concept as it spread and started adopting sustainable development as a policy goal. As a concept, it is malleable enough to be dynamic, adaptable to changing situations, and open enough to allow participants at all levels, and sectors to shape it to fit their situation [10].

The concept of urban sustainable development addresses concerns such as urban pollution, and production capacities of the national environment, it encourages recycling, harmless developments, and decreasing the wealth gap between rich and poor. It further highlights the government's involvement in planning and supporting the urban environment [11].

Since the primary goal of human communities is to evolve toward urbanization, sustainable development practices will assist countries in growing in ways that adapt to challenges, therefore helping to protect important natural resources for us and our future generations.

2.3.1. The Pillars Of Sustainable Development

In 1992, the Earth Summit[2] gathered governments from the world to deliberate an agenda to set goals for development in the 21st century. The Earth Summit officially adopted Agenda 21, a comprehensive blueprint for sustainable development that includes detailed work plans, goals, responsibilities, and financing estimations. Agenda 21's definition of sustainable development is based on three conceptual pillars [12], which are economic sustainability, social sustainability, and environmental sustainability (Table 2.1).

Table 2.1. The paradigm of sustainable development in agenda 21 [12].

Element	Criteria
Economic Sustainability	Growth Development Productivity Trickle down
Social Sustainability	Equity Empowerment Accessibility Participation Sharing Cultural identity Institutional stability
Environmental Sustainability	Eco-system Integrity Carrying capacity Biodiversity

Sustainable development elements widen the development's interest to consider the natural, social, and human capital instead of focusing on the monetary capital. It encourages restricting economic growth and encouraging equity, accessibility, participation, cultural identity, and institutional stability to achieve social sustainability [12]. To conclude, the goals of sustainable development can only be achieved by acknowledging economic, environmental, and social concerns throughout the decision-making, achieving a successful sustainable development, economic growth, environmental protection, and social inclusion must be applied simultaneously. It is foreseen that our global population will reach 9 billion

[2] The Earth Summit is a major United Nations conference held in Rio de Janeiro in 1992 to cooperate international member states on development issues related to sustainability.

people by 2050. Sustainable development will be challenged to provide all these people with a substantial quality of life without diminishing our natural resources [5][13].

2.3.2. Sustainable Development Goals

The United Nations General Assembly launched the Sustainable Development Goals (SDGs) first in 2001 under the name Millennium Development Goals (MDGs), then after that campaign expired it was launched again in 2015 fixing the goals that didn't work in the MDGs to create the SDGs and addressing the underlying causes poverty, hunger, and inequality [13].

Before starting the campaign with 1 billion people under the extreme poverty line, the 2030 agenda's main focus is to end global poverty by the end of the year, luckily this number decreased steadily since 1990. Now we are eight years away from achieving that goal but there are concerns about whether we will succeed given that the COVID-19 period was a global challenge. Figure 2.2 shows the 17 Sustainable Development Goals of 2030 [14].

Figure 2.2. The 17 sustainable development goals [15].

It is obvious that by this year, 2022, we are not close to meeting all goals by 2030. However, this does not invalidate all of the work done toward these goals over the past years. It also doesn't imply that we shouldn't work on achieving all of the other goals and indicators in the

next eight years. The United Nations has declared the decade between 2020 and 2030 as the Decade of Action. Before COVID-19, progress on the goals was inconsistent, but the pandemic "in some cases reversed decades of progress," according to the UN. COVID-19 showed the inequality that keeps the cycle of poverty and its causes. This means we have much work but better a idea of what to do in the next 10 years of action [13].

It is predicted that more than fifty percent of the world's population currently living in urban areas, and this number might climb to seventy percent by 2050. This is a massive shift that will have an impact on both the millions of people who move and the cities where they settle. The challenge of sustainable development is to move forward in a way that every person will be able to enjoy a sustainable quality of life without depleting our natural resources. Development must also be harmonious in order to be sustainable, a certain level of social cohesiveness on a global scale is required to establish the circumstances for the needed peace [16].

2.3.3. Sustainability In Developing Countries

After recognizing the importance of sustainable development, it is equally important to understand that it will require a significant amount of concentrated effort and will face several challenges to be achieved. It is also vital to remember that while dealing with polar opposite ends of the spectrum, sustainable development is equally valid in both developing and developed countries. Developed countries could be developed but not necessarily sustainable, and the main goal for these countries is to cleanse their societies from issues like social inequalities, waste management, and environmental responsibility [17]. Sustainable development in developing countries faces many challenges, including:

- Inadequate financial resources to carry out and plan sustainable development
- In war-torn countries, sustainable development is affected by other priorities on hand.
- Natural disasters that threaten sustainability by destroying infrastructure.
- The governmental conflict between short-term profit and long-term investment in sustainable technologies.

- Corrupt practices (Funding to developing countries is provided from foreign grants which can be put in the wrong hands).
- The lack of effort [17].

Despite the difficult conditions many developing countries now face, sustainable development can be achieved through a dedicated and coordinated effort. If policies, such as education and vocational programs were adopted and illiteracy rates decreased, people would become more conscious of their surrounding environment [17].

The sustainability model illustrated in (Figure 2.3) views planning as a triangle that represents how equity, economy, and environment work together. Despite the main goal of development being the promotion of economic growth, preserving the environment, and fostering social justice, planners act differently based on their background, vision, and value system, leading to different outcomes. This model proposes that sustainable planning may be achieved by mindfully balancing society's three conflicting planning goals [18].

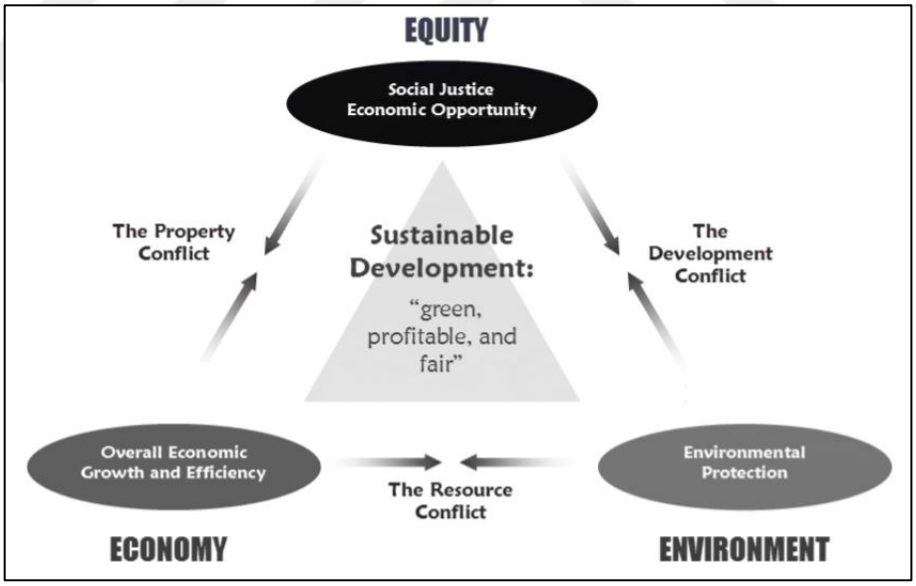

Figure 2.3. The sustainability model of the conflicting planning goals [18].

Sustainability may not have a measurement scale, but this model can suggest a reference point to choose development plans based on how close they are to achieving sustainability, the closer a certain plan is to the center the more it is considered sustainable [18].

Sustainability guides communities and cities to create futuristic visions and set goals to achieve them, it lays a new goal for planning that aims to meet the needs of all groups by resolving conflicts and promoting a higher quality of life for everyone. moreover, following this model helps in establishing a sufficient framework that organizes planning and creates an orienting stance. It does not guarantee the elimination of conflicts, but rather triggers inevitable and healthy debates that might occur in every planning decision. This model recognizes conflicts and allows a real discussion among various actors and sectors of planning, to increase acceptance leading to more robust and informed decisions [18].

3. URBAN RESILIENCE

3.1. THE ORIGINS OF URBAN RESILIENCE

Urban resilience is the capacity of an urban area to overcome a diverse variety of disturbances and stresses (Bene et al., 2018; Doyon, 2016). The term was long found in psychology and engineering, tracked to ecologist Holling in his views on global environmental change in 1973. In the ecological context, he introduced resilience as the capacity of ecosystems to keep a basic level of functioning if interrupted by any disturbance. However in the engineering context he described the ability of systems to bounce back to the previous dynamics as resilience [19].

Socio-Ecological Systems (SES) came after building an understanding of the ecological frame of resilience and the traits of ecosystems as dynamic and adaptable systems. This explanation widened Hollings views to include the social aspect. In the literature on SES resilience gathers three factors: the amount of disruption that the system can bear without losing key functions, its ability to self-organize, and its capacity to adapt and learn. [19]

Resilience concepts were categorized as engineering resilience, ecological/ecosystem resilience and social-ecological resilience. The below figure (Figure 3.1) explains each concept, its characteristics, and its variations to further explain different complications that might occur when defining resilience [20].

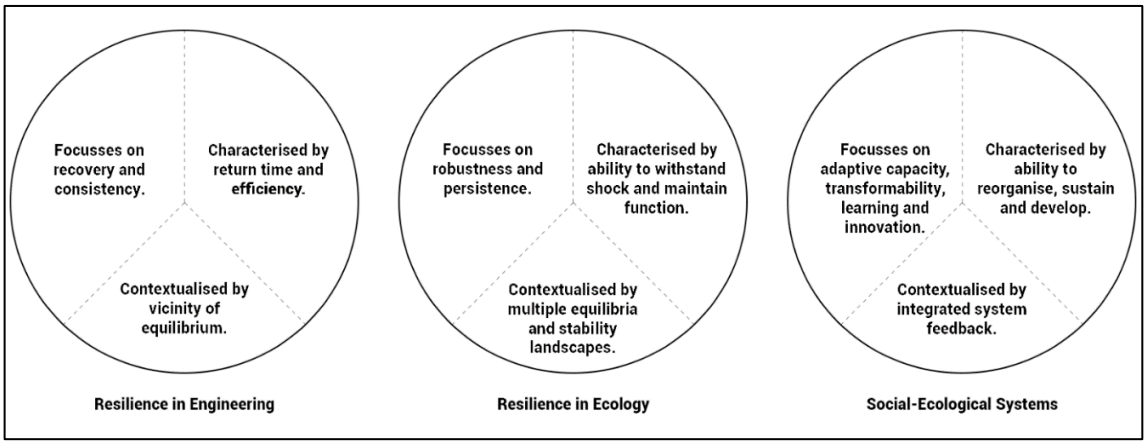

Figure 3.1. Ecological, engineering, and social-ecological resilience theory [20].

Earlier in the 2000s, resilience became a part of the UN agenda as a conceptual framework and as a development goal when the official report on Disaster Reduction (Hyogo, 2005) identified community and national resilience as a key issue to address in order to reduce risk vulnerability [21].

The definition of resilience applies to cities since they are complex systems that are continually adapting to changing circumstances. When chronic stresses or sudden shocks threaten widespread disruption or the collapse of physical or social systems, the concept of a resilient city becomes conceptually relevant (The Rockefeller Foundation & Arup, 2015).

3.2. MAKING CITIES RESILIENT

The participation of cities and urban communities is vital to implement the goals of the sustainable development agenda, there is a global movement to invest in risk reduction and resilience to develop urban communities in a sustainable way, this leads to increased trust in government institutions among investors. When disaster risk management satisfies the needs of various stakeholders and their competing goals, it becomes more desirable. Generally, it is more convenient to invest in disaster risk management when it is directly a reason for economic growth and social well-being [22].

The United Nations System for Disaster Risk Reduction (UNISDR) and the United Nations Human Settlements Programme (UN-Habitat) made the integration of sustainable urban development and urban risk reduction a priority. As a result, the Making Cities Resilient Campaign (launched in 2010 under the supervision of the UNISDR) and the City Resilience Profiling Programme (launched in 2012 by UN-Habitat) represented a guiding path for local governments to discover urban resilience [21].

The first plane was created to define, explain and outline the requirements for disaster reduction from all the actors involved was the Hyogo framework for action 2005-2015: Building the Resilience of Nations and Communities to Disasters (HFA). It evolved in collaboration with the governments, international organizations, and disaster specialists to reduce disaster risk by integrating them all into a mutual system of coordination. As a result, the UNISDR's Making Cities Resilient Campaign (MCRC), which was established in 2010,

intended to create a plan that helps local governmentS to implement the HFA at their level [21].

Figure 3.2. The five priorities for the Hyogo framework for action [21].

The Making Cities Resilient: “My city is getting ready!” [22].The campaign aimed to raise the local governments’ leaders’ awareness of resilience, it suggests "Ten Essentials for Making Cities Resilient" that works in accordance with the Hyogo Framework for Action's Five Priorities. Applying these essentials allows cities to have a basic measurement of their current level of disaster resilience, and remind authorities and stakeholders to work harder to guarantee long-term resilience in their plans. The ten essentials are as follows: [22]

1. Organize for disaster resilience
2. Identify, understand and use current and future risk scenarios
3. Strengthen financial capacity for resilience
4. Pursue resilient urban development and design
5. Safeguard natural buffers to enhance the protective functions offered by natural ecosystems
6. Strengthen institutional capacity for resilience
7. Understand and strengthen societal capacity for resilience
8. Increase infrastructure resilience
9. Ensure effective disaster response
10. Expedite recovery and build back better.

The Ten Essentials can be considered as a foundation that guides and encourages cities through specific resources, tools, and frameworks to increase their commitment to resilience.

3.3. HERITAGE COMMUNITY RESILIENCE

A community is the dynamic component of social and socio-ecological systems, this calls for pursuing resilience on its level. To support community resilience it is mandatory to strengthen the culture and the cultural heritage within it. Cultural heritage was recognized as the main actor that addresses global hazards in 2013, mainly for the role it plays in strengthening community resilience [23].

The Council of Europe's Framework Convention on the Value of Cultural Heritage for Society known as the Faro Convention 2005 described Heritage Community as a community that "values specific aspects of cultural heritage which it wishes, within the framework of public action, to sustain and transmit to future generations". A Heritage Community emphasizes the value of cultural heritage as a source of sustainable development tied to human rights and democracy. It promotes the understanding of heritage and its relationship to communities and society. The Convention encourages us to recognize that the attachment and use of people to objects and places is what makes heritage important [24].

Cultural heritage contributes to sustainable development, disaster risk reduction, and community resilience, it provides a source of identity, encourages the sense of belonging among communities and individuals, it further promotes social cohesion through growing a strong sense of purpose and responsibility among the community, this sense of purpose guides communities to learn how to prevent disasters [25].

Communities that are connected to their environment are more resilient because they benefit from their resources, and when they are able to create an economy through their resources they become more adaptive to changing circumstances on a local level. When people meet their needs in livelihoods, infrastructure, and support services with the assistance of an engaged government the community as a whole becomes more resilient. All in all, focusing on developing social resilience would improve the ability of individuals, communities, and societies to adapt, evolve, and become stronger when confronted with environmental, social, economic, or political challenges [26].

3.4. ONE HUNDRED RESILIENT CITIES

The 100 Resilient Cities initiative was designed in 2015 to help cities all over the globe enhance their resilience in the face of challenges reflecting the broad goals of the Rockefeller Foundation. The cities that joined the initiative were expected to improve their performance against acute shocks and chronic stresses. This resulted in the creation of the City Resilience Framework by The Rockefeller Foundation and the global design firm Arup, together they developed categories, goals, and qualities that define resilience and help stakeholders develop a shared understanding of resilience. This framework can be used to identify major gaps where action to build resilience would be most effective, and define areas where further in-depth analysis or knowledge is required [27].

Figure 3.3. The city resilience framework [27].

The core goal of the 100 RC Initiative is to lead the cities toward the adoption of a Resilience Strategy by creating a systematic and common framework to assess and improve the resilience of cities based on their own priorities [28].

3.5. INTEGRATING SUSTAINABILITY AND RESILIENCE

To move towards a sustainable and resilient future, social, economic, environmental and governmental efforts must be supported. There must be an agreement among actors of different levels about the desirability of an alternative future, the methods needed to achieve this goal, and the compromises that will be made along the way. [29]

Despite the differences among approaches to sustainability and resilience, efforts have been made to combine them. However, improving a system's resilience makes it more sustainable, but increasing a system's sustainability does not always make it more resilient. When sustainability is connected to resilience, it shifts from a secure status to a state of renewal that allows for rapid change and all-inclusive reorganization (Seager, 2008). Figure 3.4 shows how systems that are more resilient better maintain sustainable progress (Marchese et al, 2017) [30].

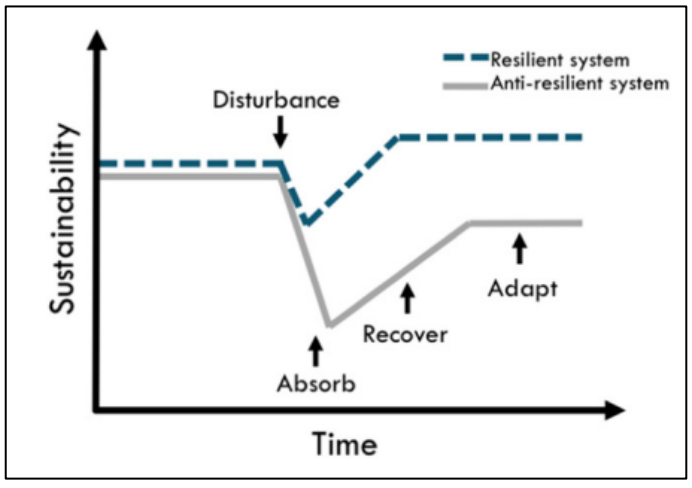

Figure 3.4. Resilience as a component of sustainability [30].

On the other hand, sustainable systems are more capable to absorb, recover from, and adapt to economic, environmental, and social disturbances. Figure 3.5 indicates how more

sustainable systems lose less critical functionality, and recovers quicker in response to economic, environmental, and social disturbances (Marchese et al, 2017). [30]

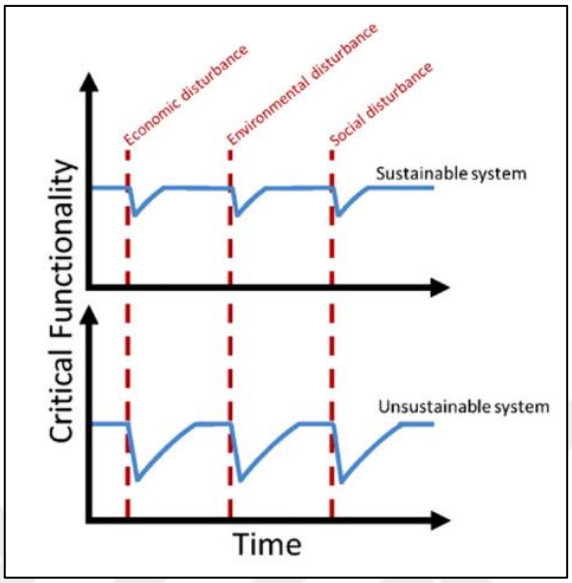

Figure 3.5. Sustainability as a component of resilience [30].

Overall, in the urban context, the city is the most complex and typical socio-ecological system created by humans. The key stresses of government and governance will be urban as urban planners, policymakers, and researchers navigate the new urban world. This reflects the global interest in urban resilience and sustainability. The concept of rational urban development is developed based on discussions about urban resilience and sustainability and recognizing environmental uncertainty and limited urban capacity , rational urban development follows the basic laws of social-ecological systems in a way that integrates resilience and sustainability. Urban resilience and urban sustainability may compete, but rational urban development may occur only when cities are both resilient and sustainable. Therefore , urban managers, planners, and researchers must consider both urban resilience and urban sustainability in the decision-making process [31].

4. URBAN DEVELOPMENT IN SYRIA

Throughout time Syria has hosted one of the world's earliest civilizations, with a rich artistic and cultural legacy. The country has a complicated history, from its ancient roots to modern political instability and the Syrian civil war. After the civil war in 2011, Syria faced serious challenges to rise after the crisis. The war that took over most of the country for the past 11 years has caused drastic trauma in the country and resulted in the disruption of its history and future [32].

Aleppo is Syria’s industrial and intellectual center rivaling the Syrian capital, Damascus. In 1986, UNESCO designated its historic structures as a World Heritage site. After the civil war that took over Syria in 2011, Aleppo became a hub for armed activity in the summer of 2012 and the fighting in the city lasted until December of 2016. The civil war caused severe destruction within the country affecting the city of Aleppo the most, with more than $7.5 billion in damage, the majority of which is housing. With the predicament threatening the city's historical identity, the disruption of the urban fabric and the expulsion of citizens, a new approach must be considered to help the city retain its value, recover from past disruption, and adapt to future risks [33].

4.1. SYRIA’S LOCATION, GOVERNORATES, POPULATION, AND AUTHORITY

Syria, officially the Syrian Arab Republic, is a country in Western Asia that is bordered on the west by the Mediterranean Sea, on the north by Turkey, on the east and southeast by Iraq, on the south by Jordan, and on the southwest by Palestine and Lebanon. A land of fertile plains, mountains, and deserts, is home to a diverse ethnic and religious population, with Arabs being the biggest ethnic group and Sunnis being the largest religious group [34].

Figure 4.1. Location of Syria [35].

Syria is a unitary republic and the only country that espouses Ba'athism politically. The country consists of 14 governorates: Latakia, Idlib, Aleppo, Raqqa, Al-Hasakah, Tartus, Hama, Deir Ez-Zor, Homs, Damascus, Rif Dimashq, Quneitra, Daraa, As-Suwayda, The capital city of Syria is Damascus (Figure 4.2).

Syria's population before the civil war was estimated to be over 22 million inhabitants in 2011, including 21,124,000 Syrians, 1.3 million Iraqi refugees, and around 500,000 Palestinians. The war makes an exact count of Syria's population impossible since the number of Syrian refugees, internally displaced Syrians, and casualties are constantly changing [34].

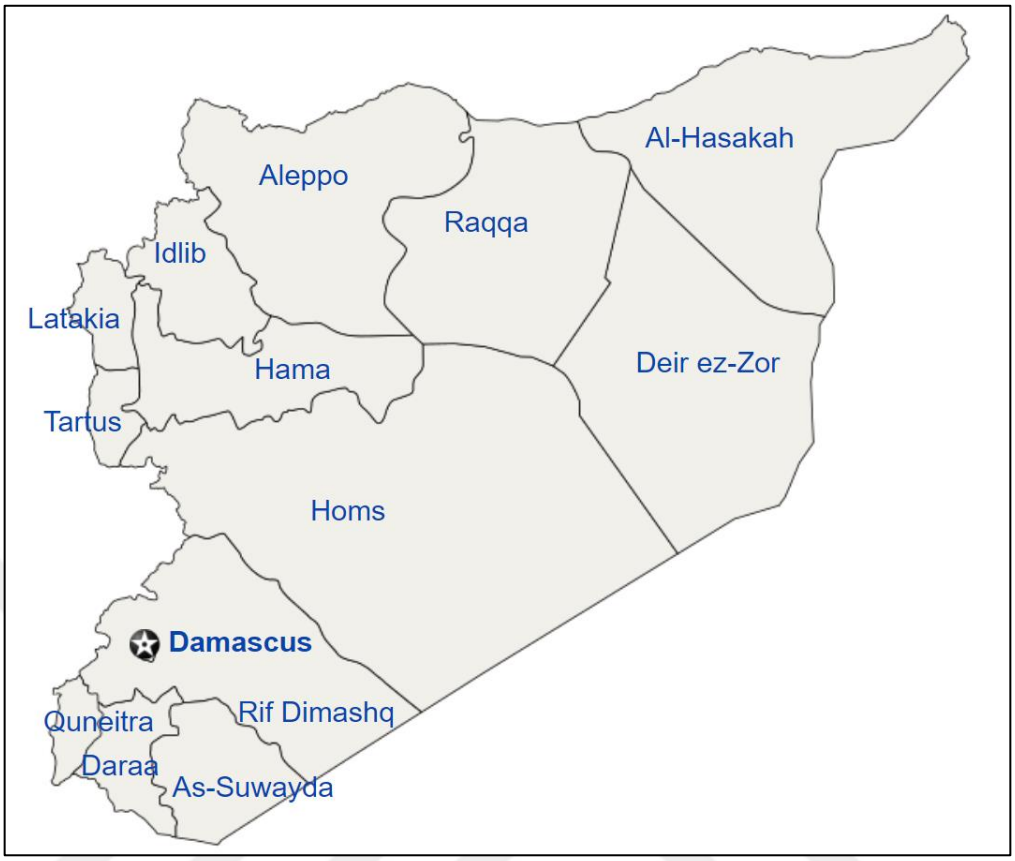

Figure 4.2. The fourteen governorates of Syria [34].

Syria's political life was unstable after its independence in 1946, because of the friction between the country's social, religious, and political groupings. Syria came under the authoritarian rule of President Hafez al-Assad in 1970, with the primary aims of establishing national security and political stability, as well as regaining Syrian land lost to Israel in 1967. However, this political complication pressured the national budget leaving little for development. In 2000, Bashar al-Assad assumed the presidency of the country after his father’s death [35].

4.2. PATTERNS OF URBAN DEVELOPMENT IN SYRIA

The term "Development" in Syria is commonly used, but there has not been an inclusive strategy to guide the process after the 2011 civil war in Syria which has drastically affected most of the Syrian governorates. It is undebatable that without an effective plan that adapts to sudden changes, the future of Syrian cities will be at risk. To better address the obstacles

to development in the present, it is mandatory to study the points of weakness in past development strategies and learn from them.

The development strategy in the 1970s was described as ‘inegalitarian’ by Volker Perthes, containing upper positions for the bureaucracy and the military. The state-organized a combination of class-based support and a strategy of the domestic-alliance building that has continued to this day [36].

After the 1970s and 1980s, zones of collective contravention developed because the tools available for urban planning were limited. Later in the 2000s urbanization and population growth increased, rural migration was accelerating, and waves of displaced people and refugees from neighboring countries (Palestinians, Golan residents, Iraqis) were entering [37].

Between 2003 and 2004, 1.2 to 1.5 million people migrated from rural to urban regions. In 2007, it was predicted that the rate of urbanization would increase from 51 percent to 61 percent over the following 25 years, and the municipal development predicted that Syria's urban population would increase from 12.1 million in 2010 to 18.3 million in 2025 [36].

However, after the civil war took over Syria in 2011, significant destruction of the urban environment began in battle zones. Urban areas experienced armed fighting, resulting in large-scale damage that brought entire populations to the verge of collapse. Public spaces and basic utilities (water, electricity, health and educational institutions) were severely damaged, worsening pre-existing challenges, while a large number of housing units were partially or completely destroyed, but the exact numbers are unknown [37].

In 2018 Following the end of the major battles in Syria, the extensive devastation in the housing areas became apparent among a significant number of internal migrants. The World Bank predicted in 2017 that the entire or partial destruction of housing in Syria amounts to roughly seventy-two percent. That indicates that more than a million of Syria's 4 million houses were damaged (according to a housing census done by the Central Bureau of Statistics in 2010). When it is combined with the pre-war shortage of about 1.3 million houses it becomes reasonable to believe that Syria's estimated housing gap is over 2 million housing units at the present. Due to the limited amount of new statistical studies linking demographic changes and displacement to housing, these are general predictions [38].

Overall, Syria's national development objectives were normally set out in a series of 5- year plans, but after each of their end periods, their results were often not evaluated. Rather, more plans were created to cover up the shortcomings of the plans prior. It became obvious that the actions needed to keep up with the country's development plans were not taken and the plans were often delayed years after their due date was planned [36].

A major factor in the current urban situation in Syria is the great developmental disparity between regions and the growth of some regions at the expense of others, despite the tenth five-year development plan[3] that was proposed to balance regional development goals. Any plans did not have visible results on the ground because of the ongoing armed conflict. This conflict led to an increase in the crisis due to the poor social conditions in some developmentally neglected areas that became battlefields. Additionally, the centralization of decisions made it difficult to contain the crisis and control the remote developmentally neglected areas [39].

Since the beginning of the Syrian conflict, Syria's government has taken small but visible moves to alter the regulatory framework that supervises local administrative and development activities such as projects that promote the overall well-being of the local community, infrastructure restoration, health and education support, basic service rehabilitation, and creating jobs. The intended goal has been to allow local government institutions to take responsibility for their own development as part of Syria's broader decentralization. On the ground, these changes have done little to alter the reality of local development in which central government institutions and security forces continue to hold a significant amount of the real power. Central state institutions hold legal authority over local development projects, although local security forces may interfere to severely change or terminate projects. Official local government bodies such as city and municipal councils sometimes lack the skills needed to carry out local development operations, and financial resources cannot fulfill the requirements of the community. Because of access limitations, the historical opacity of the Syrian administration, and limited experience with development

[3] In its Tenth Five-Year Plan (2006-10) the Government of Syria has set out a vision in which the country will have been transformed by 2020 into one that is fully integrated into the world economy and has the confidence, institutions and creative talents to compete effectively in international markets. Under this vision, the private sector would play the main role in economic activity, and major reforms would be introduced to encourage private savings and investment. (Syrian Arab Republic: UN Development Assistance Framework, 2007-2011).

programming in government-held regions, the international response has been obligated to view local development in Syria [40].

Since September 2015, the Syrian government has retaken most of the urban centers and started to advance a process of post-war reconstruction. Up to this point, the government’s strategy has been successful to reject Western attempts to link reconstruction funds to progress on a political transition. It has also put legal limits on the in-country operations of the United Nations and international NGOs, affirming that only the current government in Syria's sovereign authority that is in control of any reconstruction programs [41].

All in all, the old patterns of urban development were one of the causes of the Syrian crisis. The old development and the absence of administrative planning capabilities that manage disasters and crises have had a significant role in putting Syrian cities under the crisis. From here we conclude that to achieve a sustainable recovery after the crisis, the current approaches that deal with these crises must be reconsidered, especially since it is the social, environmental, and economic vulnerabilities of a country that determine its resistance to disasters and crises. This confirms the importance of creating a more resilient and sustainable development strategy to manage the Syrian crisis so that it does not only depend on immediate solutions but rather works according to a system that predicts disasters and sets the fitting measures to prevent them. Adapting to a sustainable and resilient development strategy will grant human and social advantages, such as the protection of lives, community assets, and heritage in urgent situations by relying on the active participation of citizens. Moreover, it will attract investors to increase economic growth and invest in the reconstruction of buildings and infrastructure, therefore, creating new job opportunities for citizens.

5. THE CITY OF ALEPPO PRE, DURING AND POST WAR

The conflict that started as an uprising 11 years ago evolved into a full-scale civil war, resulting in half a million people dead, devastated cities, and refugees inside and outside the country [42]. As a result, survival became the main activity for citizens in Syrian cities including Aleppo. This chapter analyzes the urban conditions of the city of Aleppo before, during, and after the war. It examines the city from the perspective of its citizens and explores how basic urban functions were related to everyday life, such as security, transportation, water, gas, and electricity supplies. This chapter aims to develop a more effective approach for urban development in Aleppo that includes the participation of the local community by proving that the people of Aleppo learned urban resilience during the war and can lead an effective role in the rehabilitation of their city after.

Figure 5.1. Map of Aleppo [33].

It all started when protests occurred in the southern city of Deraa in March 2011, motivated by revolutions in neighboring countries. Protests expanded to other Syrian cities, including Aleppo, Homs, Hama, Baniyas, Damascus, and Latakia. As a result, the violence quickly

accelerated between supporters and opponents of the government, and the country descended into civil war. The Webster's Dictionary definition of a civil war is: "A war between opposing groups of citizens of the same country". But how can a war be civil when militias from multiple countries have participated in it? In this case, is it considered extermination? How do cities and citizens survive extermination?

5.1. URBAN CONTEXT

Aleppo, northern Syria's main city, strategically located between the Mediterranean coast and the Euphrates Valley, has been a crossroads of various trade routes since the 2nd millennium B.C. and is one of the important sites along the historical Silk Road. It is one of the oldest constantly inhabited cities in the world. The original residents created homes on top of the hill in the city's center, taking advantage of the area's natural defensive position, agricultural land, and its closeness to a water supply, the Quaik River (Figure 5.2) [33].

Figure 5.2. Aleppo by Matrakci from the 16th century [43].

Several civilizations passed through the city, such as the Hittite, Aramaic, Assyrian, Persian, Roman, Byzantine and Islamic civilizations. Aleppo became a part of the Ottoman Empire in 1516. Due to its strategic location near Anatolia, Aleppo played a substantial role in the Ottoman Empire, it was the second city after Constantinople, and the main city for trade between East and West countries [44].

Given its importance, Aleppo was a city of war. The city gained its independence in 1946. After nationalists led by Ibrahim Hanano, protested the French mandate that started in 1920 and divided the country. Later, Aleppo suffered from an armed conflict between the Muslim Brotherhood movement and the Syrian government between 1979 and 1982 which was the last armed conflict in the city until the recent one in 2011 [44].

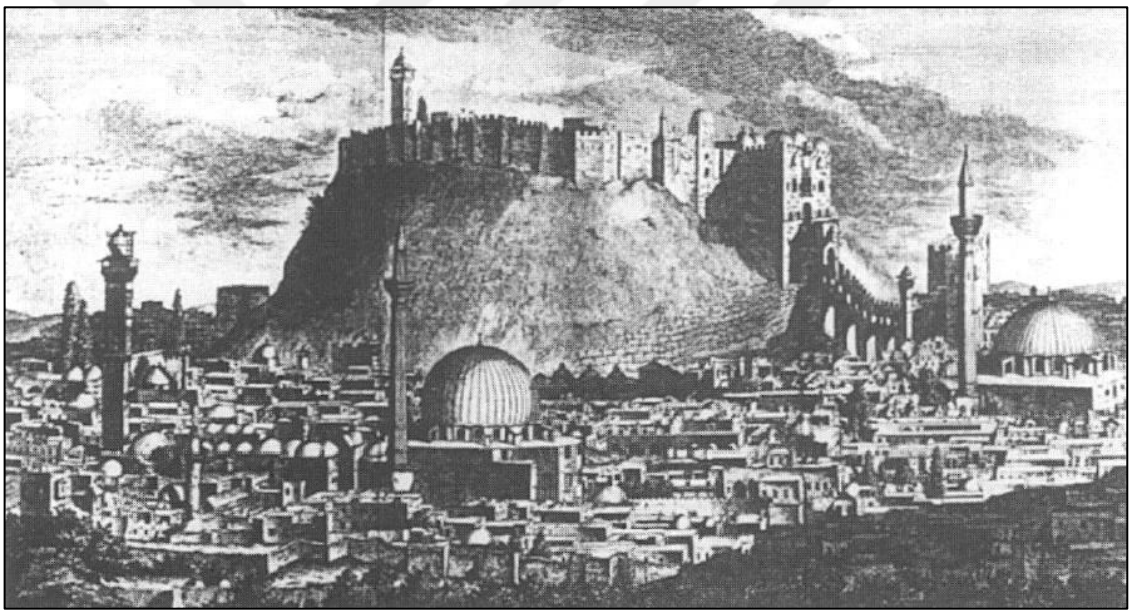

Figure 5.3. Aleppo. source: Drummond, Alexander 1754 [45].

The city is centered around its citadel, which is an iconic landmark that overlooks the city of Aleppo from the top of the hill (Figure 5.3). Aleppo's urban territory developed gradually, the traditional fabric expanded over an area of 4.65 square kilometers horizontally around the citadel and outside the defensive walls containing the old city's souqs (traditional markets), mosques, and religious schools [46].

The first municipality was established in the city of Aleppo in 1866 and upon the commissioning of the Ottoman government in 1882, the German engineer "Jung" made the

first organizational scheme for the city of Aleppo to develop the city's neighborhoods. He adopted the chess layout of the city in the European style, whereby he made the streets wide, parallel, and perpendicular [46].

In 1930, the engineers "Ekochard" and "Danje" were commissioned to develop a plan to organize, beautify and expand the city of Aleppo. They designed wide streets that extended inside the old city to turn it into modern neighborhoods derived from European planning, but this plan was not achieved due to the opposition of the residents of the city. Later, in 1954, the French architect "Gutton" developed a new organizational scheme, according to which the street heading east from the "Umayyad Mosque" to the Citadel was opened and exposed so that the city's residents could connect with its administrative center represented by the Saraya, the old municipality, the National Hospital, and the Palace of Justice. Gutton's master plan was rejected in 1979 and later replaced with a new plan by urban designer "Bianca", which adopted the idea of "preserving the traditional architectural style of Ancient Aleppo", Bianca together with architect Adli Qudsi persuaded UNESCO to declare the Ancient City of Aleppo as a World Heritage Site in 1939 [46].

Figure 5.4. A view of Aleppo from the citadel, 1997 [47].

It can be concluded that the planning and development of the ancient city of Aleppo have always been a focus of the successive governments in the country. After the two UNESCO reports in 1979-1980 on the preservation of the ancient city of Aleppo and the international symposium for the protection of “Old Aleppo” that was held in 1983, the idea of preserving the traditional urban fabric of the city was adopted so that the new development plans of the city were in harmony with the old urban fabric.

5.2. THE CITY BEFORE THE WAR

Aleppo in peacetime was an important urban and cultural center, the industrial capital of the Syrian Republic, and was named “The capital of Islamic culture” in 2006 by the Islamic Educational Scientific and Cultural Organization (ISESCO) [44]. In order to understand the city's urban status and whether the urban planning before the war had produced risk conditions that impacted the resulted situation, multiple sources were explored to understand and evaluate the city's vulnerabilities before the war.

5.2.1. Natural and Man-Made Disasters

The city of Aleppo and its historical monuments have been greatly damaged in recent years due to the ongoing war in Syria, but it is not the first time that this ancient city has experienced destruction due to natural or man-made causes. Aleppo has been inhabited by many ancient civilizations since the sixth millennium BC. Since that time, the struggle to take over the city has not ceased, and every crisis resulted in the loss of innocent lives and the destruction of large parts of the city [48].

Studying a city's past disasters may assist in detecting predictable threats and recurrent disasters, as well as providing insight into the social impact of disasters. Reliable historical data on risks and hazards in Syria are almost entirely unavailable, and this is considered a serious obstacle to practically all development actors' activities in Syria [48].

Aleppo was attacked and besieged by Hulagu, the Mughal king in 1260, he besieged the citadel of Aleppo and destroyed it along with all the city’s walls and mosques. In 1400, the Tatars led by Tamerlane sieged Aleppo, burning the city, and killing large numbers of its

inhabitants. In terms of natural disasters, in 1138, the biggest earthquake in the history of the city struck Aleppo, turning it into ruins. Decades later, in 1822, Aleppo was hit by another severe earthquake that collapsed 60 percent of the city’s buildings [49].

5.2.2. Governance and Administration

In Syria, governance impacts vulnerability in many ways. Generally, the public sector in Syria suffers from low performance. Jobs in the public sector have a low payment rate which does not attract qualified employees who often turn to the higher-paid jobs in the private sector. As a result, the development projects and strategies of the country may be assumed by those with fewer qualifications who produce lower quality projects. Although the government occasionally allocates sufficient funds for projects, they are not always put to use as intended. Corruption can consume the majority of the funds. It is common to come across projects that were never completed due to a lack of funding. Furthermore, resources are sometimes spent on projects that suit the interests of certain groups or organizations. The World Disasters Report of 2004 emphasized the significance of who benefits from national resources as a determinant of how governance influences a country's overall vulnerability [48].

Bribery, which is common around Syria in general, also contributed to vulnerability. Because of the soil condition, it is forbidden in some regions to build two-story houses. However, this may be avoided by paying the person in charge. The same applies to other laws, such as traffic laws. Bribery makes various rules ineffective in reducing citizens' exposure to various threats. The Syrian government's efforts to improve its disaster management abilities may be seen in a variety of sectors, such as official statements and Syria's social and economic plans, and the environment and disaster management are covered in detail in the Tenth Five-Year Plan for 2006-2010 plans. However, it did not always deliver the desired results. Without enough financial backing and disaster-related laws, these strategies were useless. The inadequate funds allocated for disaster management are challenging. Officials have to make a strong commitment to investing time and effort in disaster management problems [48].

5.2.3. Illegal Housing

Before the war, the city of Aleppo faced several weaknesses in development due to the overlapping of land uses, the increase in population density and the imbalance in population distribution. Along with the lack and poor distribution of services, weak infrastructure networks and environmental degradation.

Throughout Syria's construction growth in the 1970s, several buildings were built swiftly resulting in the formation of informal settlements. These settlements were usually constructed on unstable ground in high-risk zones. As a result, multiple building collapses occurred in various places around Syria. In 2002, at least 31 people were murdered and 22 were injured when a block fell in Aleppo's old district of Al-kallaseh [48].

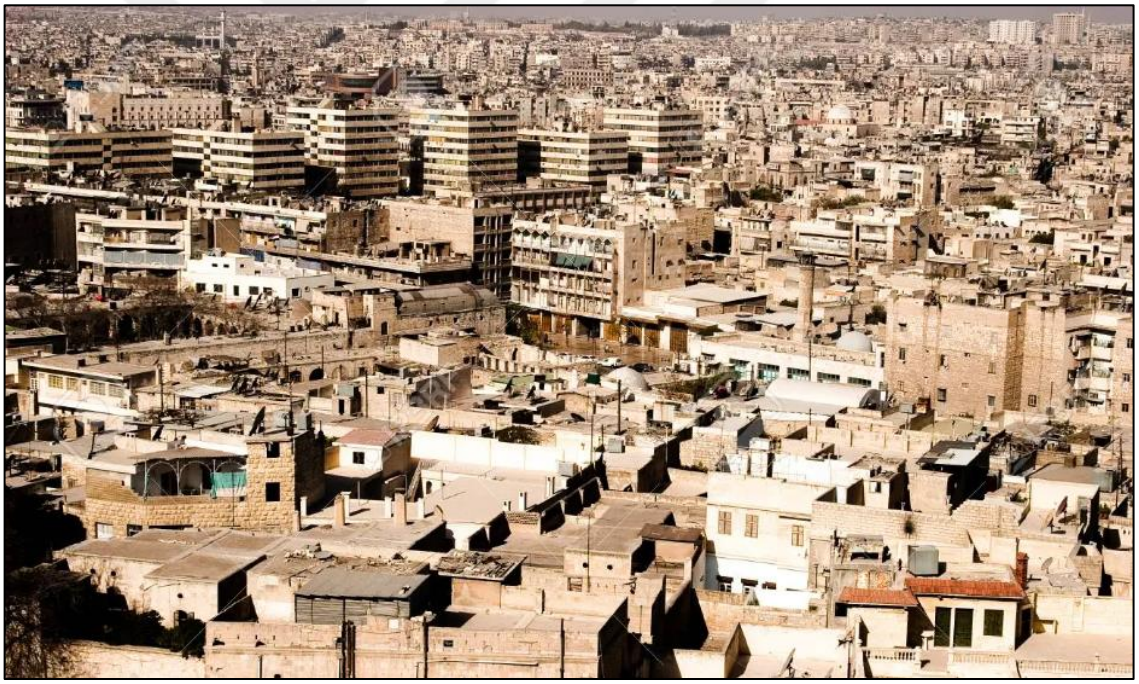

Figure 5.5. Aleppo city before war, 2010 [50].

There were several urban development projects in the pre-war period in Aleppo, such as the Revival of the Old City of Aleppo project in 1993, which was in cooperation with the Aleppo City Council and the German Agency for Technical Cooperation (GTZ), and the Aleppo City Development Strategy (CDS) project for 2003 and other projects that mostly aimed to meet the requirements of the modern city while preserving the identity and character of the

traditional Islamic Arab city. Also link every part of the city, improve public services, and distribute them equally to all parts of the city, and control the urban growth that was occurring at the expense of agricultural lands. Although some of the goals of these plans were achieved, most of them remained in the theoretical framework only due to the lack of mature management that is keen to fulfill the goals of these plans [48].

It can be concluded that Aleppo, in addition to being a vulnerable city in many aspects, lacked the needed disaster risk reduction strategies in urban planning and the resources that could help the people and the city adapt to sudden changes and resist disastrous events.

5.2.4. Other Vulnerablities

Syria's urbanization started because of a population shift from agriculture to industry and services, particularly in urban areas such as Aleppo. Droughts, soil degradation, unemployment and poor socioeconomic condition in rural areas all contributed to this migration. However, urban migration along with the rapid population expansion also contributes to urban growth. Inflows of refugees from neighboring countries have also contributed to this expansion. In short, urbanization in Syria has gotten completely out of hand. Uncontrolled urbanization gathers vulnerable inhabitants in high-risk urban areas [48].

By nature, these areas are not prone to disasters, but they increase disaster vulnerability because of the socioeconomic structural processes related to urbanization. Meaning that, existing vulnerable populations, such as migrants, refugees, and low-income residents, settle in high-risk areas that are overlooked by more capable groups. Furthermore, the patterns of these communities generate additional risks and vulnerabilities, such as building collapses, urban fires, infections, and the inaccessibility of emergency services. These communities also cause vulnerability at the national level. The majority of Syria's industrial activity is concentrated in Damascus and Aleppo. If one of these two cities is destroyed, Syria's industrial core would be endangered [48].

Additionally, Aleppo's transportation is comparable to most cities in developing countries. In general, the city's transportation is poorly managed. Aleppo had increasing numbers of automobiles but poor infrastructural development. Despite the efforts of the authorities to

enforce traffic regulations, citizens ignore them. The absence of a safety culture, extreme driving speeds, and joint routes for cars, buses, motorbikes, and occasionally pedestrians all contribute to transportation vulnerability [48].

5.3. THE CITY DURING THE WAR

"The Battle of Aleppo" was a major military confrontation that occurred in Aleppo between groups of opponents and supporters of the Syrian government. This battle began on July 19, 2012, as part of Syria's civil war. A four-year-long stalemate ultimately ended in July 2016, when Syrian government forces launched a decisive operation that lasted a month and took over all of Aleppo by December 2016 [51].

This battle was referred to it as the "mother of battles" because of its importance and the significant devastation that occurred after it. The fight was marked by severe violence against civilians, the recurrent bombing of hospitals and schools, and reckless aerial attacks and shelling of residential areas. Hundreds of thousands of citizens were displaced as a result of the conflict, and efforts to provide aid to civilians or ease evacuation often were hindered by an ongoing battle between opposing forces [51].

During the escalated crisis in 2016, the UN High Commissioner for Human Rights warned of "crimes of historic proportions" in Aleppo. This battle caused severe damage to Aleppo's Old City, a UNESCO World Heritage Site. An estimated 33,500 structures have been damaged or destroyed. Having lasted for four years, the battle represented one of the longest sieges in modern history and one of the worst battles of the Syrian Civil War, killing an estimated 31,000 people [51].

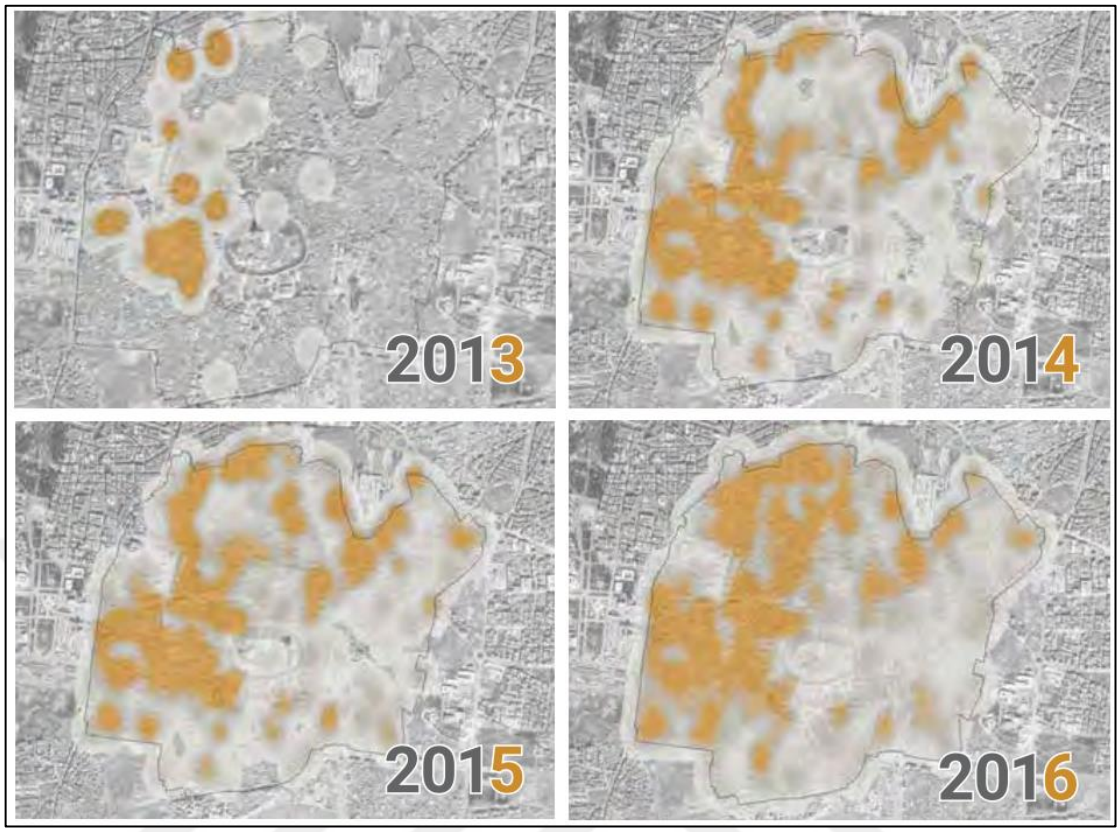

Figure 5.6. Damage of the old city of Aleppo during the four-year battle, 2017 [52].

5.3.1. Practicing Urban Resilience in Daily War Life

In a book published in 2016, called “The Tragedies of Aleppo: The Letters of the besieged,” the authors Sabir Darwish and Muhammad Abi Samra mention the testimonies and stories of the citizens of Aleppo during the siege, describing the changes that occurred in daily life since the beginning of the war in 2011, the spread of the militia in the streets, the increased number of felonies, thefts, robberies and kidnappings for the purpose of taking ransom has increased. This was one of the initial results of amnesty decrees for prisoners to join the pro-government militia and control the urban public space, which substantially affected the life patterns inside the urban fabric in the city [53]. The houses were turned into fortified castles due to the lack of security of their residents. They brought blacksmiths to strengthen the doors of the buildings and install strong iron fences on low windows, and electricians were called to install automatic compressors for the doors, cameras and optical intercoms; for residents to see their known and unknown visitors before opening the doors [48].

Every day, five or six warplanes were constantly flying over the city and dropping missiles and explosive barrels on it. To save their lives, many people, especially children, were participating in burning tires around the city in the hope of obscuring the view of the warplanes that were roaming the sky day and night. The city of Aleppo, although unsafe, became a survival resource. People escaped bombing by hiding in the basements of buildings. But when the brutal barrel bombing started and buildings weren't safe enough to hide in, some people migrated to the rural areas of the city where they turned to nature for protection and hid in caves [54]. Others created their own shelters by digging 3-meter deep holes in their yards. This operation would take almost a year but was the only method of survival for some families in Aleppo during the war [55]. The urban green areas and public parks were turned into cemeteries [56]. Olive trees were cut off and used for heating in winter or everyday cooking [57]. Aleppo as a city was continuously transforming under the fire of military strikes on one side, and the adaptive survival strategies of its citizens on the other. Aleppo's image as a war city grew accordingly.

5.3.1.1. Alternative Food Provision Methods

After only three days of the siege, basic materials disappeared from the markets, and the prices of the supplied ones rose four times due to the monopoly of merchants. But the problem of bread shortages was resolved in the first five days, after setting up local bread distribution centers and limiting the sale of the daily need of citizens to bread without allowing purchasing of large quantities to avoid crises. The bread was distributed at a rate of one bundle every two days, each bundle containing 6 loaves, regardless of the number of family members [58]. The city's markets were empty of vegetables (except for a few locally grown varieties), fruits and dairy products. Meat and food supplies, such as sugar and oil "if available," became more than most families could afford, and people tended to rely mainly on their depleted food stocks, which mostly consisted of flour, bulgur and some legumes. Many activists encouraged people to start planting indoors and on rooftops, so they planted seeds of various vegetables in cork boxes and placed them on roofs after filling them with soil, exposing them to the sun, and watering them with water regularly, taking into account the appropriate seasons for planting vegetable seeds [58]. The citizens began urban gardening everywhere across the city, on rooftops, balconies, flowerpots, in any basket or cork box, and on the soil of public streets to resist the outrageous price hike of vegetables in the markets [59].

Figure 5.7. Gardening in cork boxes in Aleppo [59].

This siege led to a transition in food recipes to meet the new circumstances. Before the war, the homes of the people in Aleppo were full of food supplies such as cheese, ghee, jams, dried fruits and vegetables. The Aleppine family was known for its generosity and the local cuisine was popular for the quality of its food. However under the siege, cooking was no longer what it used to be, as the family with the lowest income was suffering from a shortage of almost every cooking ingredient. Food preparation depended on the available ingredients, the Aleppine Kibbeh (Aleppo's famous dish) no longer contained a filling of meat and nuts as before, after the siege Kibbeh was prepared only with mashed bulgur, fat and spices. Till now, years after the siege, it is still being sold in the city as street food and an acceptable alternative for traditional meet stuffed Kibbeh during the current economic crisis [60].

5.3.1.2. Infrastructure, Water, Gas, and Electricity

After people became accustomed to the during the war and the surrounding dangers in the external environment, the next critical issue to address was finding resilient coping strategies in their houses. People returned to using firewood and primitive ways of cooking due to the increase in the price of gas tenfold and the daily power outages. The old popular "portable stove" returned to the life of Syrians, and the new generation got to know the name of this stove, which has become present in most homes because people were unable to buy gas [61].

In Aleppo, the destruction of electricity, gas, phone line and water facilities were used as a weapon against the citizens of the city during the siege. To overcome the problem of power

outages, most people bought generators, but the high fuel prices have prevented them from using generators permanently. The power outage led to the growth of the generator trade and the emergence of the generator repair profession, as the generator became one of the necessities in the Syrian home due to the daily power outages [61]. Those who were unable to buy generators relied on battery-lit chargers, but with the long period of power outage, those chargers were no longer useful, so merchants provided an invention that people found acceptable: light strips consisting of 10 small signal bulbs, or LEDs that worked using telephone current. However, the intensity of its use damaged telephone exchanges and it quickly lost its popularity, until the long-waited alternative (xenon lighting) appeared. A single tape can light a room well for seven hours using a 7A/12V battery [62]. As for lighting the city at night, a group of volunteers in one of the relief associations used "batteries" to light the public streets at a low cost.

Figure 5.8. Bicycle power generator in Aleppo, 2016 [63].

Others have generated energy to charge batteries by mechanical power produced from riding bicycles. They extracted the small generators “dynamos” from cars they no longer had fuel to run, then welded the generator to a bicycle and connected it to a small battery used in homes. Someone would get on the bike and run quickly to charge the battery. Those home batteries powered small bulbs or even a washing machine if needed (Figure 5.8) [63].

As time passed, citizens in Aleppo invented all sorts of creative equipment to survive the siege. A group of inventors, in cooperation with professors from the University of Aleppo, invented a simple device (Figure 5.9) for generating electric power and pumping water. They installed it in the “Queiq” river which passes from the center of the city. The device is a wheel that contains a group of circular plates in the form of a miniature water mill that rotates in the middle of the water. Its speed increases as it increases in abundance, so that the small device can generate approximately 2 kilowatts per hour [64].

Figure 5.9. Water mill invention to generate electricity from water in Aleppo, 2014 [64].

To fight the cold, people got wood from the city’s green areas and burnt any flammable objects. In addition, they invented an alternative method of heating without using electricity, oil, or gas. The tools needed to make this innovative heater are an empty ghee can, three small cans or a wide metal tube, construction sand or beach sand, a metal barrel cover, and a metal plate (Figure 5.10). As for cooking, they used hand-made tin stoves [59].

Figure 5.10. Innovative heater created by citizens of Aleppo [59].

From the tools of death, the citizens collected dozens of Russian cluster missiles that were thrown at the city and turned them into tools of life. They created missile stoves for cooking, and ironically, they painted and hung the missiles to make swings for children (Figure 5.11) [59].

Figure 5.11. Swings made from missiles in Aleppo, photo by Abd Al-Haleem Bakro, 2016 [59].

5.3.1.3. Mobility and Internet

The city was experiencing a lack of mobility due to the loss of fuel, which was reflected in the availability of basic materials and the speed of transportation, and the limitation of the movement of individuals. This new reality led people to rely on their feet or by bicycles as an alternative to public transportation [58].

With the damage of local communication networks, and the destruction of most of the satellite towers and switches, there was a need to search for new ways and tools to help bring the internet from neighboring countries into Syria, at a time when the regime cut off the central internet from all the areas that got out of its control. The “Hawa Net” project has installed internet transmitters and receivers on both sides of the border, and as soon as “radio internet signals” reach the receivers on the Syrian side of the border, internet packets are supplied to cables and networks, whose maintenance and protection was supervised by the Ministry of Communications, from the borders to the heart of Syrian cities after reaching the central divisions [65].

Despite the war and the dangerous life threatening conditions, creating innovative spatial practices for everyday life was the main activity for people in Aleppo. During the war, the planned city disappeared, and citizens had to learn urban resilience. Although the city did not have a definitive urban resilience strategy before the war, most of the required resilience and coping mechanisms came spontaneously from within the people of Aleppo as a response to the sudden disastrous situation.

5.4. THE CITY AFTER THE WAR

The city that existed shortly after the war was an urban ruin: destroyed, divided, dangerous, and different. It was a response to the many emergency conditions that happened during the war. The war ended in December 2016 after a military offensive launched by the Syrian Armed Forces and allied groups against opposition-held districts in Aleppo. For four years, the city of Aleppo was divided between eastern neighborhoods controlled by opposition factions and western neighborhoods under the control of government forces. Throughout this period, the city was a battlefield that witnessed the death of thousands of civilians and a

massive destruction of buildings and infrastructure in the eastern neighborhoods, which were attacked by heavy air strikes [66].

As a result of a military operation by the regime forces, during which they tightened the siege of the eastern neighborhoods, on December 15 of 2016, the first operations to evacuate opposition fighters from this part began. The evacuation process lasted a whole week. The Syrian army announced on December 22 of 2016 that Aleppo had been completely retaken minutes after the departure of the opposition factions outside the city. Thus, the Syrian regime forces recorded their most prominent victories since the start of the conflict in the country in March 2011, while the loss of eastern Aleppo was the biggest setback for the opposition factions. Since then, the regime forces had successive field achievements with the support of Iranian, Lebanese and Iraqi fighters and with Russian air cover, and have controlled large areas, whether in the face of the opposition factions or the Islamic State [66] Across the city, entire neighborhoods and vital infrastructure became ruins. According to UN satellite data, more than 35,000 structures were damaged or destroyed in Aleppo before the city was reclaimed by the government in late 2016 [42].

Figure 5.12. An aerial view of destroyed buildings in Aleppo, 2016 [67].

During the war, the planned city slowly crumbled, and people were forced to learn urban resilience. Even without a definitive urban resilience system, it can be learned from the case of Aleppo that urban resilience could exist spontaneously from the citizens of the city, and that urban resilience comes from the social rules, the ideas to resist crisis in urban environments and the creative and inventive practices for everyday life.

At last, cities should have a basic urban resilience strategy that could provide an assessment at the beginning of crises and improve the response of cities to sudden disruption. Such a strategy can serve as a solid foundation for reducing physical damage in cities and the loss of human life.

5.4.1. Damage Assessment In Aleppo After The War

Before the war, the city had the highest population with 2.5 million inhabitants, after four years of clashes, the UN estimates that as of 2019, 1.6 million people were living in Aleppo city. Only 200,000 people reportedly live in the eastern parts of the city, which endured the greatest amount of damage due to sustained aerial bombardments between September and October 2016. As of 2019, conditions in Aleppo city were alarming with high-levels of poverty, lack of basic services, and extremely damaged buildings with reconstruction efforts estimated at hundreds of millions of dollars [68].

The UN satellite analysis estimated the number of damaged or destroyed structures in Aleppo was 35,000 structures before it was retaken by the government in late 2016 [42]. Bellow, are figures obtained from reliable resources about post-war damage assessment in Aleppo to better understand the impact of the war on the city.

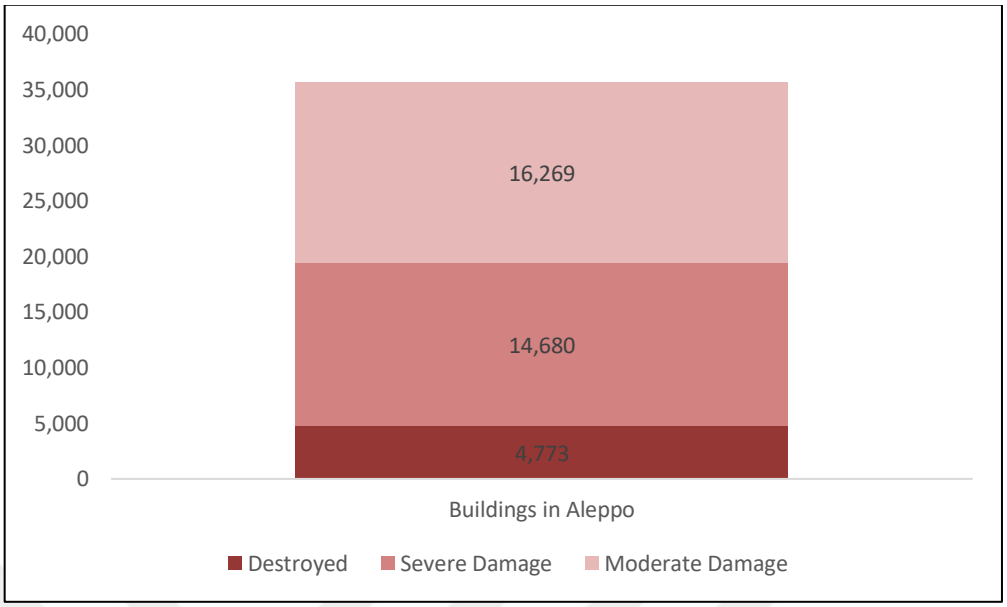

Figure 5.13. The damage in buildings in Aleppo 2016 [68].

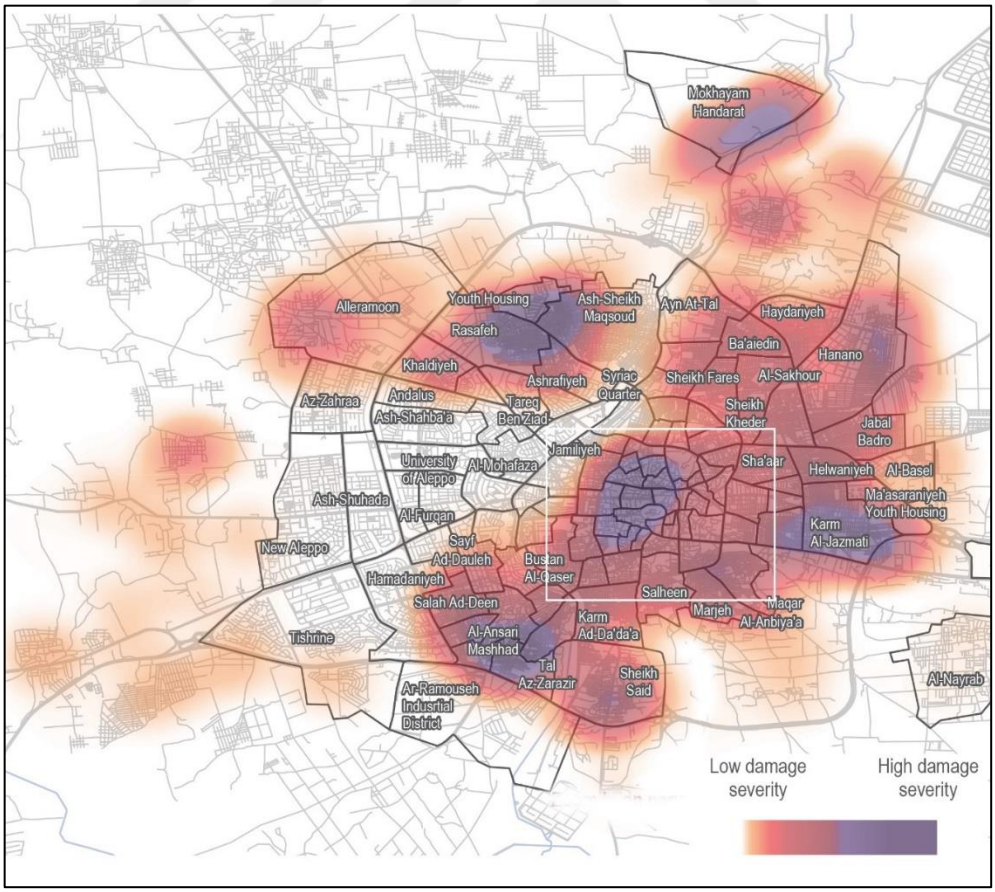

Figure 5.14. Aleppo satellite damage density analysis, 2016 [68].

Based on the satellite damage analysis, all but one neighborhood in Aleppo had building damage. Neighborhoods within the center of Aleppo had a high level of damage, and areas in the west of the city had lower damage. The west of the city was under the Government force's control, as compared to the east of the city, which experienced a far higher level of damage. On average, 4 buildings per hectare were classified as damaged or destroyed in Aleppo. This ranges from 10 to 15 buildings per hectare in the 10 most damaged neighborhoods [68].

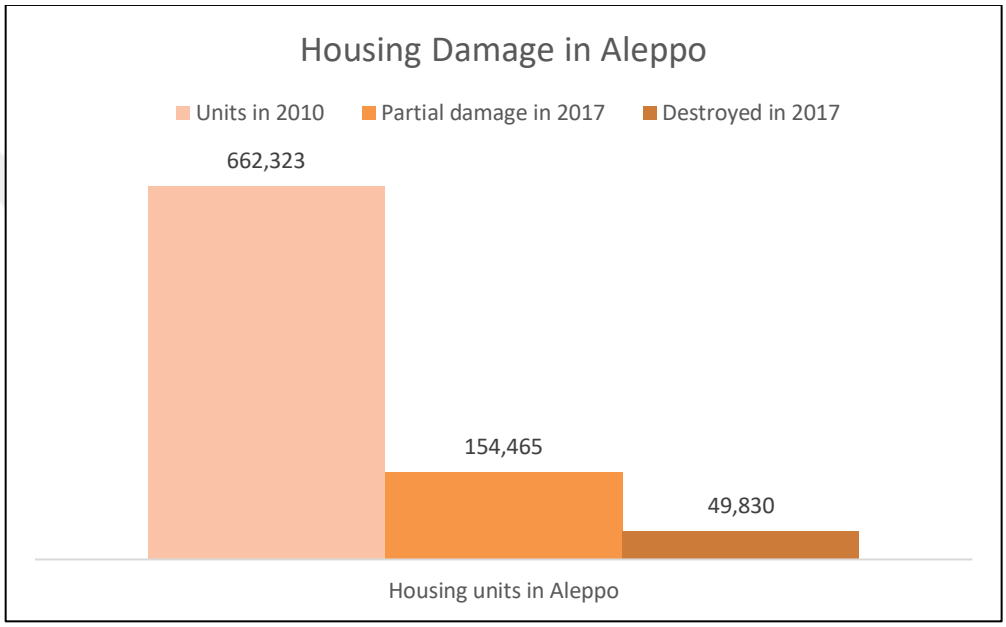

Figure 5.15. World bank calculations of housing damage in Aleppo, 2017 [69].

The post-war damage led to large-scale debris buildup in Aleppo, which requires clearance, transportation, and processing or disposing. A study conducted by the World Bank Report using remote-sensing-based analysis determined the extent of debris accumulation in Aleppo. The results showed that it would take about six years of continuous work and 26 million truck-kilometers to clear the debris [69]. The significant amount of debris not only disturbs mobility but increases environmental risks and the everyday life of citizens.

In Aleppo, 44 percent of the inner-city road network has been damaged. Approximately 25 percent of bridges are impassable, and 65 percent of roads need basic repairs due to lack of maintenance [68]. Throughout the conflict, major residential and industrial areas in Aleppo have been gradually damaged or destroyed. Sixty percent of the city's infrastructure was damaged, the provision of water, transportation, and electricity still is the biggest challenge

for Aleppo after the war. Because of the crisis, black markets for fuels and electricity-generating supplies have flourished. Fuel prices vary significantly across cities, depending on accessibility and different government pricing schemes across regions. In many conflict-affected cities, commercial and private generators, as well as automobile batteries (charged from the grid or other sources), serve as the primary source of energy for households. According to surveys conducted in Aleppo, only a small percentage of respondents rely completely on the public system for electricity generation (figure 5.16). Many households converted small electrical appliances to work with 12-volt car batteries [69].

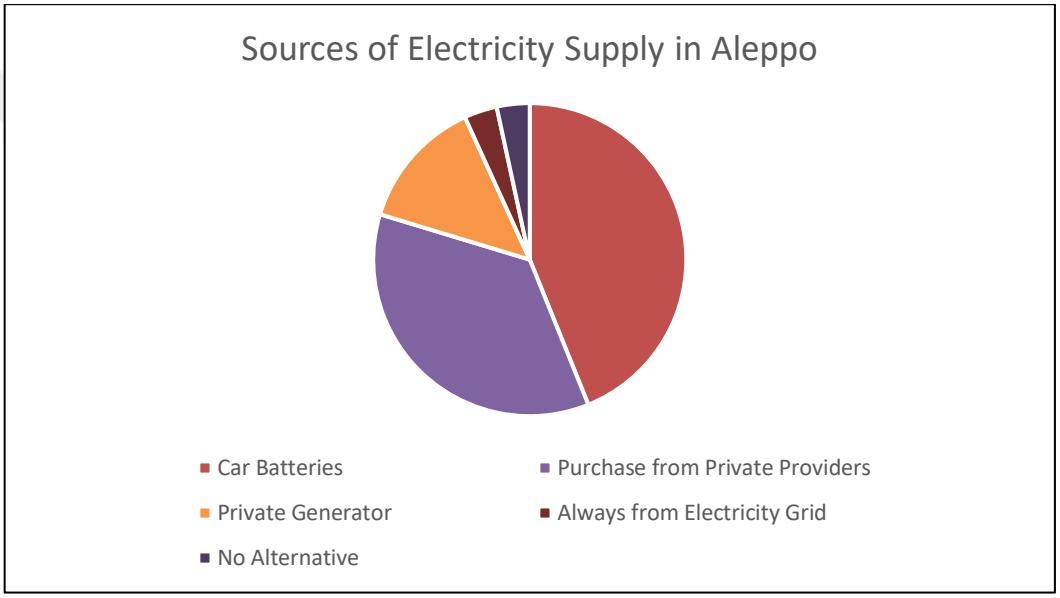

Figure 5.16. Sources of electricity supply in Aleppo [69].

Health facilities were also affected by the war, fifty-three percent of health facilities were completely destroyed in Aleppo where twenty-eight percent were partially damaged, moreover, education facilities in Aleppo have the highest occurrence of damage, with a total of 49 education facilities destroyed [69].

These brief statistics stressed the consequences of war on buildings, housing, and infrastructure in the city of Aleppo. The city will eventually have to overcome plenty of urgent economic and social challenges to promote peace and stabilization. The conflict has put most of the population into poverty, and reoriented several million toward livelihood sectors that will not be sustainable in a post-war economy. The needs arising from the

conflict will require a strident response to promote development objectives and create a new vision for the city of Aleppo.

6. THE REHABILITATION OF ALEPPO CITY AFTER THE WAR

Syrian cities have faced a crisis that was classified as one of the "greatest humanitarian crises of the era" (UN, 2022), causing the destruction of human, social and economic capitals. The pre-war development patterns, the institutional incapability of planning and organizing, and the absence of crisis management strategies in development resulted in increasing the city's overall vulnerability. For this reason, future development plans must work according to innovative and resilient approaches to provide a strategic framework and therefore a better outcome.

This study aims to guide the post-war rehabilitation process in Aleppo to face the impacts of the war and become more responsive to future shocks by integrating the principles of sustainability and urban resilience into post-war development. To achieve this aim, the disaster management actions and rehabilitation plans in Aleppo after the war must be understood. Therefore, within the scope of this study eight interviews were conducted with stakeholders, architects, and members of non-governmental organizations. However, two of the interviews were not added to this research, as they did not provide additional information to the six prior indicating that a level of saturation[4] was reached. The interviews are presented in this chapter describing the post-war development of three aspects of the city: the old souq, residential areas, and the local community.

6.1. EMERGENCY RESPONSE PLAN OF 2017

In 2017, an Emergency Response Plan was published based on the directives of the Minister of Local Administration and Environment because of the joint work between the Executive Office of the Aleppo Governorate Council and the Executive Office of the Aleppo City Council with all stakeholders regarding the priorities of intervention in Aleppo, to facilitate the return of the citizens to their homes and revitalizing the local economy [70]. The following was listed on the agenda of the plan:

[4] Saturation refers to the point where data begin to repeat and further data collection is redundant, signifying that an adequate sample size is reached (Hennink & Kaiser, 2022).

- A preliminary assessment of the status of the destroyed neighborhoods in the analysis, which included (infrastructures, public constructions, and residential buildings).
- A preliminary assessment of the percentage of damage to the urban fabric.
- Giving priority to the rapid return of the population.
- Rehabilitation of services, public utilities, and buildings in the shortest time.
- Prioritizing creating opportunities to revive the economy in various sectors.

As a result, a list of priorities was listed as a first stage for emergency intervention:

Table 6.1. Emergency response plan of Aleppo in 2017 [70] translated by the author.

1. Opening the main axes connecting the city's neighborhoods and the important streets linked to them	1. Removal of earth mounds.
	2. Removal of the debris of collapsed buildings.
	3. Filling holes and gaps caused by bombings.
	4. Restoring sidewalks and paving the streets within damaged sites.
	5. Repairing the asphalt in important sites.
	6. The deportation of destroyed buses and cars according to the appropriate mechanisms.
	7. Equipping lighting poles and removing the damaged ones in important locations.
	8. Reactivation of the traffic lights system in the main streets.
2. Rehabilitation of public buildings and services	1. Rehabilitation of Souq Al-Hal in the city center.
	2. Rehabilitation of the artistic altar in Ramouseh as a first stage.
	3. Rehabilitation of the burial office.
	4. Rehabilitation of the slaughterhouse in Qadi Askar.
	5. Rehabilitation of AlRamoush garages.
	6. Rehabilitation of Bab Jenin Travel Center.
	7. Rehabilitation of Bab Jenin public market.
	8. Rehabilitation of the fire stations.
	9. Rehabilitation of Saad Allah Al-Jabri Square and the Public Garden.
	10. Restoration of the service directorates buildings in parallel with the rehabilitation of their neighborhoods.
3. Rehabilitation of industrial and craft areas	Rehabilitation of the Arqoub area
	Rehabilitation of the Kalaseh area
	Rehabilitation of Ramouseh area
	1. Hanano neighborhood housing.

4. Rehabilitation of the least damaged and most densely populated neighborhoods and granting compensation	2. Qadi Askar neighborhood.
	3. Seif Al-Dawla and Al-Zabadiyah neighborhoods.
	4. Al-Kallaseh and Bustan Al-Qasr neighborhood.
5. Organizing the areas of informal settlements in which a real estate development decision has been issued	1. Haidariya.
	2. Tall Al-Zarazeer.
6. Gradual compensation for the shortage in the mechanisms of Aleppo City Council.	
7. Gradual compensation for the shortage of quality human cadres in the City Council.	
8. The projects approved to be implemented from the reconstruction budget with public construction companies as a first stage, which has been started and the contracting and ratification procedures are being completed and approved.	
9. Inviting companies interested in recycling rubble to start investing in this field because of its economic and interfacial impact on the city of Aleppo.	

The plan focused on the rehabilitation of main axes and streets, however streets in residential neighborhoods are still in the debris removal phase to this day [71], and the city mainly relies on Amp transmitters to obtain electricity [72], The United Nations Development Programme (UNDP), the Syria Trust for Development, Syria Recovery Trust Fund, and other NGO’s are working on the removing and recycling the rubble under the supervision of the governorate and the Aleppo City Council [73].

The rehabilitation of public centers and service directorates has been completed in some areas and is still in process in others. However, prioritizing industrial areas rehabilitation is a part of the country’s priority to rebuild Aleppo's industrial capacity and give the city its status back as Syria's industrial capital.

In 2017 a hundred million Syrian pounds were allotted to each of the three areas identified in the Emergency Response Plan: Arqoub, Kalasseh and al-Ramouseh, until now it has not been completed yet. Among the projects prioritized was the repair of Souq al-Hal which was completed in 2020. Also the Ramouseh area and its garage and slaughterhouse restoration were completed [74]. As for residential areas, the Emergency Response Plan prioritizes two types of action. The first is concerned with the rehabilitation of "the least damaged and most inhabited neighbourhoods," notably Hanano, Qadi Askar, Saif al-Dawla and Zabadiya,

Kalaseh, and Bustan al-Qasr. Compensation for damage in these locations is also provided under the Emergency Response Plan. The second action calls for the urban development of two informal settlements, al-Haidariya and Tell al-Zarazir, following Law 15 of 2008, which entails destroying and rebuilding rather than repairing. Because previous residents have limited rights, the target here is real-estate development corporations rather than citizens [74].

Based on reports, newspapers articles, and Aleppo Council announcements, it is noted that the 2017 Emergency Response Plan has not been fully achieved in Aleppo six years after the city was reclaimed by the government. There is a delay in the governmental action in the recovery phase of the city, and the emergency interventions either took several years to be implemented, or are still in the implementation process until now.

6.2. THE ORGANIZATIONAL MASTER PLAN OF 2018

The Minister of Public Works and Housing, Eng. Hussein Arnous, issued Decision No.791 dated 5/3/2018 to issue an amendment to the general organizational masterplan of Aleppo city to be the first building block in the reconstruction process for the city.

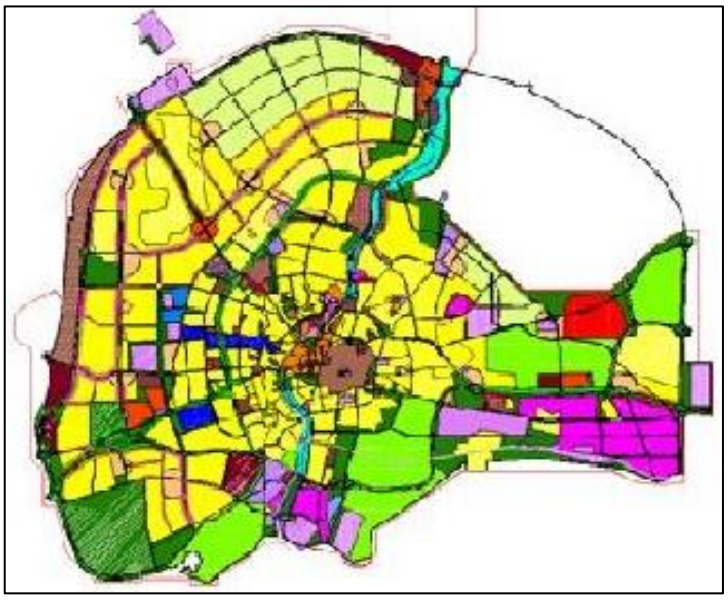

Figure 6.1.The organizational master plan of Aleppo city of year 2012 [75].

The plan was officially approved by the Ministry of Public Works and Housing, and detailed plans and studies were drawn up according to standards put in cooperation with specialists and stakeholders [76]. The main aim of the master plan is to reduce the spread of informal housing and define a collar around the city.

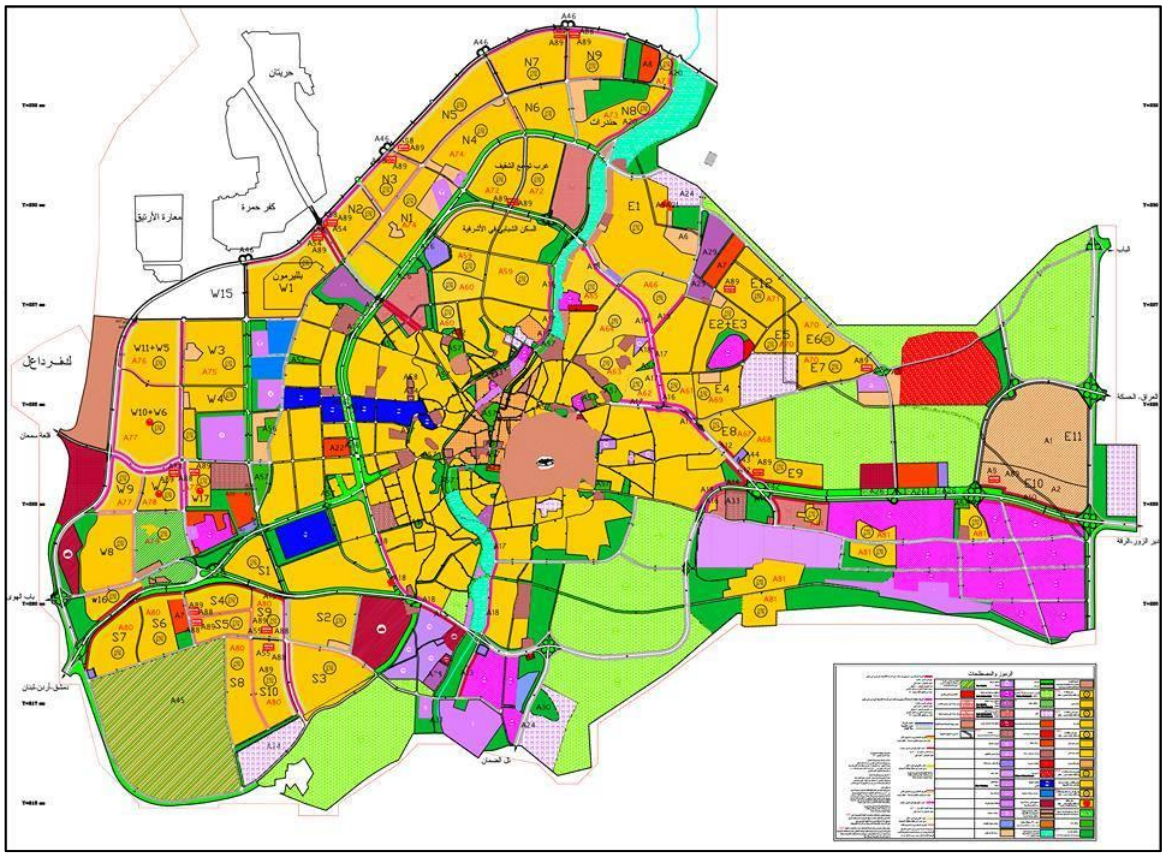

Figure 6.2. The organizational master plan of Aleppo city of year 2018 [77].

The aim of developing the organizational master plan of 2018 was to revive Aleppo's economy through tourism and investments. However, the master plan was technical, it focused on land use and residential density, rather than development projects. It is worth noting that the master plan is the same as the pre-war plan from 2012 and was slightly modified in terms of function for public areas, the density of housing and the use of green areas, (Table 6.2) shows the original plan of 2012 and the modified plan approved in 2018 [75] [78].

Table 6.2. The organizational master plan amendment of 2018 [77] translated by the author.

Amendment number	The urban description in the approved plan in 2012	The suggested urban description 2017-2018
A1	housing 300.	390 density housing, investment, trading, tourism, industrial services.
A2	Housing 350 + Proposed sector center. + Mixed-use.	390 density housing, investment, trading, tourism, industrial services.
A3	Real sector[5] center.	Souq Al-Hal Market.
A4	green areas.	Souq Al-Hal Market.
A5	housing 350 + green areas.	Souq Al-Hal Market.
A6	green areas.	Real sector center.
A7	Real sector center.	Real city center and parking center for trucks.
A8	green areas.	Real city center and parking center for trucks.
A9	Unreal sector[6] center.	Unreal city center.
A10	Unreal sector center. + mixed-use.	Investment type A[7].
A11	Industrial and investment areas + green areas.	Investment type A.
A12	housing 350	Investment type A.
A13	unpolluting industries + professional areas.	Investment type A.
A14	green areas.	Investment type A.
A15	Mixed-use 2.	An investment zone.
A16	public housing.	Mixed use type B.[8]
A17	housing 1.	Mixed use type B.
A18	Housing with detailed studies.	Mixed use type B.
A19	3 commercial housing.	Mixed use type B.
A20	housing 200.	Mixed use type B.
A21	housing 350 + green areas.	Commercial markets, investment and service facilities.
A22	Public services and constructions and commercial activities.	Commercial markets, investment and service facilities.
A23	Public services and structures.	Commercial markets, investment and service facilities.
A24	green areas.	cemeteries.
A25	orchards.	Orchards allowed for service construction.
A26	Forests.	Forest allowed for public parks.
A27	green areas.	Green areas, allowed public parks according to special requirements.
A28	Unpolluting industrial areas.	Craftsmanship and investment areas.
A29	crafts areas.	Craftsmanship and investment areas.
A30	Cemeteries and green areas.	Green areas, allowed public parks according to special requirements.

[5] Real sector is a part of the city either legally or illegaly implemented on ground. The city is devided into 12 adminstrative areas distributed into 10 sectors or service departments.
[6] Unreal sector is an un implemented sector (assumed).
[7] Investment A is a group of investment buildings located directly on the main axis, with height of 20 floors.
[8] Mixed use B is a group of mixed-use buildings located directly on the main axis, with height of 9 floors.

A31	A region outside the boundaries of the organizational plan.	Allowed public parks according to the needs of areas.
A32	housing 1.	Commercial, tourism, investment (real estate 125) area.
A33	green areas.	stadiums and investment facilities are allowed for the benefit of the General Sports Federation.
A34	green areas.	Public buildings.
A35	Playgrounds.	Playgrounds and investment facilities are allowed for the benefit of the General Sports Federation.
A36	green areas.	Playgrounds and investment facilities are allowed for the benefit of the General Sports Federation.
A37	City center services at the city level.	Playgrounds and investment facilities are allowed for the benefit of the General Sports Federation.
A38	City center services at the city level.	green areas.
A39	green areas.	City center services departments.
A40	green areas.	transfer center.
A41	transfer center.	green areas.
A42	Airport contract.	Adjusted boundaries of the forest.
A43	Housing with a density of 350.	Transportation Center.
A44	transfer center.	Housing.
A45	Forests.	Tourism investment area, while maintaining the green, wooded areas according to detailed studies.
A46	The extension road past northern regions.	Adding three-way road nodes at its intersection with the main regulatory roads.
A47	Right-of-way	Tourism area after detailed studies.
A48	Right-of-way	road.
A49	road.	Tourism area after detailed studies.
A50	Housing with investment of 2nd level.	Tourism area after detailed studies.
A51	Housing with investment of 2nd level.	Right-of-way
A52	Housing with investment of 2nd level.	road.
A53	Public buildings.	Playgrounds and investment facilities for the benefit of the General Sports Federation.
A54	Unreal sector center.	Modify the code between N2, W1. Determine the space in each part.
A55	Unreal sector center.	Modify the code between S9, S10 and switch spaces.
A56	Real sector center.	Public garden.
A57	green areas.	Public garden.
A58	Playgrounds.	Public garden.
A59	public housing	Public housing with a density of 350.
A60	Housing.	Housing with a density of 350.
A61	public housing	Public housing with a density of 340.
A62	Housing.	Housing with a density of 240.

A63	housing according to detailed studies.	Housing area according to detailed studies with a density of 300.
A64	housing 1.	housing 1 with a density of 380.
A65	housing according to detailed studies.	Housing area according to detailed studies with a density of 350.
A66	housing according to detailed studies.	Housing according to detailed studies with a density of 380.
A67	housing 350	Housing with a density of 155.
A68	housing 350	Housing with a density of 390.
A69	housing 300.	Housing with a density of 340.
A70	housing 60.	Housing with a density of 100.
A71	housing 60.	Housing with a density of 280.
A72	housing 200.	Housing with a density of 250.
A73	housing 200.	Housing with a density of 350.
A74	housing 300.	Housing with a density of 320.
A75	housing 200.	Housing with a density of 220.
A76	housing 100.	Housing with a density of 250.
A77	Housing 200 and licensed industries	Housing with a density of 250 and licensed industries
A78	housing 200.	Housing with a density of 250.
A79	housing 60.	Housing with a density of 100.
A80	housing 250.	Housing with a density of 360.
A81	housing	Housing with a density of 390.
A82	densely populated residence	Housing type D.
A83	housing 1.	Housing 1 with a density of D.
A84	public housing	Public housing with a density of D.
A85	housing	Housing area according to detailed studies with a density of D.
A86	housing	Housing type D.
A87	Housing 200 and licensed industries	Housing type D and licensed industries.
A88	Removing the boundaries of the Unreal sectors at the sector and the city's level.	Completion of the investment zone to cover the removed boundaries of the zone.
A89	Removing the boundaries of the Unreal sectors at the sector and the city's level.	Preserve the symbols contained within the area and sector symbol.

The amended plan of 2018 decreased green areas and forests for the advantage of investments like Souq Al- Hal market. Some originally planned housing areas have changed to mixed-use (investment, tourism, and services) while the density of other housing spaces increased to accommodate larger numbers. However, the latest update on this plan was published in April 2022 about amending the general organizational plan of Aleppo city to respond to the urgent need for improvements and to develop services. The post described the amending as a comprehensive and integrated plan that emphasizes the vital developmental and strategic dimensions of the city without interfering with the previously approved studies. But no details about these recent changes were published [79].

The governmental measures adopted in both the Emergency Response Plan of 2017 and the General Organizational Masterplan of 2018 prioritize the benefits of investors in the tourism and industrial sectors at the expense of the environmental and social needs of the city. They fail in meeting the needs of the displaced and low-income communities for housing. Nonetheless, master plans in Syria are laid in 20 years period under Law No.5[9] of 1982, and the Syrian government has a history of extraordinarily slow procedures. Until now this plan does not have a timeframe and vague governmental announcements are being published year after year without updates on the progress of the implementation of these projects.

6.3. HISTORICAL MONUMENTS

The recovery process in Aleppo had the restoration of historical monuments damaged in the war at the top of the agenda, the post war damage assessment in the old city of Aleppo was sixty percent of the infrastructure, sixty percent of heavily damaged Souqs (old roofed markets) and fifteen percent moderately damaged. The city suffered from the lack of skilled heritage experts, after the war, a technical coordination meeting organized by UNESCO in Beirut in march 2017 called the local authorities to urgently prepare a strategic plan to monitor the recovery process, and the national higher steering committee for the restoration of the Ancient City of Aleppo headed by the Ministry of Culture was invited along with the concerned GO, NGO's and international organizations.

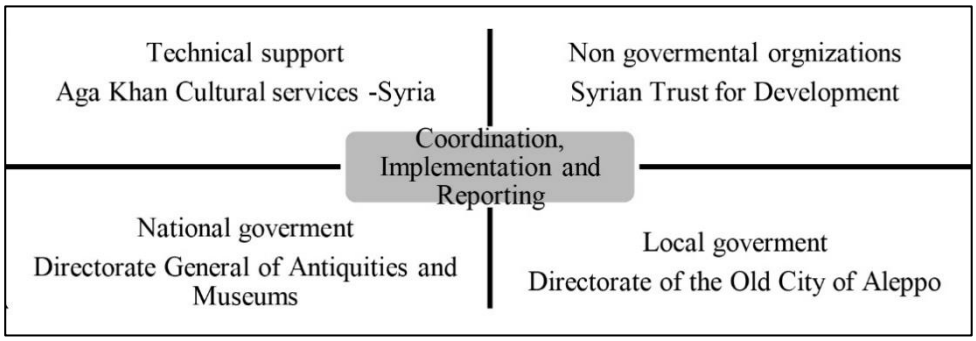

Figure 6.3. The agency for reconstruction and recovery of the ancient city of Aleppo [80].

[9] Urban Planning Law, Amended by Law 41 of 2002, listed the unified principles that regulate the process of planning residential areas and include the general organizational plan and the detailed organizational plan.

The planned framework was submitted to UNESCO in 2018. It was agreed that the old city of Aleppo should be rebuilt with its original old stone. As a result, an agency for reconstruction and recovery in the Ancient City of Aleppo was created. Later, traditional historical Souqs (markets) recovery started, consisting of 37 Souqs, today 4 of them are finished, 2 are still in the reconstruction process, and the rest is on the waiting list. Rehabilitation for churches and mosques also started and is still in progress to this day. Severe damage has occurred to the old city's image. as the economy hit crisis after the war, people could not buy primary materials to rebuild their houses so some broke the stones from damaged historical sites and used them to rebuild their homes, they built illegal houses in front of monuments. However, the government still cannot easily provide primary materials for the reconstruction as some quarries are located in opposition-controlled areas. [80]

In March 2017, The Ministry of Tourism inaugurated a memorial sign in front of the Aleppo Citadel bearing the name "Believe in Aleppo" to honor the citizens of Aleppo who stayed and survived the war, and to uplift the spirit of those who will return to rebuild their city [81].

Figure 6.4. Believe in Aleppo sign in front of the citadel of Aleppo, 2017 [81].

6.4. THE OLD SOUQ

The importance of the Souq (market) is that it is the cradle of traditional urban culture in Arab-Islamic societies. The souq is an Arabic term translating as the marketplace, referred to as the bazaar in some countries. The Souq, with its unique architecture and communal function, has deep historical and cultural significance and is linked to the development of cities, architecture, and a sense of place [82]. The built heritage is only one component of what makes souqs the heartbeat of Middle Eastern cities. “Souqs can have an architectural character, but they are also a place where there is an intangible culture, They are a part of everyday life for essential commerce. The economy of the city lives in the souqs.” [83]. After interviewing a supervisor for The Syria Trust for Development[10] Mr. Ahmad A. -who preferred to use a nickname to protect his identity- I found out about an ongoing development plan that started in 2019 and is concerned with the rehabilitation of the “Straight Street Souq”, from Bab- Antakiya all the way to the Citadel of Aleppo (Figure 6.5). This street consists of old markets which have been heavily or moderately damaged, the plan aims to rebuild the straight street Souq by the year 2024.

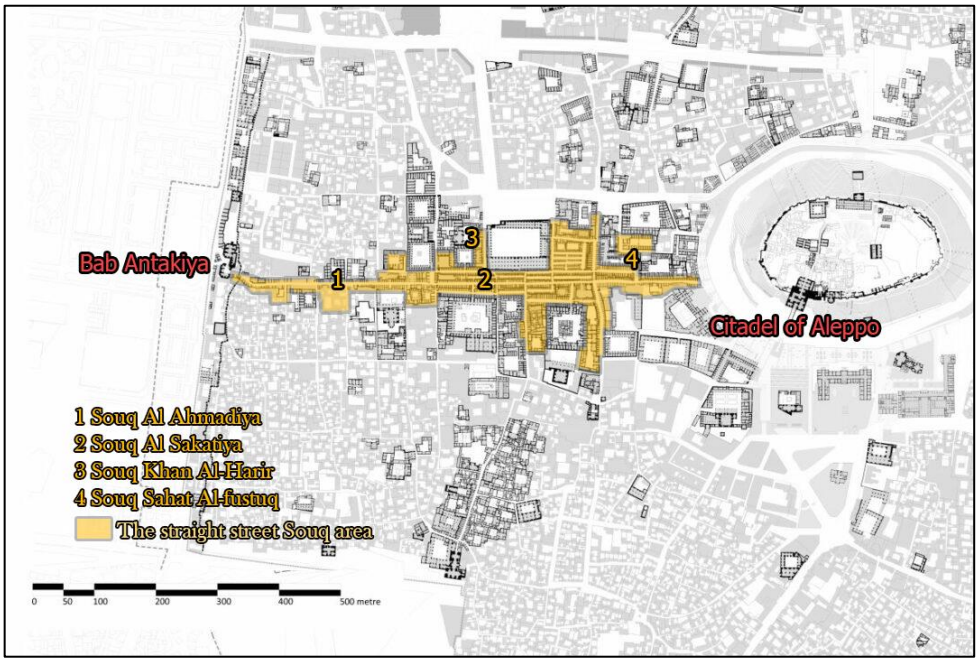

Figure 6.5. The rehabilitated Souqs by the Aga Khan from 2019 to 2022, by the author.

[10] The Syria Trust for Development a non- profit, non-governmental organisation. Funded by grants and donations, aims to provide people and communities with tools, skills, and opportunities.

In 2019, the rehabilitation of the old Souq (market) in Aleppo began with al-Sakatiya Souq; a 100-meter cobblestone alley containing 53 shops. And one of 37 Souqs that once surrounded the 13th-century citadel. Fortunately, al-Sakatiya Souq suffered from thirty percent damage during the war and its structure was not at risk of collapse. The Aleppo City Council supervised the eight-month restoration that cost $400,000 and was funded by the Aga Khan Foundation. The restoration of Al-Sakatiya Souq employed about 60 workers. Over the past years, a combination of UN agencies, international philanthropy, and volunteering merchants have worked together to bring the traditional souqs back to life to repatriate the city's estimated internal and external displaced citizens [83] [84].

Figure 6.6. Souq al-Sakatiya before and after the rehabilitation [85].

Within the scope of this study, a phone interview was conducted with Architect Thierry Grandin (April 12, 2022), a consultant for the Aga Khan Trust for Culture's restoration projects in Aleppo. when asked about the reason that the rehabilitation of the old Souq was the priority for the Aga Khan Foundation, he said:

"The Aga Khan Foundation is oriented towards restoring historical sites, it works only on public properties, not on private ones like houses or anything else. Together with the Minister of Culture, the Directorate of Antiquities, the Directorate of Aleppo, the Aleppo

City Council, and the Syrian Trust for Development, we chose the priorities for the restoration and the reconstruction of the city of Aleppo and decided to start with the Old Souq. Mosques are restored by the Awkaf[11], churches are restored by the Christian community. We want to work on other areas, but we are limited in funds. However, the work we are doing is not only on the cultural heritage but is also considered economic and social development. The rehabilitation of the Souq will enhance the social life, it will revive the activity in the area and encourage cultural events around the Great Mosque."

To start the rehabilitation, "The first work the Aga Khan foundation has done was a training course for cutting stone, masonry, and other required skills for restoration of historical monuments." 50 local workers were trained under the supervision of specialized experts, which helped in supplying and strengthening the work with specialized national labor and competencies.

As for new additions added to the rehabilitated Souq to increase the sustainability and resilience of the structure and improve the Souq in general, Architect Mr. Grandin said: "Even though there are still major problems in the city's utilities and infrastructure we have provided electricity to the old Souq. Before 2011 the old city suffered from low maintenance, vandalism, and the ancient stone was not regularly cleaned, for example, before the war the old stone in Souq Al-Saqateye was white but after deep cleaning for the rebuilding process it turned out to be originally yellow. Additionally, we have put new doors, new gates, and new LED lights. It is the same as before in the building materials but the overall result is better. In some parts of the old Souq like Souq Khan Al-Harir we used reinforced screed instead of concrete slab for greater resistance to user impact. And in case of fire we set a new firefighting system, as for floods they are not a concern."

In an online interview with Syrian urban designer Mr. Husam W. (April 11, 2022), he added: "The Aga Khan Foundation in cooperation with the municipality of Aleppo are doing a remarkable job in rehabilitating the old Souq with high craftsmanship. On the contrary, the revival of the old souq faces a major problem: many craftsmen, merchants and professionals have migrated inside and outside the country and started new businesses elsewhere, and many industries have been demolished because their owners faced a dark fate in the war. Although the old Souq is being rehabilitated, with the rest of the city undeveloped and with

[11] Ministry of Religious Endowments and Islamic Affairs.1

the public services and infrastructure functioning poorly, it is a big challenge to bring the migrated craftsmen and professionals back to the city of Aleppo. In addition, the decrease in the number of people who live near the Souq, the weak commercial and tourist traffic in the area, and the low purchasing power from local citizens discourage the migrated merchants from coming back and reopening their markets in the Old Souq. These Souqs and markets used to rely on domestic and foreign tourism which has not returned to normal yet."

Within the scope of this study an online interview was conducted with Mr. Ahmad A. (April 6, 2022) a site supervisor in the old souq, was conducted. He explained how merchants are encouraged to return to the city and reopen their shops saying: "The development plan for the souq is providing concessions that have not been provided before. For example, the rehabilitation cost of the markets is fully funded by the Aga Khan Foundation, and other NGOs, so merchants can reopen their markets without paying an extra pound. This plan will provide benefit-free loans to merchants that are financially incapable to reopen their businesses. As for public services, infrastructure is being rebuilt and sanitation is being restored. Also, water and internet will be connected, And although electricity is absent for almost 10 hours a day in residential areas in the city, it will be provided in the Straight Street Souqs for all 8 working hours. For the first time, new solar cells will be installed in the roofed market to provide electricity at night."

In another online interview with Mr. Salem Ahmad (April 18, 2022), a Syrian architect and an active volunteer in rehabilitation projects in Aleppo -who preferred to use a nickname to protect his identity- he described the souq after the rehabilitation saying: "The main visitors and customers of the old Souq were citizens from the suburbs of the city of Aleppo, large numbers of them have migrated inside and outside the country, the rest cannot easily access the old Souq because of mobility obstacles, and even if they access the Souq, they cannot afford to buy anything. Nowadays if you get to the old Souq in Ramadan or Eid there is minor commercial activity compared to the prewar activity when you couldn't step foot in the Souq because of how crowded it was". On the other hand, the war and the migration of old merchants changed the social fabric of the Souq, he said: "before war merchants were family, their grandfathers were longtime neighbors in the Souq, now after new merchants rented in the Souq, they hardly feel safe around each other because they do not know or trust each other." He added: "...Because of the economic crisis the robbery and crime rates has increased, and even if you rebuild your shop, it is still at risk of being robbed."

It is inevitable that with the change of the previously coexisted society that lived together in the Souq for generations, there is a need for raising awareness and encouraging the communication between merchants of the Souq now. All in all, despite the challenges facing the rehabilitation of the old souq, this project shows themes of resilience that needs to be applied to other rehabilitation and development projects in Aleppo (Table 6.3).

Aleppo was once Syria's commercial capital, this project will help the city regain its commercial importance by encouraging migrated merchants to reopen their businesses. Furthermore, the Straight Street was one of the most crowded touristic spots before the crisis, tourists would come to buy souvenirs, traditional clothing, and carpet, and enjoy eating traditional food while walking through the roofed Souqs. Once it's rehabilitated, secured and correctly advertised, it will attract tourists again.

Table 6.3. The rehabilitation of the old Souq of Aleppo analysis by the author.

Challenges	Themes of sustainability and resilience in the rehabilitation of the Souq
• Focuses on mildly and moderately damaged Souqs • Migration of customers • Migration of merchants • Infrastructure damage • Accessibility obstacles • Limited funding • Security and safety concerns within the community • Lack of purchasing power in the Souq	• Training local expert labor for the rebuilding process • Recycling and using the same old stone of the Souq in rebuilding • Using LED lights and solar cells for lightning • Financial facilitations for merchants

After understanding the current rehabilitation of the Souq, it is certain that developing the Souq is vital to support the growth of the local economy. There are many suggestions to be proposed in order to help the souq get back on track, the cultural liveliness of the Souq can be sustained by strengthening the bonds between merchants through group activities and building up local community awareness.

In post-war conditions it is crucial to focus on the security of the Souq to ensure that the vendors and customers feel safe, this requires prioritizing the removal of debris in the souqs that are still "on the waiting list" to facilitate access to the four working Souqs, increasing

lights, avoiding having dark corners and corridors. Launching frequent events in the souq also helps to increase the eye-on-the-street[12] and attract tourists to visit the souq and live the 'authentic' experience, and engage with the tangible and intangible[13] heritage of the Souq while feeling safe.

6.5. RESIDENTIAL AREAS

The Ministry of housing have social and cooperative housing projects that are still in the allotment phase and has not been executed yet, these projects are Self-financing, which means that subscribers in these projects pay installments for their houses. However, forty-five percent of Aleppo's population lived in informal settlements [86], these settlements are mainly located on the eastern side of the city while the western side is more developed and accommodates the richer community of the city.

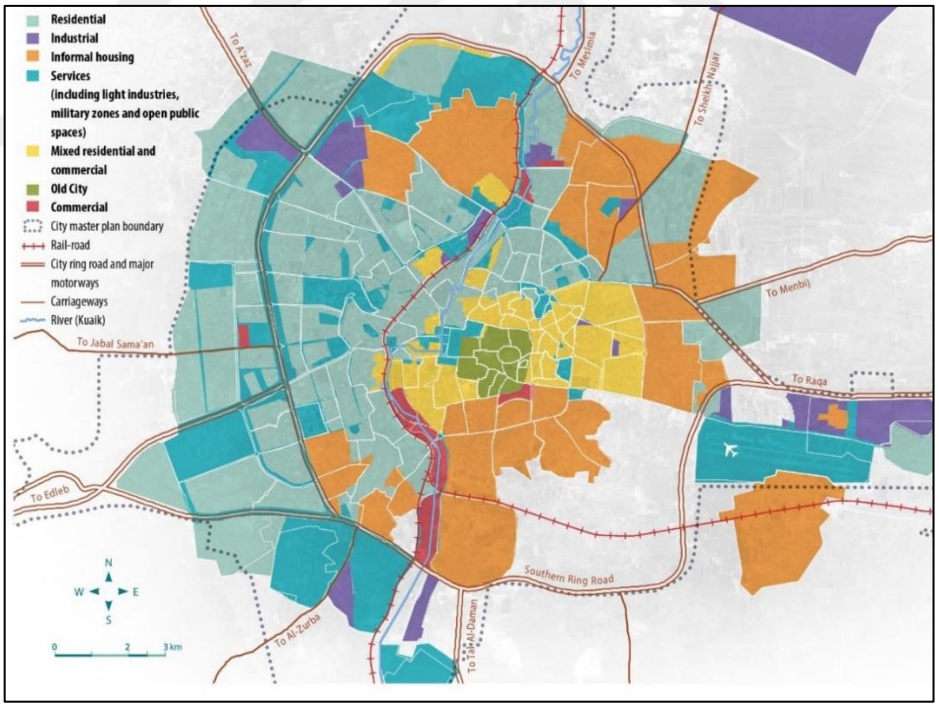

Figure 6.7. Land-uses masterplan of Aleppo, 2014 [86].

[12] An activity taking place in city streets keeps the movement and security intact because where there is a crowd of people, the streets are safer to use (Jacobs, 1961).
[13] Tangible Cultural Heritage is the physical artefacts produced, maintained and transmitted intergenerationally in a society such as artistic creations, buildings and monuments. 'Intangible Cultural Heritage' indicates 'the practices, knowledge and skills communities recognize as part of their Cultural Heritage (UNESCO, 2003).

Informal settlements have grown dramatically in all city growth directions throughout the crisis because the local authorities have less planning control over expansion and condensation [86].

Informal settlements are either real estate built illegally on state property, or on private property without a license, these areas were battlefields during the war and were significantly damaged after.

Within the scope of the study, an online interview was conducted with Mr. Mazen Ezzi (April 20, 2022), a Syrian reporter and researcher, he said: "…the Syrian government has stipulated several laws to organize reconstruction projects in affected areas: Decree 66[14] of 2012, Law No. 23[15] of 2015, and Law No. 10[16] of 2018, but there has not been a response from the International Monetary Fund to start these projects." This can negatively affect the residents of informal settlements because Law No. 10 of 2018 allows residents to provide property documentation within a year, if it is not provided, their houses will be demolished according to Decree 66. After the war and the internal and external displacement of citizens in Syria, providing property documentation can be very difficult, more so very expensive.

However, "if property ownership is proven, Decree 66 defines three types of beneficiaries for alternative housing and/ or organizational shares in projects launched in the rezoned regions: the owner of the claimed property, the tenant of the claimed property or the occupant of the claimed property" Mr. Mazen added.

To explain the complicated process for the rehabilitation of any property, Mr. Mazen said: "To start the rehabilitation process of any building a restoration license is required, to obtain this license a security approval and approval from the administrative unit is needed, after that a committee is sent to the location to detect the building and determine whether it is applicable for restoration or not. The next challenge is providing the necessary infrastructure and equipment for restoration, this can be very tricky because the government is banning the entry of building materials to some areas and prices can be very expensive within the same city".

[14] Urban planning law. Demolition and re-zoning law.
[15] Planning and Urban Development Law. Drawing new urban boundaries for future residential communities.
[16] Any illegal or unregistered property to be demolished unless property documentation is provided within a year.

Table 6.4 shows the challenges of residential areas' rehabilitation in Aleppo and the suggested solutions to overcome them.

Table 6.4. Residential areas rehabilitation challenges in Aleppo by the author.

Residential areas' rehabilitation challenges	Suggested solutions
• Developing investments and industries rather than housing • Lack of funding • Complicated process for obtaining rehabilitation license • Failure in providing infrastructure for the rehabilitation process • Top-down rehabilitation • Loss of property because of intractable property laws.	• Cognizant urban planning that considers the low income • Demanding international funding • Clearer laws for rehabilitation • Unification of building regulations • Governmental facilitations in releasing rehabilitation license • Allowing down-top rehabilitation and local participation in urban planning and reconstruction to rebuild the trust between the community and authorities. • Creating an innovative documentation mechanism for properties to prevent the loss of land records.

The management of the crisis in Aleppo has surpassed the destruction of residential areas, economic capital, and infrastructure to reach an excessive depletion of human capital. It threatens the coexisting social fabric because of the large number of displaced citizens whose capabilities are the indispensable human capital for the development process. In the ongoing development there is a gap between the need for displaced citizens to contribute to the development and the disordered future that is provided for their return. There is a vital need for prioritizing the rehabilitation of residential areas and infrastructure to encourage the return of displaced communities.

6.6. LOCAL COMMUNITY

War affects communities as much as it affects cities, infrastructure and buildings. rehabilitating local communities should be included in the post-war recovery plan, or else the conflict will continue on a social level and last for future generations. After the war, several local initiatives emerged in Aleppo to provide services to community members and institutions, preserve public and private properties, ensure the continuity of service

institutions, support civil peace, and provide relief to those affected like the Aleppo's People Initiative.

On an international scale, the UNDP is doing a remarkable job in rehabilitating the local community in Aleppo after the crisis. Within the scope of this research, an online interview was conducted with Mr. Luqman Al-Agha (April 15, 2022), one of the project managers in the UNDP and asked about the organization's role in Aleppo, he said: "Our program in UNDP Syria is concerned with three main issues: socioeconomic recovery, rehabilitation of the basic infrastructure, and supporting social cohesion. Our goal is to increase the Syrian people's resilience by improving coping strategies that allow them to depend on themselves and rebuild their livelihoods rather than relying on humanitarian aid." The UNDP together with Aleppo Governorate, Ministry of Local Administration, and Ministry of Social Affairs supports social cohesion by working on three thematic areas, he added, "the first is local governance, by training the cadres of citizens in service centers, in the municipality, and the local committees to communicate better and interact better. The second thematic area is promoting gender equality, and the third is ensuring community security."

Including the local community is the core of the UNDP work, the organization does discussions, analysis sessions, and questionnaires with participants and volunteers from the local community for projects. Mr. Luqman added: "in Economic Development and Livelihood (EDL) we work to equalize the income of individuals by soft skills training programs, we give enterprises for small economic projects, and vocational training after studying the market's offers and demands. We have two main centers in the city of Aleppo, the first is the Metal Center, which is concerned with the turning and welding works, and the second is the knitting and weaving center, these centers train citizens and enable them to work in these industries and decrease poverty in alignment with the Sustainable Development Goals number 1, 2, and 8.".

After the war, architects, researchers and intellectuals from the local community documented the architecture in Aleppo, using archive photos, plans, and people's testimonies to later use in rebuilding the destroyed city as it was before the war [87]. Other volunteer groups included architects, craftsmen and engineers who vowed to rehabilitate the city with the available resources.

In the interview conducted within the scope of this study with Architect Salem Ahmad (April 18, 2022), he said: “We as architects volunteered to rebuild some damaged buildings and mosques with the local community assistance, local workers and craftsmen, and with charity funding. However, obtaining a restoration license for any residential, commercial building or a mosque is very expensive and there are many restrictions. Volunteering architects and craftsmen do not get easily provided with electricity, generators, water, and equipment to work.” He provided me with a picture of a recent mosque rehabilitation project in Aleppo (Figure 6.8) saying: “The mosque had only rubble of stones remaining after the war, it was rebuilt after a year's work and with the effort of one construction worker, one stone sculptor, with harsh living conditions, without frequent electricity, with the scarcity of fuel and materials, financial hardship, high prices, and economic blockade”.

Figure 6.8. Rebuilding a mosque in Aleppo by local community, photo by Salem Ahmad, 2022.

Although the local community efforts are appreciated, they lack the funding and the governmental recognition that allows them to reach stakeholders and executors, without

providing the necessary facilitation and infrastructure services it becomes less encouraging for the local community to participate in rebuilding their city.

Table 6.5. Local community rehabilitation challenges in Aleppo by the author.

Local community challenges in Aleppo	Themes of resilience in Aleppo's local community
The limited **national** local community rehabilitation initiatives	UNDP's: vocational training. Supporting socio-economic recovery rehabilitation of basic infrastructure supporting social cohesion
Lack of funding	
Lack of governmental recognition	Local community volunteering in small rehabilitation projects
Lack of governmental facilitations	Architects and intellectuals from the local community documentation of the city for rehabilitation.

The role of local community is considered one of the most important actors in the reconstruction and rehabilitation of cities after the crisis. It is as significant as the role of the state, local authorities, the private and public sectors, and international supporters. The integration of these roles leads to success in reconstruction and faster relief of human suffering. It is vital to offer governmental funding, recognition and facilitations to encourage the local communities to participate in post war development.

6.7. EVALUATING THE RESILIENCE THINKING IN PLANNING ALEPPO

The first step to develop a comprehensive and integrated strategy to establish urban security and safety in a post-war city is to read the actual reality of this city, after the previous studies and analysis about the plans, policies and current rehabilitation projects in Aleppo, it can be concluded that the current rehabilitation in the city faces various challenges (Table 6.6).

Table 6.6 The challenges for post-war development in Aleppo by the author.

Administrative challenges	Social challenges
• The organizational plan of the city was prepared after the war in accordance with legislative laws that does not work according to the requirements of contemporary life, but rather work according to traditional quantitative standards and regulate land uses only. • Current plans do not cover the needs of alternative housing after demolishing informal housing. • The domination of traditional laws and legislation on administrative, organizational and urban planning procedures, and the absence of an effective development strategy and mechanism that reflects the principles of resilience. • Weakness of local administrations and the inefficiency of local stakeholders involved in urban planning and management. • The absence of a timeframe to border the development and avoid delays. • Concentrating development on the national level and the lack of material resources and sustainable methods in development. • The centralization of decision making and the Top–Down urban planning approach.	• Current plans do not meet the housing needs of the affected citizens. • No participation from citizens in decision making, officials assessed the damage and the percentage of destruction that occurred, while it was possible to invite representatives from the residents of each neighborhood to enhance social cohesion. • Current plans do not find solutions to reduce urban poverty • Current plans did not include the terms and measures for the return of the displaced citizen whose houses were damaged.

Environmental challenges	Economic challenges
• Current plans do not address the methods of waste treatment, rubble recycling, water pollution solutions and the destruction of green areas because of fires and logging. • The preservation of the environment was not mentioned among the objectives of current plans, and the environmental impact of the organizational master plan on the city and how it adapts to climate change was not taken into consideration.	• Current plans mentioned opportunities for investments but do not specify the proposed investments and the number of new job opportunities it provides for citizens. • The financing plan for the post-war development and its resources have not been determined.

Post-war city rehabilitation in Syria is often seen as rebuilding only the destroyed urban structure. Consequently, this perspective neglects the rest of the components of the urban fabric that shapes the comprehensive physical structure, the economic, environmental, and social aspects of the city. Moreover, it makes it far from the sustainable and resilient concept that makes cities capable of facing emerging changes and recovering from shocks.

The urban development programs in Aleppo are mainly oriented toward developing economic projects while neglecting social and environmental dimensions, this requires reconsidering the effectiveness of current traditional planning approaches, then adopting innovative and creative solutions in order to manage the current crisis with the required efficiency and keep up with the rapid changes facing the country.

Now, the question is how can we transition from urban resilience as a concept to urban resilience as an actual reality for Syrian cities? Is it possible to know how close the city is to achieving urban resilience? How can resilient thinking in planning be evaluated and to what extent is planning able to adapt to new conditions, and cope with and manage changes?

1. *Recovery:* Are the policies, programmes, plans and projects promoting capacity in the territory to respond to and recover from disturbance?
2. *Connectivity:* Are the policies, programmes, plans and projects enabling an interrelated territory, in which the nodes of the network are effectively linked?
3. *Capital building:* Are the policies, programmes, plans and projects under analysis contributing to the build-up of capital (stock), reinforcing in this way the stability and cohesion of the territory?
4. *Adaptability:* Are the policies, programmes, plans and projects enhancing the adaptability of the territory and its capacity to adjust to change in a reactive way?
5. *Robustness:* Are the policies, programmes, plans and projects increasing the robustness of the territory to unforeseen shocks and disturbances?
6. *Flexibility:* Are the policies, programmes, plans and projects enhancing the flexibility of the territory and its capacity to react to change in a proactive way?
7. *Transformability:* Are the policies, programmes, plans and projects contributing to the transformability of the territory and to its ability to innovate and create a new system should the previous become no longer viable?

Figure 6.9. Resilience in thinking evaluation questions [88].

The evaluation offered measurements to understand whether resilience was considered in adjusting the planning policies, and the overall information was as shown in (Table 7.7):

Table 6.7. Resilience thinking evaluation results by the author.

Recovery	Connectivity	Capital building	Adaptability	Robustness	Flexibility	Transform-ability
Debris removal. Repairing historical sites. Rehabilitation of Saad Allah Al-Jabri Square and the Public Garden. United Nations Development Program (UNDP). Local community rehabilitation efforts.	Opening main axes. Restoring sidewalks and paving main streets. Equipping lighting poles and traffic lights system. Rehabilitation of Bab Jenin Travel Center Rehabilitation of AlRamouseh garage.	Rehabilitation of Souq Al-Hal market. Rehabilitation of Qadi Askar and Arqoub industrial areas. Rehabilitation of the Old Souq. United Nations Development Program (UNDP).	United Nations Development Program (UNDP).	United Nations Development Program (UNDP).	Rehabilitation of the Old Souq.	

The importance of urban resilience evaluation comes from the need for a roadmap for local governments to guide their cities through crises. Especially since the administrative regulations and the planning methods currently used in Aleppo do not qualify for disaster management. This evaluation framework sheds light on the thinking approach of the current development among stakeholders in Aleppo, it emphasizes the fact that the ongoing development is mainly oriented towards recovery, connectivity, and capital building, and neglects key attributes for disaster reduction such as Adaptability, Robustness, Flexibility and Transformability.

Given the existing concerns in the city of Aleppo, learning from experience is vital and calls for supporting the change in policies and planning paradigms. According to these results, there is an urgent need to adopt a new planning strategy since present planning systems have struggled to prepare the city to cope with increasing economic, social, and ecological stresses and disruptions. This suggests introducing the phrase "resilience" and incorporating "resilience thinking" into planning. Resilience thinking has substantial benefits that can be adapted into planning in two ways: first, in the evaluation of existing plans, programs, and planning measures to identify shortfalls, and second, in understanding critical risks in the urban system and defining key areas and issues before setting priorities and constraints when developing a strategy. The primary mission of urban planners in Aleppo must be to prepare the city for the future rather than rebuilding the same city that existed before the war and crumbled during the crisis. Unfortunately, their role is usually focused on solving the daily problems of the city to satisfy the interests of the dominant actors in the urban system. At last, resilience thinking can serve as the foundation for an alternative planning approach that guides decision makers to prepare the city of Aleppo to react more proactively against natural or man-made disasters.

7. ALEPPO AS A RESILIENT AND SUSTAINABLE CITY

During the civil war, citizens in Aleppo practiced urban resilience through creating innovative practices for everyday life. Although the city did not have a definitive urban resilience plan before the war, resilience appeared spontaneously from within the people of Aleppo. However, having a basic urban resilience strategy would help the city at the beginning of a disaster to respond more effectively to disruption. Such a plan can be a solid foundation for reducing physical, social, and environmental damage in the city. On this subject, the making cities resilient campaign proposes a five steps cycle for building resilience using the ten essentials for making cities resilient and provides examples of what local governments can do to guide their cities to become more resilient.

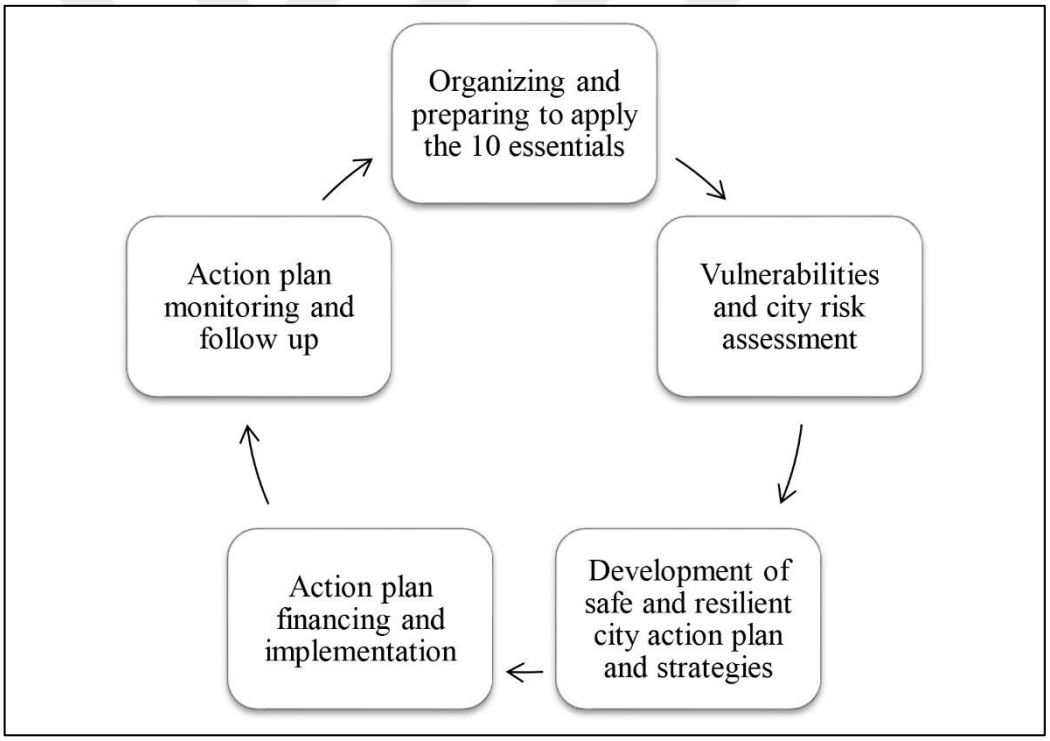

Figure 7.1. Building resilience cycle using the ten essentials [22].

The Making Cities Resilient Campaign by UNISDR [22] and the Sustainable Development Goals [15] are relied on to suggest a resilient and sustainable strategy for the city of Aleppo, along with the studies and conclusions of this research.

7.1. PROPOSING THE TEN ESSENTIALS TO STAKEHOLDERS

The Municipality of Aleppo must commit to investing in disaster risk reduction and sustainable development as important priorities for the development of the city after the war. After gaining this awareness, the municipality can prepare institutions to consider these concepts as a foundation for the rehabilitation of Aleppo. However, The Municipality of Aleppo cannot address all matters alone and will need to be supported in funding, human resources, knowledge, data, professional services, and other resources from the various stakeholders like the UNDP, the Agha Khan Trust, the Syrian Trust, and other NGO's. Intellectuals, architects, academic organizations, and the local community can contribute significantly to disaster risk reduction because partnerships are essential to building resilience and their engagement in the process must be facilitated. Once all actors are invited to participate in the process, the city of Aleppo will be ready to plan and execute a resilient development.

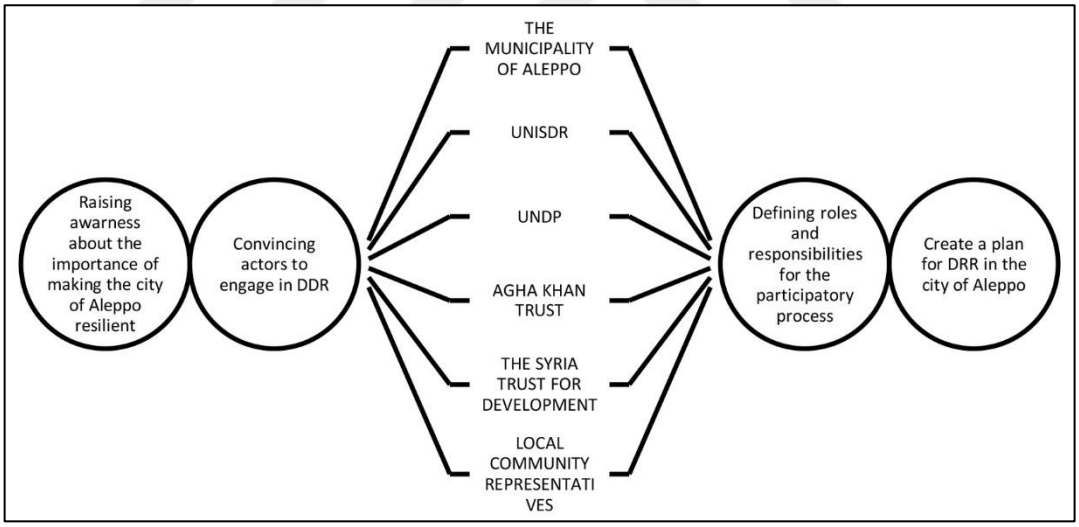

Figure 7.2. Preparing to apply the ten essentials with stakeholders by the author.

This step will require that the Municipality of Aleppo prepare an institutional setting with stakeholders by creating a team for Disaster Risk Reduction in collaboration with the UNISDR, allocating a dedicated budget, and promoting awareness among other stakeholders. After convincing the actors, the roles and responsibilities must be defined for the participatory process in resilience building. Needs, priorities and city resources must be defined accordingly to establish a baseline for the work ahead. Later, the methodology to be

used must be determined, and the challenges and risk concerns will be studied to create a work plan and build technical capacities to implement it.

7.2. UNDERSTANDING VULNERABILITIES AND RISK ASSESSMENT

An effective risk assessment will guide proposed plans to decrease disaster risk by focusing attention and resources on the vulnerabilities of the city and the community. The vulnerabilities of Aleppo before the war, and the points of the defect in post war rehabilitation should be the basis for the development of a disaster risk reduction action strategy. The reason why the war severely damaged the city's infrastructure and residential areas is that it was not constructed properly or had been placed in unsuitable locations (like informal settlements) and considering sustainable planning methods reduces the exposure of communities and assets to risks. Furthermore, detailed studies about potential and previous disasters, strengths, weaknesses, opportunities, and threats facing Aleppo will serve as a baseline of knowledge upon which a risk analysis can be conducted. Then risk assessments must be developed based on all identified disasters with the involved stakeholders and the local community with regular updates.

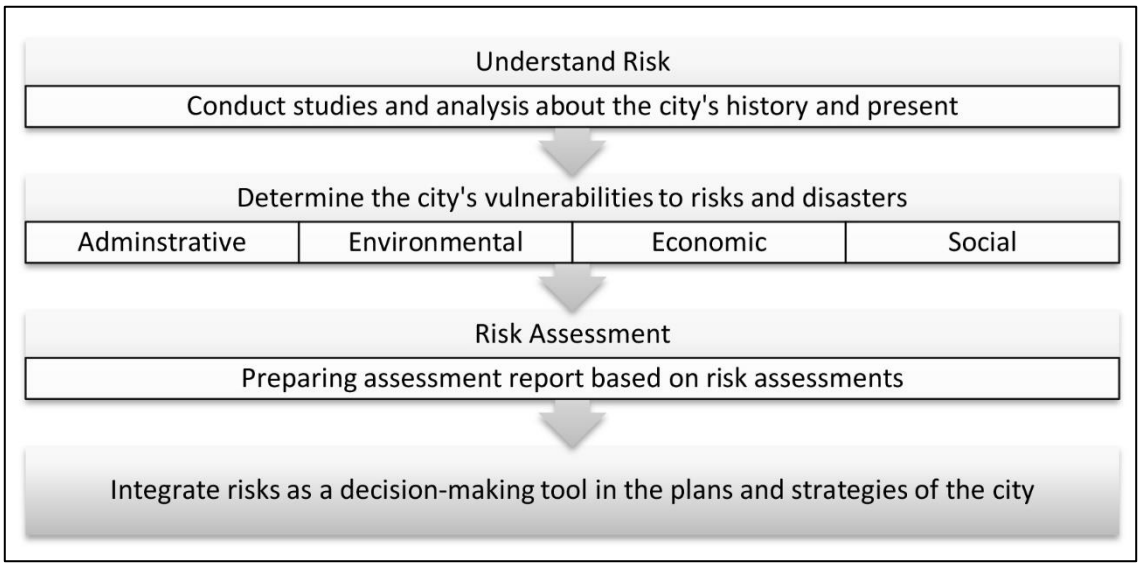

Figure 7.3. Understanding risk and risk assessment by the author.

7.3. DEVELOPING A RESILIENT AND SUSTAINABLE STRATEGY

The Municipality of Aleppo and the stakeholders can develop a local level Disaster Risk Reduction action strategy based on the risk assessment findings, this strategy must integrate concepts of sustainability and resilience and be compatible with the national and local DRR targets, indicators, and development demands. The action plan should allocate the responsible departments for implementation, operational arrangements, method of financing, expected level of impact, and conduct an evaluation after a proposed period. The action plan should include a performance evaluation to measure the success of the proposed risk reduction activities. It is important to engage all stakeholders in the development of the action strategy and clarify their roles and responsibilities [22].

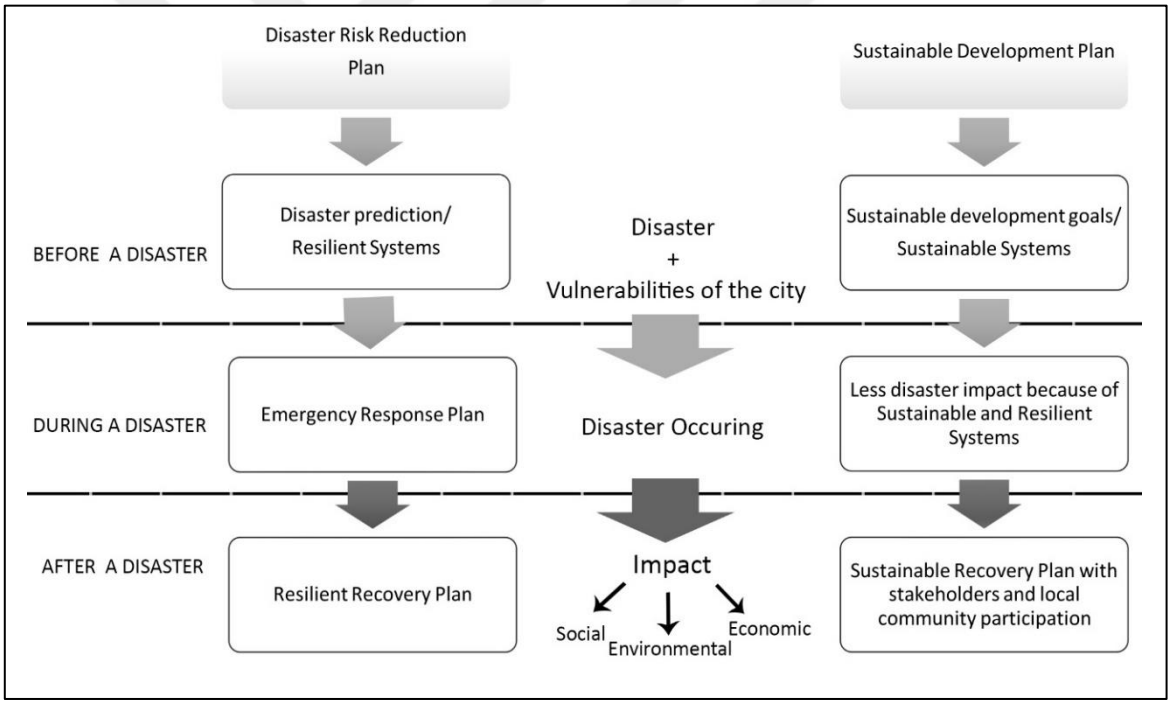

Figure 7.4. Resilient and sustainable city strategy by the author.

The baseline to create a resilient and sustainable strategy in Aleppo is to adjust legislative laws to work accordingly with the city's vision, the DRR strategies and the approved frameworks. It is essential to have the necessary political support and legal framework to implement the action strategy. Then to create a DRR plan there is a need to identify priorities, implementation method, evaluation criteria and a financing plan all in a specified timeframe. This strategy must work accordingly with the sustainable development goals to reduce the

vulnerabilities of the city, build capacity, and promote resilience to disasters using sustainable systems. Conversely, a disaster can erase the economic and social progress that takes years to achieve and may risk the community's ability to pursue a sustainable development process. Therefore, it is essential for sustainable development plans to incorporate DRR considerations. The elements of the action strategy should be incorporated into the city's development plans and projects, and the responsibilities of stakeholders must be identified in all the social, environmental, economic, and administrative aspects. After the strategy is clarified and stakeholders are aware of their responsibilities, the strategy should be published to raise awareness and increase the preparedness of the entire community. In Aleppo, the community learned urban resilience on their own through surviving war conditions, engaging the local community in DRR plans activates its role in resilience in a participatory Top-Down and Down-Top action.

7.4. FINANCING AND IMPLEMENTING THE ACTION STRATEGY

After 11 years of war, it is certain that the country's treasury lacks the required funding to implement a DRR action plan let alone a sustainable one. The People's Assembly of Syria approved the draft budget for the year 2022 for 13.325 thousand billion Syrian pounds, with a deficit of 4.400 billion pounds, the total amount of which does not exceed 5.3 billion dollars, based on the official exchange rate currently fixed at 2.512 pounds for one dollar. About half of the announced budget appropriations were allocated to "social support," according to Finance Minister Kenan Yaghi, which mainly includes fuel, wheat, sugar, and rice. Today, most of the state's budgeted revenue comes from taxes, public sector surpluses, and revenue from public property investment. The tax share amounted to 3,500 billion pounds, or a quarter of the budget, which is consistent with decrees and laws requiring the imposition of more taxes on real estate, investment, and consumer sectors, as well as the collection of taxes related to the previous ten years, including income and profits taxes, cleaning fees, water and electricity, and the extraction of government documents [89].

The Municipality of Aleppo will not be able to contribute effectively toward risk reduction initiatives due to funding constraints. On top of corruption concerns there is poor financial planning, the city allocates its limited resources to priorities like investment projects without leaving financial resources for disaster risk reduction measures. Fighting corruption and

reconsidering the city's financial priorities will be the start, furthermore, developing an implementation strategy and embedding the activities and priorities of the plan in the core of all development programs in the city. Stakeholders, actors, and the local community must know their roles and responsibilities in the implementation of the action plan.

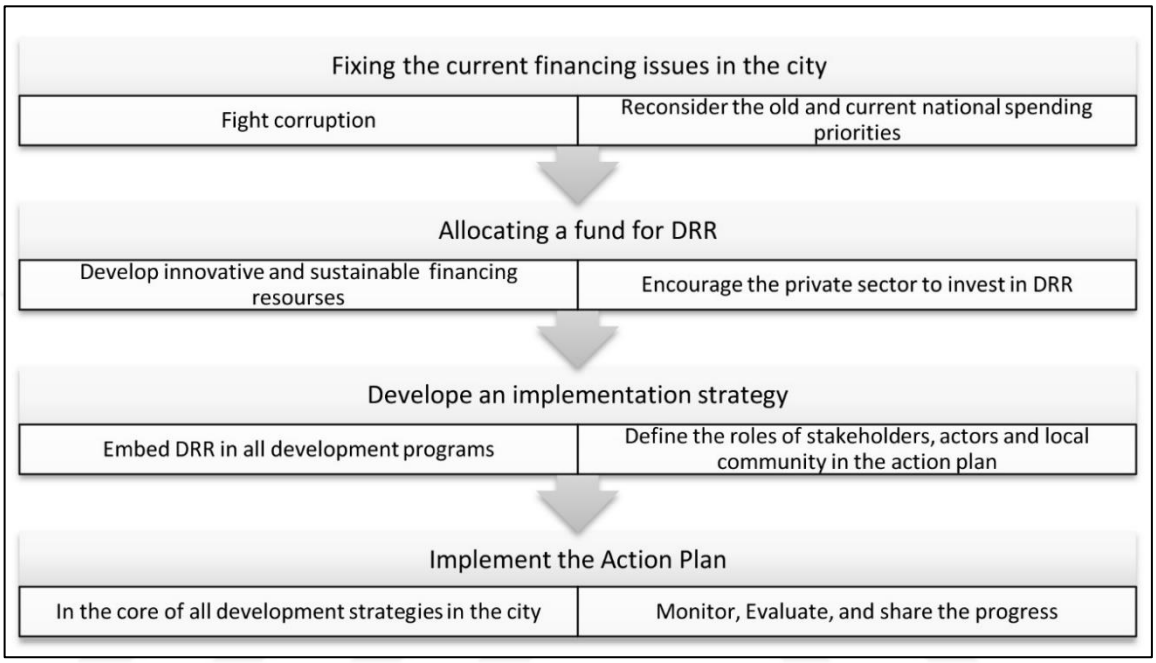

Figure 7.5. Action plan funding and implementation by the author.

After determining the required budget, it is important that the Municipality of Aleppo develop innovative and sustainable financing resources with the stakeholders by inviting the private sector and encouraging the investment in DRR activities to fund risk reduction plans. However, the case of Aleppo is a special one, the implementation of any actions should not interfere with or jeopardize the image of the city especially after inviting the private sector to the development process, national and international private sectors usually focus on the the economic gains rather than preserving the history and the identity of the city.

Furthermore, the municipality must implement the activities outlined in the action strategy with the assistance of stakeholders and the local community representatives. It is mandatory to monitor and evaluate the process and update all involved parties with the progress to overcome any barriers or challenges, these updates must be shared on a national level to facilitate the implementation process with financial and technical support. The stakeholders together with the Municipality of Aleppo must have a strategic vision that restrains the

changes in the city to specific limits. Aleppo's local community must be aware of their role in monitoring and reporting the ongoing actions in their city.

7.5. EVALUATING AND SUPERVISING THE ACTION STRATEGY

To ensure disaster risk reduction and the improvement of the city's resilience, monitoring and follow-ups are needed as the last step. The Syrian government has a history of slow implementation of all development plans in the country, to make DRR action plan effective, it is essential to set a timeframe to implement the action strategy and create criteria to evaluate the success of the city in building resilience. The responsible departments assigned for evaluation and monitoring should measure the impact and success of the action strategy through performance indicators and monitoring tools. The tools and approaches should consider quality standards, cost targets, sustainability and environmental goals, level of impact, and all other performance indicators identified within the DRR action plan. The local community must be able to give feedback about the impact of the strategy, report any gaps or problems in the implementation and participate in improving the strategy.

8. CONCLUSION

Developing countries are more prone to produce risky circumstances than developed ones as the administrative, environmental, social, and economic shortcomings in a system can create a formula for disaster in case of sudden shocks. The Syrian crisis was fueled by these vulnerabilities when the civil war started in 2011, this caused severe damage to the urban fabric that will take the county years to reverse and overcome. Throughout its history, Aleppo was a resilient city, it survived numerous wars, fires, earthquakes, and other man-made hazards. Large parts of the city were destructed and rebuilt every time, unfortunately, the last war in Aleppo resulted in tremendous destruction of infrastructure, economic capital, and human life. This type of destruction requires plans, skills, tools, funding, and the unification of national and international stakeholders along with the local community to overcome. Although six years have passed since the government reclaimed Aleppo under its control, the city is still in the recovery phase. The economic, social, physical, and environmental challenges must be addressed from the top-down and the down-top in a participatory process between the local community and the stakeholders. However, participatory processes are often affected by the state of democracy in the country and will require raising awareness about the importance of the local community's role in developing their cities. During the war, the local community in Aleppo proved that resilience can come from social rules, from ideas to resist crises in urban environments, and from the creative and inventive survival practices in everyday life. In these post-war circumstances, it is mandatory to engage the citizens in the rehabilitation process by giving them the facilitation and authority to take part in rebuilding their city and therefore speed the recovery process. After understanding the impact of the crisis, studying the current situation in Aleppo city, and conducting interviews to analyze the existing administrative, legal and planning frameworks, an evaluation was conducted to determine the patterns of thinking in the current rehabilitation measurements, and the results showed that the thinking approach although contains themes of resilience that contributes to recovery, connectivity and capital building, it falls short in terms of adaptability to adjust to change reactively, the robustness to unforeseen shocks, the flexibility to react proactively and the transformability to innovate a new system if the previous becomes no longer viable. Given this information, it can be concluded that patterns of development followed previously and currently lack the needed resilience thinking that enables the city of Aleppo to cope with various changes. These

changes can be both slow transformations as well as major events, such as natural disasters, economic crises or social/political unrest. Consequently, the rehabilitation, organizational plans and development projects in Aleppo after the war do not have an integral vision that considers resilient and sustainable strategies and the participation of the local community. The current development in the city is taking an incremental approach, micro solutions are happening gradually within the city, On one hand, these solutions although small but are aiding the situation in the city of Aleppo. On the other, it will take tens of years to bring the city back to its pre-war condition, let alone create a better city in the future that can absorb, recover from, and adapt to economic, environmental, and social disruptions.

The ten essentials for making cities resilient provide a guideline for implementing the Sendai Framework for Disaster Risk Reduction at a local level. DRR combined with a mindful consideration of the sustainable development goals, provides a solid foundation on which post-war cities' development strategies can be created. A city like Aleppo, with its historical significance should have a basic urban resilience strategy to support it before crises in order to respond positively to disruption. The cultural heritage it hosts, its strategic location, and its industrial potential can attract stakeholders, organizations, and the private sector to invest in rehabilitating the city for different reasons. It is vital that an integral vision is created for the city to preserve its identity through this change. Launching a sustainable and resilient development will demand coordination between all stakeholders and the local community to identify roles and embed these concepts in every institution and system in the city of Aleppo. This will require conducting studies and analyses about the Aleppo would help in identifying the vulnerabilities of the city, and raising awareness among the stakeholders and the local community about the possible risk conditions of the city to build up preparedness for disasters from the down-top and the down-top.

Before the occurrence of any disaster, having a disaster risk reduction plan that is working parallel to a sustainable development plan provides sustainable and resilient systems that predict disasters and identify risks. Later, when a sudden disaster interferes with the vulnerabilities of the city, the impact of the disaster will be less fundamental because of the early preparedness of an emergency response plan and the pre-disaster sustainable and resilient systems within the city. Therefore, after the disaster conditions are over, the sustainable and resilient recovery plans implemented with the unification of stakeholders

and the local community will minimize the social, environmental, and economic impacts on the city and speed up the recovery of the city accordingly.

In the current complicated situation of the country, it can be critical to get the needed funding for such a strategy. However, fighting corruption, reconsidering the old and current national spending priorities, convincing donors, and attracting investors might fix the current financing shortcomings in the city. To allocate a fund for sustainable and resilient development in the city there is a need to develop innovative local financing resources and encourage the private sector to invest in DRR. Furthermore, a strategy of implementation must be embedded in the core of all development programs and each department should know its role in this new vision. Lastly, the implementation of the strategy should be monitored and evaluated regularly to avoid procrastination and corruption, updates must be published on a national and international scale to receive feedback and improve points of weakness in the strategy. All in all, Disaster Risk Reduction goals and strategies must be included in national development policies and plans in Aleppo to establish a form of sustainable development. If the Municipality of Aleppo, the stakeholders, and the local community engaged in a rehabilitation process that not only reduces the city's vulnerabilities but also considers other possible disasters that the city and its population are exposed to, it will help the city avoid reproducing risk conditions and bring about change in its future. Such a strategy can serve as a solid foundation for decreasing physical damage, loss of human life, and promise a better future for displaced citizens.

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