ANKARA YILDIRIM BEYAZIT UNIVERSITY

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ARCHITECTURAL HERITAGE MANAGEMENT IN POST WAR SMALL AND MEDIUM CITIES, AND THEIR RURAL AREAS IN NORTH WEST SYRIA

M.Sc. Thesis by

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by

Hussein Walid ALTAH

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M.Sc. THESIS EXAMINATION RESULT FORM

We have read the thesis entitled **"ARCHITECTURAL HERITAGE MANAGEMENT IN POST WAR SMALL AND MEDIUM CITIES, AND THEIR RURAL AREAS IN NORTH WEST SYRIA"** completed by **HUSSEIN WALID ALTAH** under the supervision of **PROF. DR. SALAH HAJISMAIL** and we certify that in our opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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O Allah, all praise is due to You, a good and blessed praise, as befits the majesty of Your face and the greatness of Your power, for this success, and peace and blessings be upon the teacher of humanity and the messenger of guidance, our master Muhammad, may Allah bless him and grant him peace.

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A dedication full of feelings of love and respect....

To the river of giving…….....my dear father

To the inexhaustible spring of love……...my beloved mother

To the pulse of my heart…….....my dear wife Tharaa

To the flowers of my life…….….my children... Rawd... Hanin...Walid... Jaber

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To everyone who contributed to supporting me to complete this thesis.

2024, 05 August **Hussein Walid ALTAH**

ARCHITECTURAL HERITAGE MANAGEMENT IN POST WAR SMALL AND MEDIUM CITIES, AND THEIR RURAL AREAS IN NORTH WEST SYRIA

ABSTRACT

During wars, architectural heritage is exposed to severe damage, especially in cities and urban areas, ranging from minor damage to complete destruction. Moreover, the marginalization, weakness or absence of heritage management supporting post-war recovery, especially in medium and small towns and their countryside where attention is focused on large cities, has exacerbated the problem. In addition to the crisis of climate change and global warming facing the Earth, which results in natural disasters that increase the vulnerability of architectural heritage to destruction, which is considered a resource for flexible and sustainable practices and technologies that we can benefit from in our contemporary architecture. The thesis suggests directing attention to medium and small cities and their rural areas with a traditional fabric. Syria has been exposed to conflict for more than a decade. The study will focus on the regions of northwestern Syria, including its medium and small cities and its countryside, to study its current situation, determine its architectural heritage, and the role it can play in that complex context. The thesis conducted many research in the context of wars and disasters, focusing on many points: managing architectural heritage, the possibility of adapting technology in this context, trying to benefit from traditional practices in the context of sustainability, and finally the relationship of architectural heritage to the resilience of cities. The methodology followed in the thesis is publication-based thesis, the published articles about the different research topics were organized to serve the achievement of the objectives of the master program. By reviewing the literature and extracting the best methodologies compatible with the Syrian context, it is possible to define the value of architectural heritage in the contexts of wars and disasters and develop a strategy for using and intervening in this heritage.

Keywords: Heritage management, Syria; medium city, small city, rural areas.

SAVAŞ SONRASI KÜÇÜK VE ORTA ŞEHİRLERDE MİMARİ MİRAS YÖNETİMİ, VE KUZEY BATI SURİYE'DEKİ KIRSAL ALANLARI

ÖZ

Savaşlar sırasında mimari miras, özellikle kentlerde ve kentsel alanlarda, küçük hasarlardan tamamen yok olmaya kadar ciddi hasarlara maruz kalmaktadır. Üstelik, özellikle dikkatlerin büyük şehirlere odaklandığı orta ve küçük kasabalarda ve kırsal kesimlerinde, savaş sonrası toparlanmayı destekleyen miras yönetiminin marjinalleşmesi, zayıflığı veya yokluğu sorunu daha da kötüleştirdi. Mimari mirasın yıkıma karşı savunmasızlığını arttıran doğal afetlerle sonuçlanan Dünya'nın karşı karşıya olduğu iklim değişikliği ve küresel ısınma krizine ek olarak, çağdaş mimarimizde yararlanabileceğimiz esnek ve sürdürülebilir uygulamalar ve teknolojiler için bir kaynak olarak kabul edilmektedir. Tez, dikkatin orta ve küçük ölçekli şehirlere ve kırsal alanlarına geleneksel bir dokuyla yönlendirilmesini önermektedir. Suriye on yıldan fazla bir süredir çatışmaya maruz kalıyor. Çalışma, Suriye'nin orta ve küçük şehirleri ve kırsal kesimleri de dahil olmak üzere kuzeybatı Suriye'nin bölgelerine odaklanacak, mevcut durumunu inceleyecek, mimari mirasını ve bu karmaşık bağlamda oynayabileceği rolü belirleyecektir. Tez, savaşlar ve afetler bağlamında birçok araştırma yürütmüş, mimari mirasın yönetilmesi, bu bağlamda teknolojinin uyarlanabilme olasılığı, sürdürülebilirlik bağlamında geleneksel uygulamalardan yararlanmaya çalışılması ve son olarak mimari mirasın kentlerin dayanıklılığı ile ilişkisi gibi birçok noktaya odaklanmıştır. Tezde izlenen metodoloji yayına dayalı tez olup, farklı araştırma konuları hakkında yayınlanan makaleler yüksek lisans programının amaçlarının gerçekleştirilmesine hizmet edecek şekilde düzenlenmiştir. Literatürü gözden geçirerek ve Suriye bağlamıyla uyumlu en iyi metodolojileri çıkararak, savaşlar ve afetler bağlamında mimari mirasın değerini tanımlamak ve bu mirası kullanmak ve müdahale etmek için bir strateji geliştirmek mümkündür.

Anahtar Kelimeler: Miras yönetimi, Suriye; orta şehir, küçük şehir, kırsal alanlar.

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CHAPTER 1

INTRODUCTION

World cultural heritage (tangible and intangible heritage) constitutes a record that documents what human civilization has accomplished since the appearance of the first human on the surface of Earth, and is an important factor for preserving the cultural diversity of societies, the identity of nations, and their wealth of experiences and expertise.

Today, architectural heritage in the Arab world is exposed to a huge danger due to the wars and conflicts that broke out against the backdrop of the Arab Spring and the Arab revolutions, as a large part of it was completely destroyed, and the damage progressed to neglect, marginalization, and lack of attention[1].

On the other hand, the dialogue about architectural heritage and its preservation is mainly related to the political situation, and for heritage to become heritage, it must refer to a sense of collective identity belonging to a particular land and a common history. This is what is happening now in the Arab world, where history and geography have become a point of conflict and reshaping by the conflicting parties. Consequently, heritage lost its national collective identity and became a subject of division, definition, and distribution according to the whims of the parties to the conflict [1]. Moreover, what was considered national heritage before the conflict was destroyed after the conflict for various considerations (foreign heritage - enemy heritage - infidel heritage) and therefore is not worth preserving. It seems that it has become a new mentality in dealing with heritage issues, and this mentality has appeared in multiple actions of parties to the conflict in the Arab world through bombing and looting of architectural heritage throughout the Arab regions [1]. What happened during the period of conflict in the Arab world that began in 2011 shows that the phenomenon of heritage destruction and marginalization was not a temporary or spontaneous phenomenon, or, as some Western critics said, a fundamentalist reaction against banned art, but rather it has deeper roots and broader dimensions, as The selectivity of the destruction, the

indifference of the people to the destruction of their heritage before their eyes, and the complicity of some political actors give an indication of the ambiguity of the concept of heritage itself in the prevailing culture and policies emerging in this period [1]. In the late twentieth century, most Arab governments preserved the architectural heritage and rehabilitated as much of its features as possible, but the failure of most of these efforts was mainly due to the failure of cultural curators to understand the context in which the concept of heritage was imported from the West and implanted as a cultural framework for identity. An imposed patriotism was also unstable, and the extent of the conformity of the heritage with the imposed identity, as this conformity, which did not take into account the identity of some ethnic or marginalized groups, faced opposition, and these differences hidden under the bright national slogans surfaced after the Arab Spring in 2011 [1].

Syria is considered one of the most important countries rich in architectural heritage, as what has received attention represents cities, large urban centers and often monumental buildings. There are six archaeological areas, including 46 sites and hundreds of historical buildings registered on the UNESCO world heritage list: The old city of Damascus in 1979 AD, the old city of Bosra. 1980 AD, the old city of Aleppo in 1986 AD. The site of Palmyra in 1980 AD, Al-Hosn citadel in 2006 AD, Salah al-Din al-Ayyubi citadel in 2006 AD, and the forgotten villages in northern Syria in 2011 AD [2], which indicates a vast geography with an architectural heritage that has multiple historical, social and cultural values that has not received sufficient attention at the global or local level, especially the medium and small cities and their countryside, which contain a large percentage of the traditional residential fabric and which extend over the entire Syrian geography.

The revival of the collective memory of post-war communities, represented by neighborhoods and traditional residential fabric, is often overlooked in post-conflict architectural heritage rehabilitation efforts, even though this is essentially what gives these heritage buildings their value .Residential homes play an important role in affirming a sense of security, belonging, stability and identity, and residential homes often have a specific social and spiritual significance that stems from their inherent value. In Syria in particular, we note that family members have a strong bond with the

family home. In fact, family members currently have to repay bank loans over a period of up to two decades in order to own a family home, highlighting the exceptional value of residential properties [3].

In the same context, experiences in many war-torn countries have proven that refugees often take the keys to the house they were forced to leave behind while fleeing the scourge of war to other countries. As an example, we discover that the majority of Palestinian refugees currently reside in refugee camps and place the house keys they left behind in 1948 on the walls of their homes. One of the most fundamental human connections is the connection to homeland, as evidenced by the fact that Greek Cypriots kept their house keys during their time as refugees, and some even hid them before leaving in the hope of finding them again [3].

Regarding rural areas, Before or during the war, there were hardly any studies done on traditional architecture in rural Syria. Some historic architectural models and styles have been documented in Syria as part of the CORPUS project, which is funded by the European Union and aims to document traditional architecture in the Mediterranean area. In addition to a number of previous studies, A small number of scholars, architects, and others have studied rural architecture in Syria. They focused most of their attention on documenting the remaining traditional materials and construction spread throughout the Syrian countryside [4].

Planning and development policies marginalized the Syrian rural areas and focused on large urban centers and areas. However, rural communities were presented as communities living in a state of self-sufficiency in various aspects of life. These policies resulted in a large gap in services between rural areas and urban communities, which led to a large migration rate that reached approximately 20% during the fifty years before the outbreak of the Syrian war. Syrian war in 2011 led to a reversal of the migration trend due to the intensification of the conflict over the centers of power, which are the large urban centers, as urban residents found in rural areas a safer haven with the provision of the minimum requirements of life, in addition to the return of the basic rural population who had previously migrated to the cities in search of Reasons for living. This created a major crisis in the ability of rural areas to absorb this large

increase in population. Historical studies have also shown that the stages that preceded the reconstruction of cities and urban centers that were exposed to wars or natural disasters witnessed the necessity of a temporary migration of urban residents to rural areas [4].

Hence, we see the necessity of focusing the study on this vast geography that contains an architectural heritage that was neglected and marginalized before the war. It has been exposed to more than a decade of wars and conflicts that destroyed a large part of it, and the specter of war still threatens it to this day. In addition to the recent earthquake that occurred in February 2023. And studying the possibilities that this heritage can play in the war period and beyond.

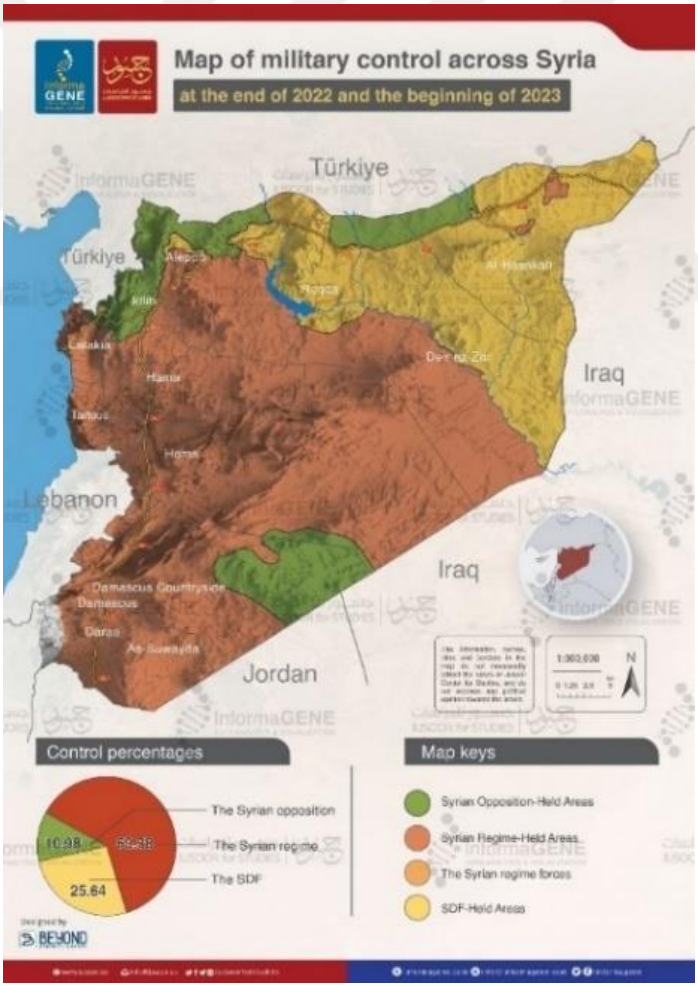


Figure.1.1 Military control across Syria. Source: Jusoor, 02.01. 2023

During the Syrian war, the map of control between the parties changed from time to time with changes in the areas of engagement and areas of control, and this led to great destruction of the architectural heritage spread over the entire Syrian geography. The map stabilized after the Turkish-Russian-Iranian agreement in 2020, and there were no Any significant changes up to now are shown in Figure (1.1).

1.1 Research Problem

The interest in studying, preserving and documenting architectural heritage in major cities led to the marginalization of medium and small cities and their countryside (which constitute a large geographical area of the world) in times of peace, not to mention the destruction and loss of this heritage in periods of war, where it was exposed to varying degrees of destruction from minor to major. In addition to the absence of the tools and specialized personnel necessary to manage this heritage.

1.2 The Aim of the Research

The research aims to shed the light on the marginalized architectural heritage in small and medium-sized Syrian cities and its countryside and define the role it can play during and after the war recovery process

1.3 The Research Objectives

The primary goals of the research are:

- to draw attention to the architectural heritage in medium and small cities and their countryside in general, which represents assets that are lost on a daily basis due to different factors and risks, particularly in Syria after the conflict in 2011.
- to develop strategies to deal with this heritage and its management, which constitutes a fundamental pillar in the post war recovery of these areas.

The benefits of achieving these goals:

- documenting the architectural and urban heritage in these areas

- forming specialized staff to deal with this heritage
- providing a database for decision makers
- benefiting from the experience of this heritage in contemporary architecture
- benefiting from technology in saving the architectural and urban heritage, which can provide multiple technologies to preserve and manage these assets and find alternative solutions compatible with potential conflict scenarios.

1.4 Research Limitations

The search was limited to the northwestern regions of Syria because it is not possible to move between conflict areas. In addition to, Lack of information and studies in these areas and the scarcity of references.

1.5 Research Methodology

There is a general methodology for the thesis, which is a thesis based on publication, consisting of three published research papers, each of them achieves a partial goal that contributes to the general goal of the thesis. In addition to a special methodology for each research. The first research, the author relied on a case study of one of the small and medium cities in the study area, during which a field survey of all the architectural heritage in this city was conducted and documented, supported by references wherever possible. The second research, the author relied on a case study of one of the countrysides of the study area, where he conducted field surveys and collected data based on personal meetings, focused discussion sessions, and observation. The author chose three villages, each village representing a type of village in the Syrian countryside. The author discussed sustainability practices in local architectural heritage in the case study, relying on the framework VERSUS Project of Sustainability. The third research, the author relied on assessing the resilience of one of the small and medium cities in the study area, which contains a historical center and architectural heritage, according to the Rockefeller resilience framework, to identify the positive and negative points in the city and propose solutions to them. Enhancing the resilience of this city and linking solutions related to heritage management. The

role that architectural heritage can play in raising the level of resilience of these cities will be identified, figure 1.2.

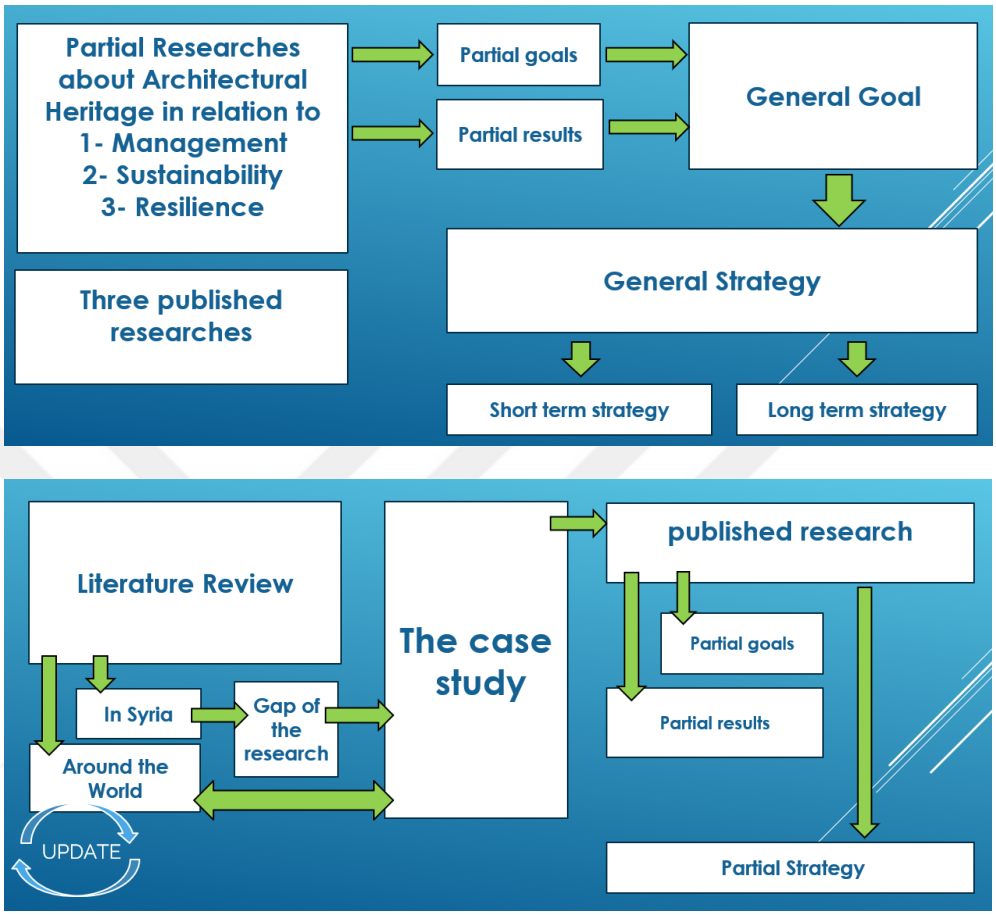


Figure1.2 Up, thesis methodology. Down, research methodology (developed by auther)

1.6 Summary of results

Small and medium cities and their countryside are large geographical areas that have been marginalized for many decades. They contain an architectural heritage that reflects the cultural and urban value of these areas and is no less important than the architectural heritage in large cities. Managing architectural heritage using advanced tools in this geography is necessary because it is subject to constant destruction over time, especially due to conflict and war. It is also rich in sustainable practices and strategies that can be a starting point for sustainable contemporary architecture and, plays a major role in resilience of cities in times of war and disasters.

CHAPTER 2

ARCHITECTURAL HERITAGE IN MEDIUM AND SMALL SYRIAN CITIES: MANAGEMENT ADVANCED STRATEGIES FOR POSTWAR RECOVERY

Architectural heritage is the cultural properties and physical assets of cities, which explains the history and culture of the city as well as the aesthetic, architectural, symbolic, and urban identity aspects. Architectural heritage is a critical component that indicates the civilization experienced by the community and the events that have occurred in cities. We must preserve them and consider them in any intervention in the field of urban design and planning [5]. Neglecting the architectural heritage is a significant reason for its destruction [6]. The difficulty of accessing this heritage increases its deterioration. On the contrary, the ease of access supports the recovery of origin and the development of societies [7]. HBIM of the architectural heritage plays a vital role in preserving this heritage. It also reduces the risks of physical interventions in the future [8], and the responsibility for facilitating access to this heritage lies with the administrations and governments [7]. Information and communication technology play an essential role in accessing and developing cultural heritage [7], which constitutes a cornerstone of strategies for preserving architectural heritage. With this experience, awareness has emerged in Europe to reuse architectural heritage while preserving originality[6]. On the other hand, reusing architectural heritage causes a loss of originality in some cases[6]. Placing cultural heritage preservation on the priority list of politics and people is a new phenomenon [7]. Each traditional building was built to perform a specific function. Still, with the development of life, the change of use was an inevitable result of the operation of the building, which led to transformations and changes that occurred in this architectural heritage[6], and this is what makes digital 3D modelling a complex and challenging process [8]. To solve this problem, we must rely on tools to reconstruct in reality this heritage. It has an outstanding contribution to improve our understanding of this heritage and reduces

errors to a large degree in the process of rehabilitation[8]. The adaptive reuse of the architectural heritage enhances the continuity of this heritage and its ability to live for more extended periods[6]; it has a significant impact on improving the economy of societies [6]. As a result, Architectural heritage management develops and becomes more efficient when it relies on advanced management tools and information technology development[9].

Uprisings in Arab Spring ousted or destabilized administrations while simultaneously exposing institutional fragility and cultural heritage vulnerability. In many cases, institutional structures and knowledge of cultural heritage protection were deficient, and regional turmoil weakened these institutions and procedures [10], as more than 30 armed conflicts have occurred in the Middle East alone since 2004 [11]. The war that took place in Syria since 2011 affected Syria and its people at all levels. The cities had the largest share of destruction, and the architectural and urban heritage constituted an essential part of its fabric [11]. In most conflicts, Architectural heritage, representing specific religious, historical, or ideological traditions, is targeted indiscriminately as the reality right now in Syria [10]. Cultural heritage is considered representative of the identity of any society with its values and history. Therefore, its preservation is a critical issue linked to respect for the originality and nobility of the past [11]. Preserving urban and architectural heritage requires developing society's values at all levels. Great awareness has emerged for all countries of the world in maintaining their values, of which the architectural and urban heritage represents the most significant part [11]. Literature reviews in Syria regarding the attention to architectural heritage and its management during the conflict seemed shallow and few. These were directed toward large cities. Also relied on traditional strategies in most of them. As a result, deterioration of the architectural heritage increased. Its exposure to loss day after day, especially in North-Western Syria, the study's subject (revolution regions), where the bombing of cities and towns continued. The architectural heritage constitutes an integral part of its urban fabric, such as the city of Ariha, Sarmin, and others. Ariha was chosen as a case study. It is a medium-sized city which people were according to 2010 statistics amounted about 80,000 people. It contains a traditional canter and an urban fabric still inhabited by a large part of the population. It contains many

traditional architectural edifices such as mosques, baths, the market, and traditional courtyard houses. It is about five kilometres away from the conflict borders. The conflict and the bombing destroyed a part of this architectural heritage, in addition to the displacement of a part of its inhabitants, thus this heritage was neglected. Moreover, the weakness of the municipality and the authorities concerned, the lack of expertise capabilities to manage this heritage, adds another load to the city (municipality) and thus the difficulty of its recovery.

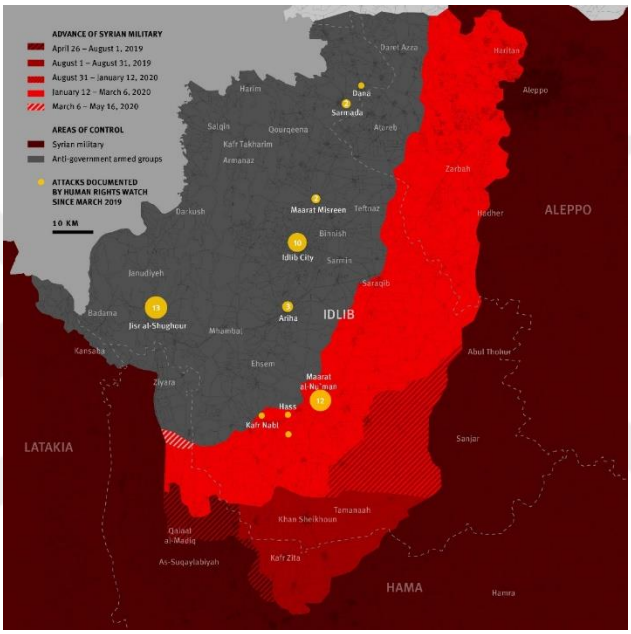


Figure 2.1 Areas of control in and around Idlib governorate (Human Rights Watch, Oct. 15, 2020)

The main objective of the research is to direct attention to the architectural heritage and its management in medium and small cities in Syria, which represents assets that are lost day after day, and the role that these assets play in the recovery of these cities during and after the conflict.

Advanced strategies that depend on modern and digital technology have been relied upon due to the fluctuations in the situation and conditions of the conflict in Syria. This can provide multiple strategies to maintain and manage these assets and find alternative solutions that are compatible with potential conflict scenarios.

The research methodology is based on the following points:

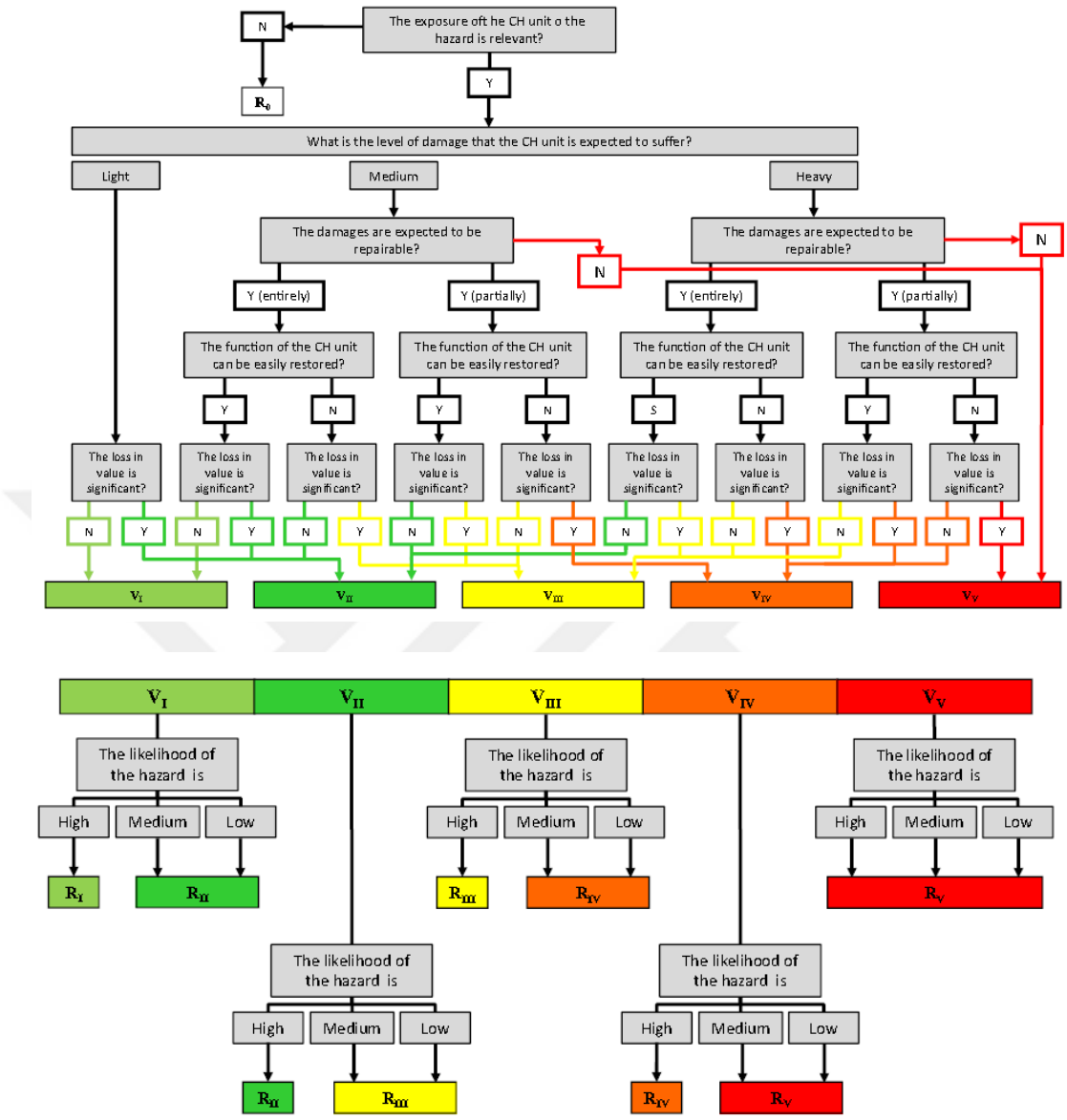


Figure 2.2 Up. Proposed risk analysis methodology: Assessment of the level of vulnerability of the cultural heritage unit. Down, Proposed risk analysis methodology: Assessment of the level of risk of the cultural heritage unit.

Starting with a literature review of the advanced management of architectural heritage using modern technological techniques, and the contexts of heritage management projects using these techniques and their applications at two levels, the first level is in Syria, where the study gap is identified, and the second level is global level to find out the best-advanced strategies used in the management of architectural heritage to

determine the strategies that correspond with the Syrian context and the to set priorities accordingly.

studying the case of Ariha city in terms of:

- Knowledge, knowing and understanding the site, mapping the architectural heritage (collecting data by field survey and observation, interviews, and Municipal records) [9].

- Analysis of the current status of the Architectural heritage in the case study and assessing the damages of the architectural heritage caused by several factors: conflict, neglect, laws and legislation, and the interventions.

- Value appraisal: Evaluate the historical, cultural, aesthetic, social, and other values of this heritage to see if we need a management plan (MP) or not (based on the evaluation criteria for social, historical, esthetical, and symbolic values) [9].

- Evaluate the risks that architectural heritage may exposed to according to the risk analysis tool, developed by (Romão X, Paupério E, Pereira N “A framework for the simplified risk analysis of cultural heritage assets”) Figure 2.2, to integrate into the suggested management strategy.

2.1 Literature Review

2.1.1 In Syria

The Researchers Kousa and Pottgiesser published their article "Post Syrian-war material recovery, reuse and transformation in the Old City of Aleppo" on the historical center of Aleppo and the current state in terms of assessing the devastation during eight years of war, proposing in the paper some strategies for the recovery of the historical center by reusing and recycling the demolition and integrating it into the reconstruction plan for buildings of high cultural value such as the Great Mosque [12].

Researcher A. Belal published his article entitled "Heritage in the challenges and solutions of the post-war period", where he discussed the protection of cultural heritage and property using the geographic information system and historical mapping, which will give a picture of the current status of this heritage and the possibility of using it in

the reconstruction process and the study was applied to the historical centre of Homs city, and the methodology of the study consisted of several stages:

1) Identification of cultural and historical sites

2) Inventory of cultural and historical property

3) Determining the degree of damage to cultural and historical sites

4) Prepare a planning list and historical and cultural destruction database [13].

Also, in 2021, he published his article "Post-war Planning for Urban Cultural Heritage Recovery" discussed the basic principles for the reconstruction phase, in which the historical properties and cultural identity of the city are preserved. And developing countries, including Syria, suffer from poor experience in restoring architectural and urban heritage in historical cities and towns, especially after conflicts and wars. Therefore, they followed a particular methodology to recover this heritage. The process is represented in four axes:

"1- Documentation 2- Assessment of damage 3- Planning 4- Regulations of the legal framework"

The author in his study, suggested to use an intervention algorithm to determine how to revive and reconstruct cultural heritage based on four factors:

"- Degree of historical and architectural significance.

- Degree of damage/Physical condition.

- Functional use.

- Property rights and regulations."[11]

After reviewing the literature published on Syrian cities during the conflict period, which is related to the management of architectural heritage, it was found that most studies were directed towards large cities such as Aleppo, Homs, and Damascus and that some of them relied on advanced tools such as geographic information systems to conduct a heritage survey, but there is a lack of the other advanced tools such as reliance on satellites, laser scanning, 3D modeling, and virtual reality, and here the research gap appears.

2.1.2 Around the World

In the article "Scan to BIM for 3D reconstruction of the papal basilica of Saint Francis in Assisi in Italy", the authors discussed the methodology and result obtained in the protection of architectural heritage. "The Papal Basilica and the Sacred Convent of Saint Francis in Assisi in Italy are "Using laser scanning technology to build more powerful and effective tools for managing this heritage, such as BIM. Moreover, this site is characterized by complex features that make the issue of the safety and security of visitors a point of interest. Therefore, Internet of Everything (IoE) technology was developed to create an integrated system for security management and site safety. The interventions required to restore the architectural heritage require certain techniques and precautions. The restoration process includes few steps:

1- The starting point of assistance in all its details

2- A comprehensive study of the developments that this heritage has undergone over time

3- Develop and manage a strategy for interventions

For the successful management of the project from the interventions in the architectural heritage, the building information model approach must be used because it has the ability to prepare digital objects that achieve the possibility of linking with higher standards, operating rules, and connectivity between the different components and the structure.

During the initial phase of assistance, surveying and management based on the BIM methodology led to the production of a single database of this architectural heritage, thus facilitating the management and monitoring of interventions and constantly updating the information [14].

We believe that using of a building information model approach and Internet of things IoT technology that enables the production of digital objects and improves the safety status of an architectural heritage site is very important, especially in war and conflict environments where the risk is very high, as in the case study.

In their article “Advanced Geomatics and Conservation Management Plan for Preserving 20th Century Architectural Heritage”, the author discussed the relationship between advanced management techniques and the conservation management plan, as well as the role and contribution of these technologies in preserving architectural heritage over the past decade (e.g., Laser Scanner, High Dynamic Range, GIS, intelligence vs. abundance, BIM, VT/IM, etc.)

And the pros and cons of each approach with the objectives of the conservation plan, are 1. knowledge, 2. value assessment, 3. data sharing and dissemination of results, 4. support for conservation and restoration activities, 5. support for the planned conservation of buildings/facility management over time.

One of the most important results of the study is that the implementation of the conservation plan using advanced techniques should be on two levels, the first: at the site level in general, and the second: at the level of the architectural object [9].

It shows us the role of each of the advanced management tools and thus determines the most appropriate tools in the case study as well as the importance of working at the level of the site as a whole and at the level of each architectural object for an integrated approach to heritage management.

In the article “The virtual reconstruction of architectural heritage and its methodological application” the research discussed the virtual reconstruction of the architectural heritage alleviates the problems that occur in the real reconstruction and restoration and gives a clearer picture of how to intervene appropriately.

The changes that happen over time in architectural heritage make the study of virtual reconstruction so complex. it needs to depend on tools (elements of architectural graphic language as a starting point for the investigation of the patrimonial architecture: The basic elements we use in the architectural language are geometry, light, color, texture, space, function, and context) to reconstruct the architectural heritage virtually, also it increases our understanding to this building and mitigates from mistakes in future reality rehabilitation.

The methodology of this article followed those stages:

1. Starting from contrasting historical data that refer to the studied architecture's formal aspects. According to a chronological, structural, and typological order.

2. Creating a digital database of graphic documents based on historical-graphic data and archaeological documents.

3. In the case of missing buildings, consider the investigations and archaeological data as formal references.

4. Research hypotheses will be formulated according to the consulted filed documentation, the digital database, and the analysis of archaeological remains if exist.

5. The digital models will be generated according to a degree of geometric abstraction that allows the formal understanding of the studied group of buildings.

6. The digital modelling will allow rethink, in a flexible way, morphological aspects which were deducted from the initial hypothesis. So, conclusions that lead to further investigations could be established.

7. Recovering history, in an updated graphic way, virtual images of non-existent assets.

8. Allowing disclosure in scientific areas.[8]

The use of virtual digital documentation is very important to ensure the preservation of the remaining fabric of the city and the possibility of its restoration in cases of destruction or various damages in war and conflict environments as a primary point, secondly, the possibility of rehabilitating the destroyed section in whole or in part, which may be a step to restore it realistically.

In the article **"**Experiencing the Inaccessible. A Framework for Virtual Interpretation and Visualization of Remote, Risky or Restricted Access Heritage Places**"** The research discussed the importance of databases and expertise in strategies for preserving architectural heritage, and that this heritage has a major role in strengthening the economies of countries. The importance of access to this heritage is of significant importance in the development of societies and the heritage itself, and this matter is not available in all cases of architectural heritage, as in the case of the Catacombs of San Vitorino, where the environmental situation is complex. This article

confirms the key role of information technology and communications with advanced management techniques in securing access to this heritage and its development, as the laser scanning technology was relied upon and then the point cloud was processed by several programs.[7]

Actually, the use of laser scanning technology may be useful in the long term to discover the caves located under the ancient city, which may be a city that was buried in previous eras, according to the testimonies of some local residents and specialists.

2.2 The Case Study

2.2.1 Ariha City

The city of Ariha located in northwestern Syria in a strategic place that connects the interior to the coast, in addition to the presence of Jabal Al-Arbaeen, which completely overlooks the Idlib governorate and on the main roads M4 and M5 which also gave it a tourist importance.

It is 73 km away from Aleppo, 13 km from Idlib, 114 km from Lattakia, 25 km from Maarat al-Numan, and 329 km from Damascus. Its population in 1986 was about 28 thousand people, and in 2004 its population reached about 40 thousand people, according to the Central Bureau of Statistics. It extends over an area of 1.5 km^2, while the remaining historical fabric of the old city extends over an area of 0.3 km^2 and is located on the southeast side of the city. Moreover, it contains Al-Arbaeen mountain which adds tourism value to the city.

The city of Ariha is an old city, as its history dates back to the first millennium BC, according to some archaeological findings [15]. There is an archaeological mound that has not been officially excavated yet. One of the most important archaeological findings is a silver tray inscribed with the Last Supper of Christ; peace be upon him. There also archaeological findings include a group of pottery and glass dating back to the pre-Roman era.

The old city contains a mixture of buildings dating back to different eras, some of which date back to before the Islamic conquest in 637 AD and others were renovated

during the Ottoman era. A large part of its historical fabric was completely removed due to the organizational scheme in 1980, including khans, specialized roofed markets, Caesareas, and others. Shown in figure 2.3.



Figure 2.3 Ariha map and the old city.

2.2.2 The Architectural Heritage

2.2.2.1 Mosques

Great Mosque, its construction dates back to before the Roman period when it was used as a temple, then a church, and then a mosque after the Islamic conquest. Some inscriptions that were distorted still lie on its walls indicating that it was a building that preceded the Islamic conquests. But the mosque in its current form dates back to the Ayyubid period and was renovated in the Mamluk and then Ottoman eras [15], and it was newly restored in 2008. The addition of a block covering half the area of the courtyard from the northern side of the mosque affected the historical value, furthermore light damage to the northern facade due to indirect bombing (Figure (2.4),

Al-Shebani Mosque, its construction dates back to the Mamluk period. Some of the interventions that affected the historical value of the building, such as the plaster works (Figure (2.5). Table (2.1),2).

Al-Takia Mosque, its construction dates back to the Ottoman period. It was removed completely, and the municipal replaced it with a new Mosque (Figure (2.5). Table (2.1),3).



Figure 2.4 Architectural Heritage in Ariha city (current state).

2.2.2.1 Ancient Baths

There are now two historical baths in the city, containing the elements of the Islamic bath, the first is called (The Small Bath) and it is still functional (Figure (2.5). Table (2.1),4), and the second is called (The Wastani Bath) and it is severely damaged due to neglect (Figure (2.4), h. (2.5). Table (2.1),5). The largest hammam (bath) in the city,

called (the Great Hammam or Al-Fawqani Hammam), was completely removed due to the new organizational scheme in 1980 (Figure (2.5). Table (2.1),6).

2.2.2.3 Zawiya (Small Mosque)

They are small mosques distributed within the alleys. They consist of a prayer hall, a small courtyard, and an Iwan, in addition to a group of rooms intended for residence for worshipers and Sufis, often with a water fountain, a well, trees, and plants in the middle. Including Al-Bayania, which is the widest, Sheikh Dweik and Sheikh Muhammad, and others. Some of them still functioning and others neglected (Figure (2.5). Table (2.1),7,8,9).

2.2.2.4 Sibat

It is the structure that covers areas above the streets of the old city in several structural ways, including the bed vault or the two intersecting vaults, and on top of it are rooms prepared for housing that open with windows on both sides (Figure (2.4).c, g). And now there are remaining 11 Sibats spread in the streets and alleys of the old city.

2.2.2.5 Squares

There are three historical squares in the city, the first is called (Al-Armoutia) which still exists now, and it is bordered by Sibats. And the city's residents still use it to hold popular events and meetings (Figure (2.4), c. (2.5). Table (2.1),10). The second one is called (the tanning square) a large square surrounded by a group of shops specializing in tanning leather. After implementing the organizational plan and opening a road at the edge of the square, most of the shops opened a gate on the road, which led to its neglect and the destruction of a large part of its landmarks (Figure (2.5). Table (2.1),11). The third is called (Old Market Square), which was breached by the organizational chart, and a corner remained of which the old shops still surround it now (Figure (2.5). Table (2.1),12).

2.2.2.6 Khans (Caravancerais)

There are three of them, consisting of a wide yard surrounded by shops, topped by accommodation rooms, used for merchandise and trade. They were completely removed according to the organizational plan in 1980, and they are: Khan Al-Suq is the largest, with an area of 1,800 square meters, followed by Khan al-Qaysaria with an area of 800 square meters, and then Khan al-Bazaar (Figure (2.5). Table (2.1),13,14,15).

2.2.2.7 The Old Market

It consists of roofed specialized markets with a length of about 100 m that were completely removed by the organizational plan in 1980 AD. Also, an unroofed market consisting of a group of shops dedicated to trading distributed on both sides of the alleys in the east of the old city near the Great Mosque. It was severely damaged as a result of the bombing, some of which continue to work (Figure (2.4), a, b. (2.5). Table (2.1),16,17).

2.2.2.8 Caesarea (Industrial Facility)

It is a specialized facility in the industry, it consists of a square surrounded by industrial stores, such as the manufacture of soap, leather, flour, grape molasses, and others. There are several Caesareas in the old city, some of which are under construction and have light damage, and others are neglected. A number of them were removed during the urban expansion in 1980.

The most important Caesareas are, the first is Bit Abd Al-Kareem's Caesarea which is heavily damaged by the bombing. The second is Al-Harsone's Caesaria which is affected slightly by interventions of the local community (Figure (2.5). Table (2.1),20,21).

2.2.2.9 Traditional Residential Homes

It forms the most of city's fabric, and the traditional house in general consists of an inner courtyard surrounded by residential rooms on two floors, a place for making

bread, and a cellar, in addition to a groundwater tank. It was previously fed from the springs located in Jabal Al-Arbaeen by Roman channels (Figure (2.4), e).

Some of the houses have a large area and a spacious courtyard that contains a water fountain, various plants, and an Iwan (Figure (2.4), f. (2.5). Table (2.1),19).

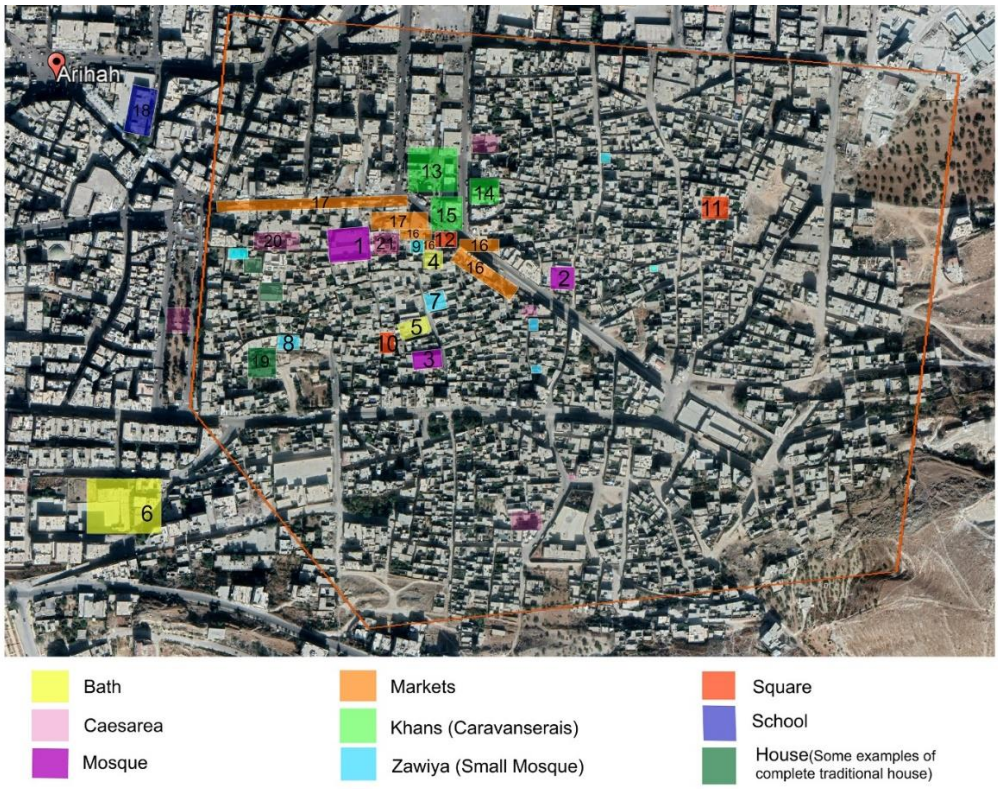


Figure 2.5 Distribution of architectural Heritage in Ariha city (the numbers correspond with table 2.1).

2.2.3 Assessement of Damage and Value

-Assessment of architectural Heritage (the assets) in three categories (working - not working - removed)

-Damage is assessed according to 4 levels (Slight – Medium-Heavy - Completely)

1. Light damage corresponds to the case where the cultural heritage unit only exhibits nonstructural damage (i.e., damage that will not affect the resisting system and the overall stability of the cultural heritage unit).[16]

2. Medium damage corresponds to the case where the cultural heritage unit exhibits more severe nonstructural damage and also suffers moderate structural damage (i.e., damage that will affect the resisting system of the cultural heritage unit without compromising its overall stability).[16]

3. Heavy damage corresponds to the case where the cultural heritage unit exhibits severe structural damage that can make it unstable (i.e., the overall stability of the cultural heritage unit is compromised) or that can cause the partial or total collapse of the cultural heritage unit.[16]

4. Completely corresponds with the nonexistent of the building or destroyed 100% due to bombing or removal.

-The cause of this damage according to 4 factors (negligence - conflict - law - intervention)

-The value represents the local community's point of view about the architectural heritage assets.

Table 2.1 Assessment of Architectural heritage units (the current situation, Damage level, the reason, and value) developed by the Author. (W: work - N-W: not work - R: removed - S: slight - M: medium - H: high - C: completely - con: conflect - neg: neglect - leg: legislation - inter: intervention)

Assessment of Architectural Heritage Damage and Value														
N	Architectural Heritage	Name	The current situation			Damage				The factor				The value
			W	N-W	R	S	M	H	C	con	neg	leg	Inter	
1	Mosques	Great (Al-Kabeer)	●			●				●			●	historical, architectural, and religious
2		AL-Shebani	●			●							●	historical and religious
3		AL-Takia			●	●						●		memorial and religious

Table 2.1(continued) Assessment of Architectural heritage units (the current situation, Damage level, the reason, and value) developed by the Author. (W: work - N-W: not work - R: removed - S: slight - M: medium - H: high - C: completely - con: conflect - neg: neglect - leg: legislation - inter: intervention)

4	Ancient baths	The Small	●			●					●			social and historical
5		The Wastani		●			●				●		●	social and historical
6		Al-Fawqani			●				●			●		memorial value
7	Zawiyas	Al-Bayania	●			●					●			historical and religious
8		Sheikh Dweik	●			●					●			historical and religious
9		Sheikh Muhammad	●			●					●			historical and religious
10	squares	Al-Armoutia	●			●					●			social and historical
11		the tanning courtyard		●				●			●			industrial and historical
12		Old Market Square	●				●					●		social and historical
13	Khans	Khan al-Souq			●				●			●		memorial value
14		Khan al-Qaysaria			●				●			●		memorial value
15		Khan al-Bazaar			●				●			●		memorial value
16	The old market	roofed specialized markets			●				●			●		memorial value
17		unroofed market	●					●		●				socio economic and historical
18	School				●				●			●		socio cultural and historical

Table 2.1(continued) Assessment of Architectural heritage units (the current situation, Damage level, the reason, and value) developed by the Author. (W: work - N-W: not work - R: removed - S: slight - M: medium - H: high - C: completely - con: conflect - neg: neglect - leg: legislation - inter: intervention)

19	House	Kadah	•				•			•				Social, architectural And historical
20	Caesarea	Bit Abd Al-Kareem		•				•		•				economic and historical
21		Al-Harsone	•			•							•	economic and historical

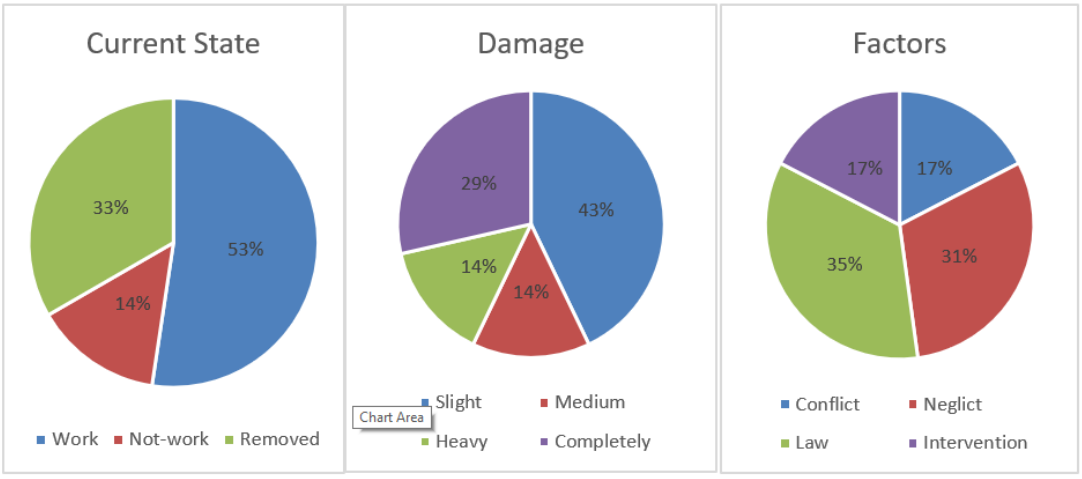


Figure 2.6 Current state, Damage, Factors (Analysis), developed by the Author.

These percentages show the current status of the architectural heritage in the city of Ariha, as well as the percentage of damages for each level and the percentage of the impact of each factor on the state of the architectural heritage. It constitutes a basic information base for building any decisions regarding the process of managing this heritage during the conflict period or after its end, on which the architectural heritage management strategy was built for the case study. The value analysis shows the importance of this architectural heritage to the local community and its role in defining the identity and culture of the community.

2.2.4 Framework for Conflect Risk Analysis on Architectural Heritage Units

The auther applied the framework of risk analysis to the architectural heritage units to find out the level of vulnerability first, and then the level of risk second.

Due to the risk of bombing and the proximity of the city to the borders of the conflict and the high probability of launching attacks using warplanes. By evaluating the areas that were directly bombed in the city, which included a significant percentage of housing units (traditional houses), the damage was large, and the ability to repair is not possible due to the impact of the military weapon on building materials and the original structure, and therefore the level of vulnerability is the fifth Vv, figure (2.2).

Since the level of vulnerability is the fifth, regardless of the possibility of the occurrence of danger, the level of danger is the fifth Rv, figure (2.2).

The Rv level, therefore, corresponds to a situation where the level of risk is unacceptable and needs to be addressed as soon as possible. A more detailed analysis of the cultural heritage unit is urgently needed to identify risk mitigation measures.

2.2.5 The Strategy

The proposed strategy to deal with the heritage of Ariha city is divided into two parts:

Short term: Documentation of Architectural heritage by Digital Advanced tools and establishing a cloud database for the old city to preserve the records from the loss in the state of emergency conflict scenario. This documentation will be on two levels:

- city level, take action to mitigate risks, (using GIS tool for collecting all information about the historical city, which doesn’t need to show 3D modeling, design an interactive map, create a building card for architectural heritage)

- building level, (create a 3D modelling for the significant historical building based on available tools like Laser scanning to be used in conservation work in the future if the conflict risks happened)

Long term: Implementation of a conservation plan for the architectural heritage that includes:

- Reconstructing the lost architectural heritage in virtual reality and consider the investigations and archaeological data as a formal reference.[8].

- Work on building capacity of a dedicated team in the use of advanced technologies through training courses by specialists.

- Raising awareness of the importance of architectural heritage as a component of these cities to the community and local administrations through seminars and workshops to integrate stakeholders into the protection plan.

- Reconstruction of the damaged architectural heritage by default to be the basis for the real reconstruction after the end of the conflict.

2.3. DISCUSSION

Architectural heritage management strategies based on advanced digital tools are considered necessary to document this heritage and preserve it digitally due to the seriousness of conflicts over architectural heritage, especially in small and medium cities where there was no documentation of this heritage previously. The research showed the importance of small and medium cities in terms of containing the same components of architectural heritage in large cities.

This study adds to a growing body of research that attempts to raise the level of knowledge about advanced heritage management tools and opens the way for new studies at the level of a large geographical region internationally and locally, that contributes to protecting heritage and civilizations that previously existed and were marginalized.

CHAPTER 3

USING VERNACULAR ARCHITECTURE PRACTICES AS A STRATEGY FOR SUSTAINABLE RURAL CONTEMPORARY ARCHITECTURE IN NORTH - WEST SYRIA

Vernacular architecture is the product of a process of centuries of trial/error and learning using available local building materials and is thus a cumulative knowledge based on experience[17]. Also, on one hand, it is a product of evolutionary adaptations between man and the natural environment. These adaptations resulted in unique building solutions. vernacular architecture is a reservoir of technical, social, and cultural knowledge of the society that produced it and passed it on from one generation to another [18]. On the other hand, technology beating tradition is a reality nowadays [19].

Many believe that the concept of sustainability is new to use at the architectural and environmental level today, but this is not absolutely true due to the adoption of many sustainable design principles in vernacular architecture. When looking for a sustainable environment, it is best to refer to vernacular architecture, which seems to have many of these features up to the present day[20]. The vernacular architecture was shaped by a conceptual framework add resource, which developed an understanding of perceived responses to environmental, urban, and cultural conditions. Thus, sustainable architecture is the most authentic expression in a specific environment and conditions. For this reason, vernacular architecture has many lessons we should learn to create a sustainable architectural environment[20] .Vernacular architecture holds more value than its cultural value. It represents the development of a community's identity and a measure of global changes[21].

Syria extends over multiple geographical regions and diverse natural resources, so the rural environments and forms of living in Syria differ widely. For example, Syria has agricultural lands in the north and west, plain lands in the central regions suitable for

grazing and agricultural activities, and deserts in the south and east of the country. On the other hand, the diversity of Syria's geology led to the diversity of building materials (limestone, sand, basalt stones, and earth), and this in turn was one of the most important factors in the diversity of architectural styles in the Syrian countryside and provided a fertile environment for exchanging knowledge and experiences within the country. Moreover, Syrian rural society has a workforce and a cohesive social structure represented by the family [22].

The decline in population growth rates in the Syrian countryside and migration to cities led to an increase in the urban population to more than half of the total population of Syria, at the expense of the share of the Syrian rural population, which led to the neglect of this vast geography. In addition to the previous suffering of the Syrian countryside from the lack of development plans to confront the problems that escalated due to urbanization rates resulting from natural growth and internal migration [22], and finally the Syrian war in 2011, which exacerbated the crisis in rural areas and caused massive demographic changes over the entire area of the country and the movement of the population in their search for Safe areas to live, especially in northwest Syria (the Syrian revolution areas) after the forced displacement that occurred from all Syrian governorates and the huge wave of displacement that occurred in late 2019 and the beginning of 2020, which reduced the geographical area of northwest Syria and put pressure on all residential settlements, including rural areas[23].

In general, the research aims to drew attention to the importance of rural areas in Syria as a geographical space capable of accommodating population growth and as a source for mitigating the phenomenon of global warming due to the sustainable strategies carried by rural vernacular architecture, and identifying the problems that it suffers from.

In particular, highlighting the vernacular rural architecture in northwestern Syria, which has been exposed to successive crises - the Syrian war since 2011 and the earthquake of February 6, 2023 - as alternative areas for housing, and an important resource for sustainability in contemporary rural areas in which the rural vernacular

architecture has begun to fade and lose its cultural, environmental, social and economic identity as a result of globalization impact.

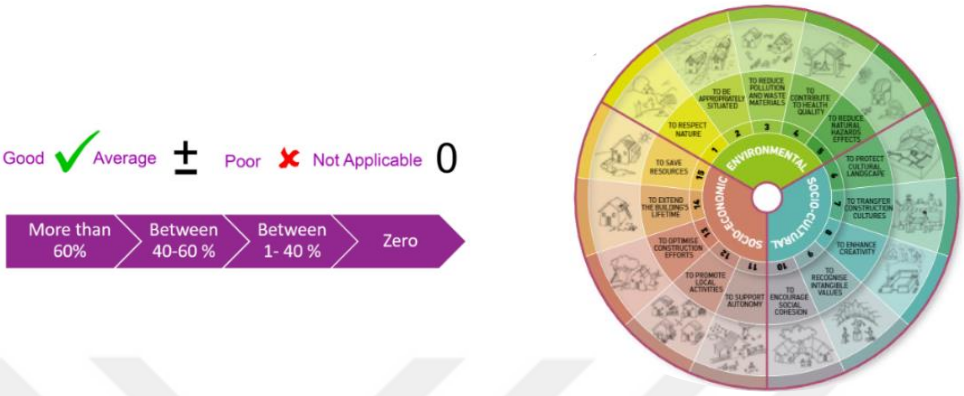


Figure 3.1 (a) The Assessment and Evaluation Method (developed by author), (b) VerSus Framework [24]

The materials and methods are as follow:

- literature Review regarding the research topic in the world and in Syria to benefit from the most important experiences and positives and avoid negatives.

- Analysis of a case study from the northwestern region of Syria, using the sustainability framework developed in (VerSus) for the Vernacular Architecture Project, which consists of three pillars. Each pillar is divided into five principles, and under each principle there are several practices, Figure ((3.1),b).

- The practices applied in the case study will be compared with the practices identified in each principle, and will be evaluated by the value of one of the four categories, figure ((3.1), a).

- Finally, the principles most applied in the case study will be identified, in order to study the possibility of their application in contemporary rural architecture.

3.1 Literature Review

3.1.1 Rural Vernacular Architecture in Syria

In the article "Rural Habitation in Syria: The Culture of Traditional Architecture and its Role in The Reconstruction Process", the research explained that the reconstruction phase gives, as indicated by most references and studies, priority to human development. And that the study of traditional architecture indicates that reconstruction plans must be based on human experience and living conditions by learning from the cultural and social heritage, represented by vernacular architecture, and preserving this identity as part of development. Ensuring the continuity of urban development as one of the most important aspects of development that can be achieved through the use of natural and local materials and focusing on the organic aspect of urban growth. Also, they discussed the importance of the family in the Syrian countryside as a social institution that constitutes an important aspect of rural urbanization, in addition to the diversity of building materials, which are represented in vernacular building patterns, which provide an alternative to imported patterns. Additionally, the architectural forms of rural housing and settlement patterns in villages depend on geographical features and changes in the concept of ownership and the relationship between the place of work and the place of residence. In this particular context, traditional architecture, exemplified by the use of local materials and knowledge of the space industry, provides an opportunity for a self-developing process of reconstruction [22].

In the article "Earth Architecture in Syria between Past Heritage and Contemporary Experiences", the research discussed that traditional architecture has been neglected in Syrian cities and even in rural buildings for several factors. During the research, he stressed the importance of land as a source of building materials, which reflects the culture of integration with the environment according to economic, social and environmental other aspects. The research recommended relying on soil-based construction in rural architecture in Syria, according to traditional techniques and experiences [25].

3.1.2 Rural Vernacular Architecture in The World

In the article "Assessment of Vernacular Impact and World Heritage: A Case Study of Patmos", the research discussed that interest in the value of vernacular heritage appeared in conjunction with the Venice Charter and the expansion of the concept of a monument from individual architectural work to the urban and rural environment in which reside and refer to a specific civilization, major development, or important historical event. They explained that the vernacular heritage lacks a plan to ensure its protection (the researcher used the methodology of a case study and relied on the (Heritage Impact Analysis) tool that was used to assess the site's interventions in the world heritage sites and that can facilitate the selection and implementation of mitigation and management strategies for vernacular architecture) He pointed out that vernacular architecture is the most vulnerable to risks, including natural disasters, climate change and human causes, and that the most important factors of vulnerability that increase risks are: loss of tacit knowledge, lack of scientific and technological knowledge. Improper maintenance and management. Inadequate or temporary buffering of the ecosystem that may cause risks and may eventually turn into disasters [18].

In the article " Traditional earthquake resistant techniques for vernacular architecture and local seismic cultures: A literature review" The research pointed out the large number of papers have been published recently regarding both sustainability and sustainable architecture, but a real discussion is missing about vernacular architecture and local seismic cultures. This is because examples of vernacular architecture have diverse environmental lessons that have huge potential for application in architecture today. On many occasions, contemporary architecture is believed to be moving towards sustainability, which means that the new paradigm is believed to have set a new path for architecture that has lost its way, marked by the stigma of creativity as opposed to nature. However, the history of architecture tells us that architecture has been sustainable since its birth and that since its inception, it has fulfilled many needs that are no longer met today, due to other priorities of the global world, as a result, we turn to technology in an effort to provide a balance. On the other hand, the most

important traditional earthquake-resistant techniques were concluded according to several criteria, including terms of preventing damage and applicability in the future, and we can identify the most important traditional techniques that we can use during the rehabilitation of existing buildings for vernacular architecture and the traditional techniques that we can use during new construction (contemporary rural architecture) and partial reconstruction [26]

3.1.2.1 VERSUS Framework

VerSus is a European project developed under the Culture Program 2007-2013, funded by the European Commission from 2012 to 2014. Its main objective is to gain knowledge of the basic principles of sustainability learned from vernacular heritage, and to explore new ways of applying these principles in modern sustainable architecture [24]. By establishing basic principles, which define a large number of strategies that must be considered and integrated into sustainable contemporary architecture[24]. Figure (3.1, b). shows the three main pillars of sustainability, with the principles as stated in Versus project.

Table 3.1 explains the framework of the Versus project, which are the basic pillars of sustainability in vernacular architecture, the principles it contains for their application, and the practices each principle contains, which will be used in analyzing the case study.

Table 3.1 Pillars and practice of Vernacular architecture Sustainability According VERSUS project[24]

VERSUS Project		
Pillars of sustainability	Principles	Practices

Table 3.1(continued) Pillars and practice of Vernacular architecture Sustainability According VERSUS project[24]

Environmental Sustainability	***1.*** **To respect nature**	• Assuring an appropriate choice of site • Minimizing the impact of interventions • Ensuring conditions for site's regeneration • Integrating with the environmental morphology • Understanding the features of the site
	2. **To benefit from natural and climate resources**	• Choosing appropriate building orientation • Considering the hydrography of the place and managing the water resources • Location buildings to take advantage of the natural landform • Incorporating solar energy into the overall design • Taking advantage of soil thermal inertia
	3. **To reduce pollution and waste materials**	• Consuming local available materials • Using recyclable and recycled materials • Reducing loss of thermal energy • Using available energy resources • Planning maintenance and extending the durability of the buildings
	4. **To contribute to health quality**	• Enhancing indoor temperature and humidity levels within acceptable values • Ensuring adequate natural ventilation • Guaranteeing adequate natural lighting and sun radiation • Improving natural and passive heating • Avoiding toxic materials

Table 3.1(continued) Pillars and practice of Vernacular architecture Sustainability According VERSUS project[24]

	5. **To reduce natural hazards effects**	• Providing practical guidance to anticipate and mitigate risks • Developing strong and flexible construction systems • Considering the specific characteristics of local risks • Integrating technical and behavioral measures for reducing vulnerability • Incorporating strategies for post disaster recovery
Socio-cultural Sustainability	***6.*** **To protect the cultural landscape**	• Understanding the value of the place and its dynamics • Enhancing techniques of land use that guarantee and sustain biological diversity • Articulating spatial organization with productive needs • Optimising soil features and microclimates through sustainable crop planting and land management • Regulating productive activities by environmental features, as well as by seasonal and economic cycles
	7. **To transfer construction culture**	• Allowing practical constructive experiences to facilitate empirical know-how • Recognizing the value of mastery and constructive memory • Involving younger generations in constructive processes • Acknowledging the value of roles in traditional activities and knowledge • Facilitating the participation of local communities in decision-making processes

Table 3.1(continued) Pillars and practice of Vernacular architecture Sustainability According VERSUS project[24]

	8. **To enhance innovative and creative solutions**	• Developing collective intelligence • Encouraging diversity in building system solutions • Integrating influences from other building cultures • Allowing in experimentation in building techniques and processes • Evolving building techniques from experience, through processes of trial and error
	9. **To recognize intangible value**	• Transmitting cultural values and history • Incorporating social rituals • Building community character and sense of place • Recognising local symbolical expressions • Enhancing of building and productive processes as cultural values
	10. **To encourage social cohesion**	• Promoting intergenerational relations • Ascribing value to the development of collective welfare • Enhancing community engagement and participation • Encouraging places for community meetings • Building common infrastructures and market places
Economic-cultural Sustainability	***11.*** **To support autonomy**	• Sharing resources • Using local and accessible materials and resources • Promoting indigenous workmanship • Encouraging local production • Enhancing community empowerment

Table 3.1(continued) Pillars and practice of Vernacular architecture Sustainability According VERSUS project[24]

	12. **To promote local activities**	• Reinforcing urban farming and local production of food • Enhancing short circuits and local trades • Promoting collective use of spaces • Including spaces for productive activities at urban and architectural scale • Developing handicraft products made with local materials
	13. **To optimize construction efforts**	• Optimizing the use of materials • Assuring appropriate scale of the building • Enhancing technical simplicity in building processes • Reducing transportation efforts • Encouraging the use of low-transformed materials
	14. **To extend the building's lifetime**	• Predicting regular substitution of building components • Preventing erosion of building elements • Planning maintenance of the building • Designing flexible buildings for possible changes and extensions • Building strong and durable structures
	15. **To save resources**	• Using recyclable materials • Promoting building densification and compactness • Assuring supply of renewable energy • Developing construction systems adequate to local conditions • Enhancing natural ventilation, heating and lighting systems

3.2 The Case Study presentation and analysis

3.2.1 Location of Study

Jabal Al-Zawiya is the name of a mountain range located in Idlib in Syria, located in the northern part of the mountains of the limestone mass in northwest Syria. The study area is located in northwest Syria and is bordered to the west by the Al-Ghab and Al-Ruj plains, and in its approximately southwestern part lies the city of Apamea, and to the east is the Aleppo-Damascus Road, and its most important points are the Maarat al-Numan Citadel and the plains of Qinnasrin and Hama, and to the north is the plains of Maarat Misrin, and to the south. Shaizar Castle. Jabal Al-Zawiya located between longitudes 25 36° and 35 36° and latitudes 40 35° and 50 35° (Basic Science Series, 2022), figure ((3.2), a).

The highest peaks in the region are Kafr Aweid Peak (1200 m), Prophet Ayoub Peak (939 m), and Arbaeen Mountain (877 m), and the latter is considered one of the most important areas for recreation and tourism for the people of northwestern Syria.

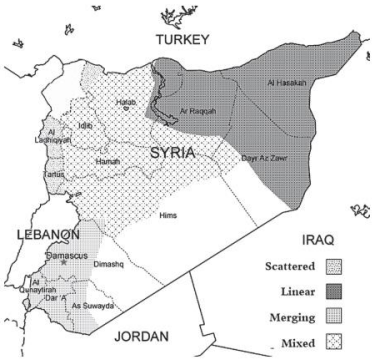
3.2.2 The Context of Villages in Study Location

The elements influencing the creation of human settlements in Syria are those agreed upon by the rural geography literature, and they fall into three broad categories: natural causes, human factors, and social factors. These elements influence the circumstances for the establishment of a village, and so, with the exception of settlements designed in advance, there are three major types of villages (Merging form: Compact form, separate from fields and farmland - Scattered form: Trace a river or road - Linear form: Houses are spread across the land without a regular pattern, highlighting the interdependence between housing and farmland, figure ((3.2), b) [22].

The study area is a combination of the three types, according to the size of the village (farm - village - town) and the topographical location (steep slope - slight slope), figure ((3.2), c).



a. Location of Jabal Al- Zawiya (Wikipedia., 2011), the red border of location study based on the *World Atlas*, developed by the author (Mohamed., 2010)



b. (Models and distribution of villages in Syria)[22]



c. (Location Study, Villages, Google Earth)



d. (Kafr Haya Village, Google Earth)



e. (Nahleh Village, Google Earth)



f. (Kafr Lata Village, Google Earth)

Figure.3.2 (case study location and villages)

3.2.2.1 Kafr Haya Village

It is a Syrian village located in Ihsim region in Ariha District, Idlib governorate. According to the Syria Central Bureau of Statistics, Kafr Haya had a population of 916 in the 2004 census. It belongs to scattered villages types, figure ((3.2),d).

3.2.2.2. Nahleh Village

It is a Syrian village located in Ariha region in Ariha District, Idlib. According to the Syria Central Bureau of Statistics, Nahleh had a population of 1189 in the 2004 census. It belongs to merging villages types, figure ((3.2), e).

3.2.2.3 Kafr Lata Village

Kafr Lata is a village in the Ariha region in Ariha district in Idlib Governorate in Syria. It is located in Jabal Al-Arbaeen and contains an ancient mosque that is five centuries old. Its population reached 4,231 according to the Census Office in 2004. It belongs to linear villages types, figure ((3.2), f).

3.2.3 Anlysis of Vernacular According To VERSUS

3.2.3.1 Environmental Principles

3.2.3.1.1 To Respect Nature

Integration: In building materials, the population relied on the available natural resources, which are the limestone and the dirt that the Jabal Al-Zawiya region is rich in, and thus the houses appeared as if they were an extension of the nature of the region, figure ((3.3), a)

Understanding the place, Harmony, and Minimal intervention: The dwellings were spread parallel to the slope lines and followed the best orientation for the dwelling in the area, which is towards the south, figure ((3.3),a, b, c)

Unchanged morphology and Geology: Most of the dwellings were located near caves of buildings and previous civilizations and carved within the rock and were used for housing and animal husbandry and other purposes, figure ((3.3),c).

Minimal Impact: Align with the slope.

Principle status: Good

3.2.3.1.2 To Benefit from Natural and Climate Resources

Orientation: The dwellings were directed towards the south, which is the preferred side to benefit from the winter sun, where there is a yard or a front yard used for sitting on sunny winter days, where the entrance and one or more windows on the southern facade. Making the eastern and western facades closed to protect them from the summer sun, and openings on the northern side, where the winds are desirable in summer, figure ((3.3), d).

Topography: The hierarchy of the dwellings according to the contour lines and the long side of most of the dwellings was parallel to the south side to benefit from the winter sun and protection from the summer sun.

Adaptation to climate: The flat surface was used for the purpose of collecting rainwater, either in existing reservoirs from previous civilizations, or new reservoirs were dug due to the lack of surface water resources, figure ((3.3), e).

Soil thermal inertia: The use of protected basements in some dwellings and caves in other dwellings, figure ((3.3), f).

Principle status: Average

3.2.3.1.3 To Reduce Pollution and Waste Materials

Local material: Using the materials of stones and soil available on the site and the surrounding area.

Recycling: Sustainable materials that can be reused

slightly transformed materials: The process of producing and assembling these materials does not result in any negative effects that harm the environment.

Less machinery used: The process of forming building materials is completely manual and no machine that has negative emissions on the environment is not relied upon.

Reduction of transport: Building materials are produced from the same site and therefore do not need to be transported by machines, figure ((3.3), c, f, g, h).

Principle status: Good

3.2.3.1.4 To Contribute to Health Quality

Thermal insulation: The construction materials themselves are heat-insulating, in addition to making the walls and the outer ceiling of such a high thickness that it consists of three layers: an outer and inner stone layer between them is a layer of soil. A second treatment is to reduce the external openings and direct them to the south and north, figure ((3.3), b, c, d, g).

Natural ventilation: The desired wind in summer blows from the northwest, so windows have been set up on the northern facade, facing the window and the door on the southern facade, thus forming an air stream that secures comfortable ventilation inside. One of the treatments to ensure natural ventilation in the winter season is to create an opening at the top of the south facade wall in order to let the air loaded with carbon dioxide gas escape and allow the internal air exchange process, figure ((3.3),b, d, j).

Natural lighting: Placing the openings in the southern and northern facades provides unobtrusive natural lighting to suit the movement of the sun and its tendencies in summer and winter. So that it prevents the harmful glare from the vision, which usually comes from the east or west side, figure ((3.3), d, e, i, j).

Natural shading: Establishing a pergola in the front space that advances the south facade to provide shade in the summer so that the residents can use the front space of the house comfortably in the summer, figure ((3.3), d, j).

Principle status: Good

3.2.3.1.5 To Reduce Natural Hazards Effects

Jabal Al-Zawiya is located to the east of the Dead Sea Fault, so earthquakes pose the greatest danger to the built environment in this location, figure ((3.3), k). No measures have been taken to mitigate the seismic risks to the vernacular architecture in this area.

The construction was made using two stone walls with an insulating material between them, which is the red soil found in the area, with the aim of providing sufficient resistance to the loads to prevent horizontal pushing, and the other to provide thermal insulation. According to the field survey, the thickness of the walls was not intended to resist earthquakes because it was not at the expense of the local community.

Principle status: Not applicable

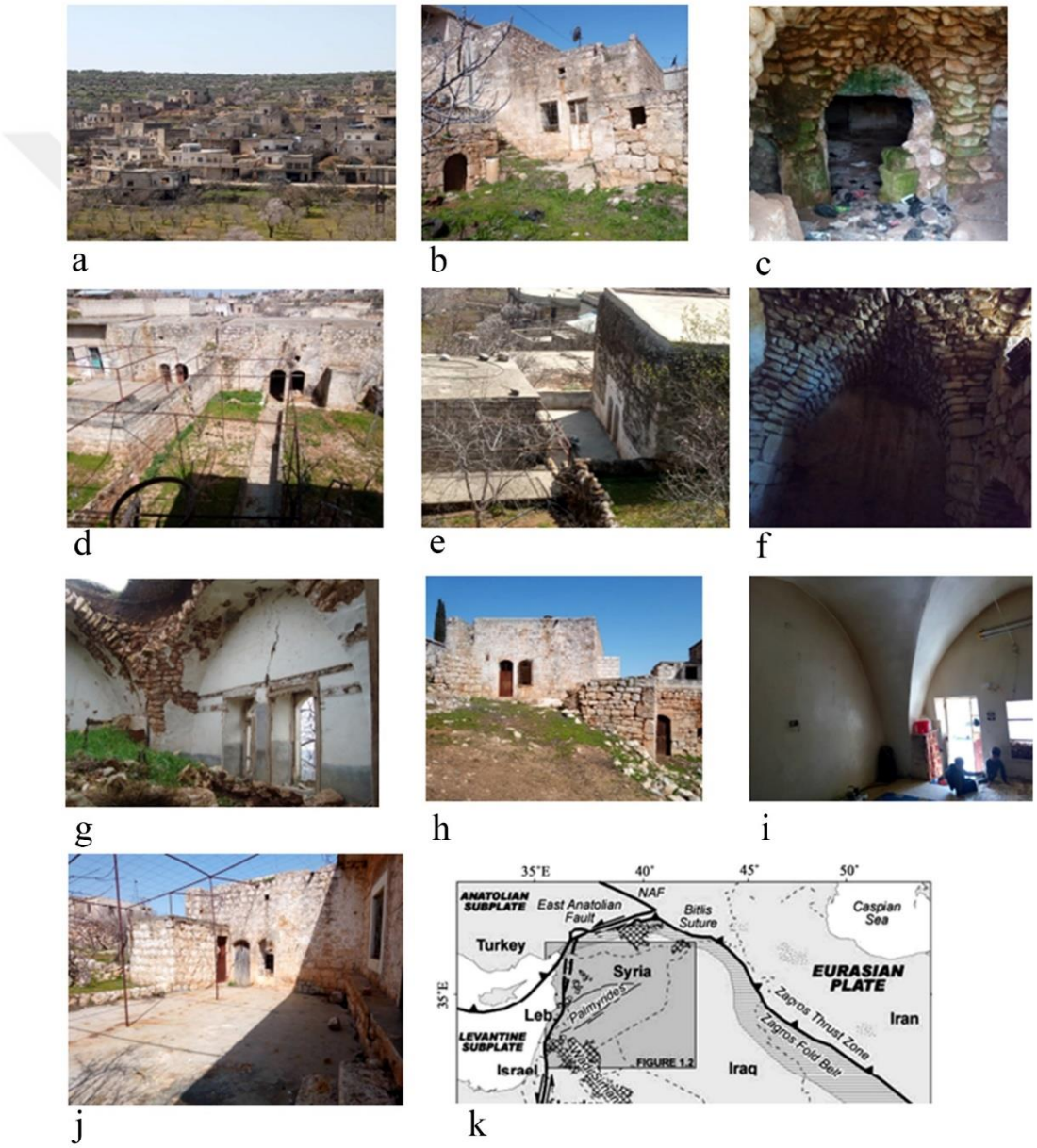


Figure 3.3 All photos without (k) explain the practices of environmental principles in the case study by the author, (k) The main tectonic trends of Syria, after Cornell University, USA 2001 [27]

3.2.3.2 Socio-Cultural Principles

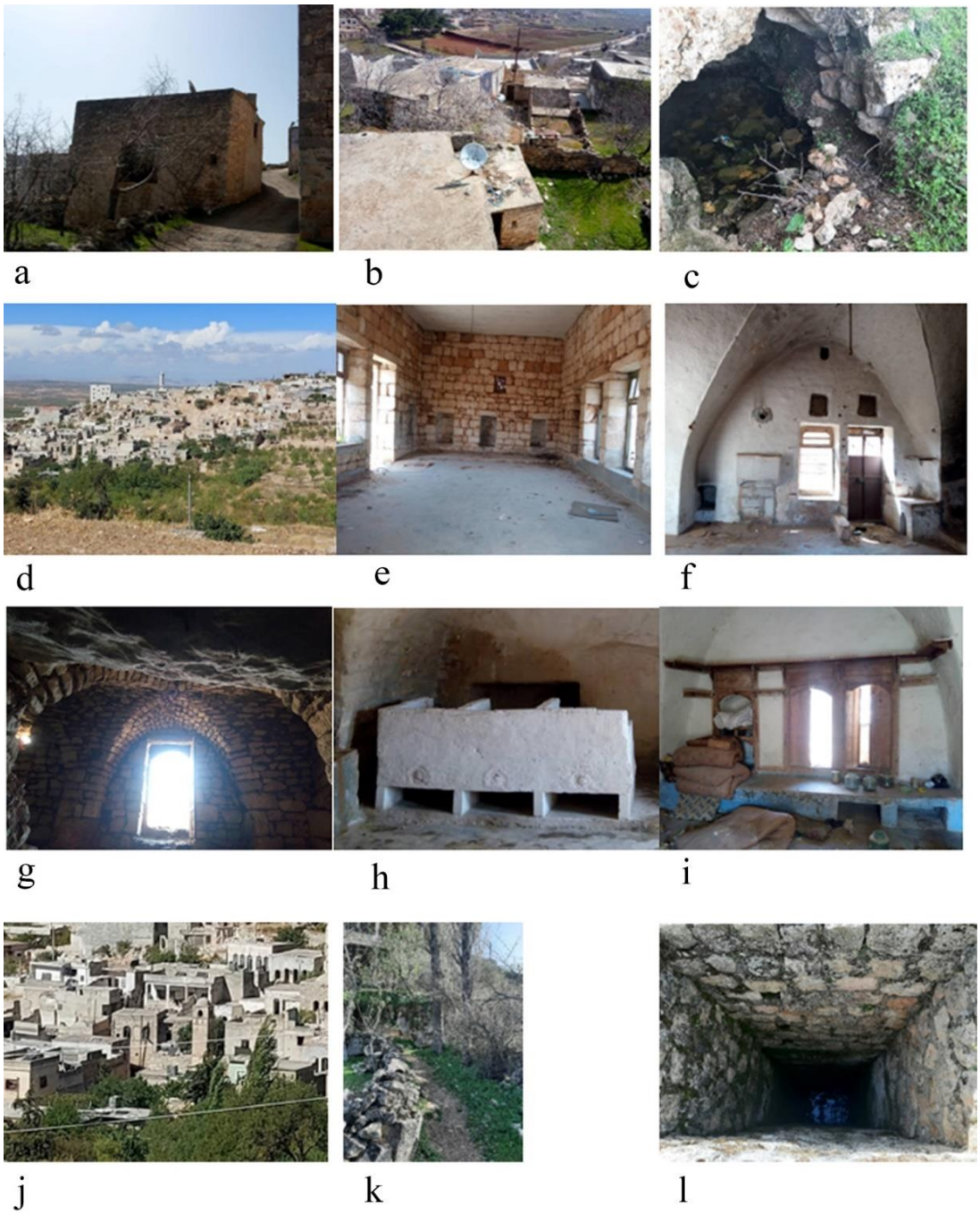


Figure. 3.4 All photos explain the practices of Socio-cultural principles in the case study by the author.

3.2.3.2.1 To Protect the Cultural Landscape

Terraced cultivation: tendencies were dealt with by the creation of so-called terraces and were used to grow seasonal vegetables, figure ((3.4), a).

Cultivated valleys: The valley plains were exploited for seasonal crops such as wheat and barley, figure ((3.4), b).

Protection channels: Establishing some channels to water crops in the summer, which depends on collecting them from surface water. The slanted nature of the earth has been taken advantage of for the water flow process, figure ((3.4), c).

Principle status: Average

3.2.3.2.2 To Transfer Construction Culture

Identity: It reflects the culture and identity of the community that extends from the surrounding environment. Adaptation to Local resources: building materials, collecting rainwater.

Evolution: Dealing with new materials and technologies according to the culture of society, figure. ((3.4), e).

Principle status: Poor

3.2.3.2.3 To Enhance Innovative and Creative Solutions

Collective intelligence: through the reflection of the culture of the community on the internal details of the dwelling, such as the presence of the threshold, which constitutes an introductory space for the dwelling that contains several functions. On its side is a bench to put a cupboard for drinking water, as well as put a heater on the other end of the threshold. Which facilitates the placement of heating materials such as firewood and others. The heating process can release smoke inside the house, this has been addressed by creating a hatch under the roof on the south side and the possibility to renew the air of the house periodically making the housing environment healthier, figure ((3.4), f).

Testing: The process of constructing cross vaults passed through multiple stages, some of which failed, until the local community reached certain dimensions and measures for the dimensions of the structural elements in order to give a safe and stable building, figure ((3.4), g).

Dexterity: The environment in which this community lives dictates thinking of solutions to achieve social and cultural requirements. One element (Al-Koor: A group of interconnected cubic cells with an upper circular opening with a diameter of more than 30 cm and a small front opening, raised from the ground by more than 25 cm, built with lime soil mixed with straw and water). It has been used for two purposes, the first is food security, especially in the winter season. And the second is a place to put furniture to provide the requirements of day and nightlife in one space, figure ((3.4), h).

Beauty: The use of wood material with different designs for windows and interior wall storage, in addition to shelves, to place some ornaments and traditional antiques on them, figure ((3.4), i).

Principle status: Average

3.2.3.2.4 To Recognize Intangible Values

Link to The Place: the nature, life style, Grandparents' place. Show figure ((3.4). d)

Sacredness: the place of worship (the mosque). Show figure ((3.4). j).

Places For Community: in the house, front space or the way to get the water, figure ((3.4), k). Peace and Well-being: The community cooperation on important occasions despite differences between them, such as construction, weddings, and funerals.

Principle status: Average

3.2.3.2.5 To Encourage Social Cohesion

Shared Facilities: like water well. Shown in figure ((3.4). c, l)

Pedestrian zones: the way to get the water. Shown in figure ((3.4), k)

Mutual aid: in farming activities like harvest or construction building.

Principle status: Poor

3.2.3.3 Socio-Economic Principles



Figure.3.5 All photos explain the practices of Socio-economic principles in the case study, author.

3.2.3.3.1 To Support Autonomy

Self-building: When any family wants to start building its house, all families gather each other for help, every one according to his ability and awareness (under the management of skilled labors)

Gathering the soil and rocks in the site and helping to build the Coverage under the main arches and ceiling. (To minimize the cost)

Gardens for self-production: Every house contains a small garden in front space for winter and summer vegetables like (Parsley - mint - radish –chard- tomato-cucumber and others), figure ((3.5), a).

In the vast lands, they cultivated annual crops such as wheat and barley and raised fruit trees such as vines, almonds, and figs (The high cost of obtaining these products and the time required for that, as the travel needs to be more than 13 km)

Collection and storage: Each house contained (Al-Koor) adjacent cells built of mud and straw. Each cell contains a circular top opening to fill the cell with a specific type of food and a bottom side opening to take materials from it when needed and for cooking. It was raised from the ground by 30 cm in order to stay away from moisture, figure ((3.5), b, c).

Each house has an opening in its roof located at the meeting point of the intersecting arches of the vaults, to drop grains and food products after they have dried from the roof into the house in preparation for placing them in the Koor, it is called (Bab Al-Hanj), figure ((3.5), d).

livestock breeding: Almost people worked in livestock breeding like sheep, goats, and cows for providing what they need from animal food products like (meat, milk, cheese, ghee, etc.) and industrial products (leather and hair). Also, Mules, donkeys, and horses for transportation, movement, and plowing, figure ((3.5), e).

Processing systems: Every house or a group of houses had an oven (it's called Al-Tanoor) for making bread (a daily need that saves the cost of traveling to the close city, it will need animals and long time), figure ((3.5), f).

Access to water: In addition to the fact that every house has a groundwater tank, there were some wells to support water security during the drought years (for watering their plants and animals, thus their income and revival).

Principle status: Good

3.2.3.3.2 To Promote Local Activities

Local construction and Skilled labor

Reliance on local workers and craftsmen who have gained skill through practice in the process of cutting stones and preparing them for construction.

The owners of the local building craft learned to build stones and take the appropriate dimensions for the structural elements that ensure the safety of the building by taking advantage of the existing architecture from previous civilizations and experience, figure ((3.5), g) (External labor is costly, and thus the cost of construction is reduced through available materials and local labor).

Local possessing

production of bread: it was going through several stages and operations.

First, the wheat and barley are harvested manually.

Secondly, isolating the seeds from the straw, and it was done through two stages. The first was grinding the straw to remove the grain of wheat from its spike. This was done by a machine in the form of a wheel shaped more than 1 meter wide, made of wood, and surrounded by a metal frame in a spiral shape. There is a place for her to sit and she is connected with the animal in order to drag her over the pile of spikes. The second is the process of completely isolating the love from the straw, and it is done by making use of the wind energy, where this mixture is dropped from a high place so that the wheat grains descend directly while the wind scatters the straw away. This process is called locally (Al-Tadria or Al-Tansif).

Third, grinding wheat by milling when needed. The mill is two cylinders of hard flint. The first is the base and a wooden axis protrudes from it towards the top to be an axis for the rotation of the upper stone. The second is the rotary chamber, which is perforated from the axis with a hole that matches the wooden axis and is slightly wider in order to put the wheat through it to complete the grinding process. It has a side wooden handle for rotation.

Farming the land: Plowing the land by the animals they keep, thus reducing the cost of production, figure ((3.5), e) to see the old plow from the metal (it is called Al-Samd), It was also made of wood.

Adapted transportation

As for the transportation process, it was carried out by animals such as donkeys and mules, and the appropriate roads were settled for them, Delivering their crops to the nearest exchange market, and thus production continuity, figure ((3.5), h).

Principle status: Average

3.2.3.3.3 To Optimize Construction Efforts

optimized use: Creating some improvements to the house to respond to the needs of users without financial costs, such as shelves for placing pots and other things from locally available plaster, figure ((3.5), i).

Shared uses: Using the main space for several purposes, such as sitting during the day and sleeping at night, to shorten the costs of constructing the building, figure ((3.5), j).

Planning in phases: Because of the high cost if the house is fully implemented at one time.

Principle status: Poor

3.2.3.3.4 To Extend the Building's Lifetime

Maintenance: Stairs to climb on the roof to isolate it annually, figure ((3.5), k).

Stabilization: Making the main pillars bearing the roof in large dimensions in order to ensure the stability of the building and using stone arches to transfer the load using pressure. Resistant materials: Stone and earth are environmental materials and are therefore sustainable and reduce building maintenance costs, figure. ((3.5), g, j, l)

Principle status: Poor

3.2.3.3.5 To Save Resources

Shared infrastructures: Water resources such as wells, because of the cost of drilling a well, reduce the cost to a minimum for the family.

Energy loss reduction: Several practices, such as reducing the area of the external openings, using environmental materials, and proper direction, reduce energy losses and thus lower operating costs, figure ((3.5), a, k, l).

passive systems: Deficient energy consumption due to sustainable materials, the thickness of the outer cover of the house, and the reduction of heat exchange to a minimum due to the small size of the external openings, figure ((3.5), a, j, k).

Principle status: Average

3.2.4 The Analysis

The evaluation of vernacular architecture in the case study according to the sustainability principles form shows that the environmental principle is the most applied, then the socio-economic principle, and finally the socio-cultural principle, figure (3.6).

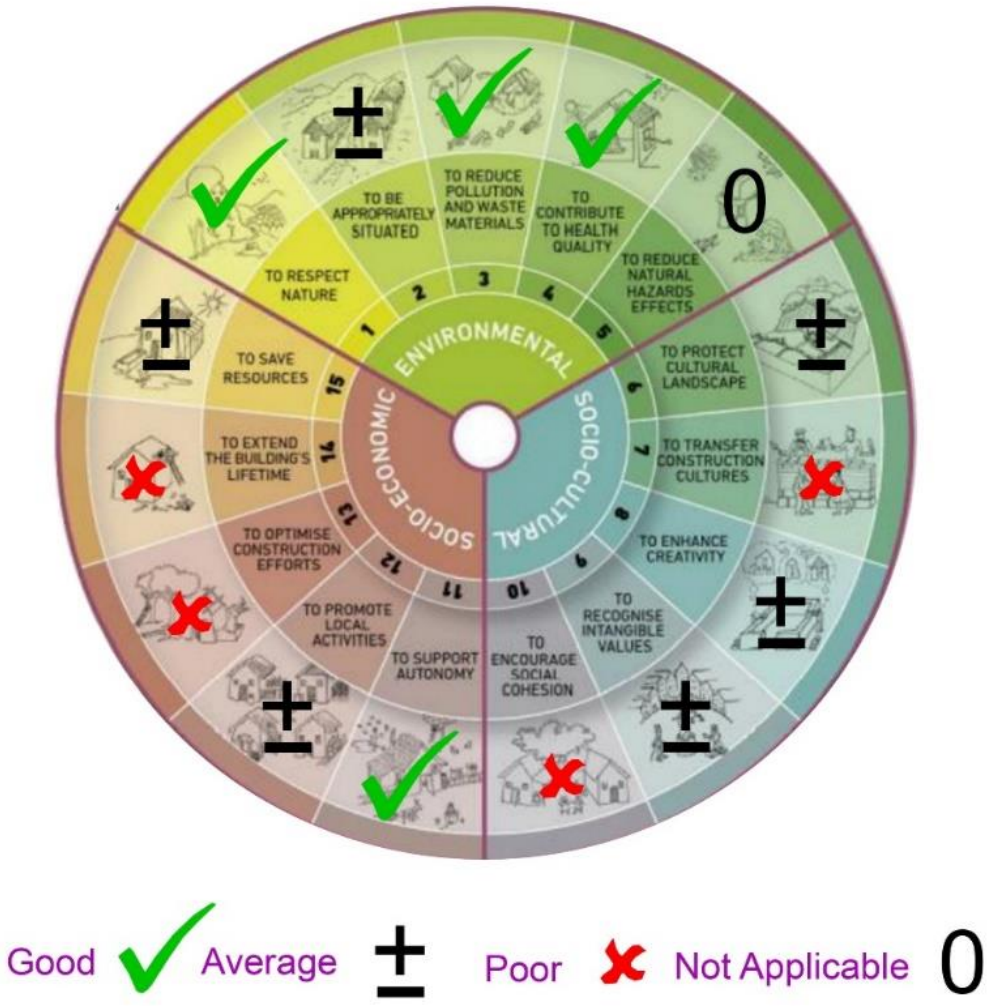


Figure. 3.6 (Analysis of the case study by sustainability framework, developed by the author)

3.3 Discussion

Vernacular architecture is the product of thoughts, lifestyle and cumulative experiences. The case study was evaluated according to the sustainability framework of vernacular architecture. It was found that the environmental pillar is the most compatible, followed by the socio-economic pillar, and finally the socio-cultural pillar. According to these results, a strategy was proposed to apply the positive aspects of the environmental principle in contemporary rural vernacular architecture, and to search for a mechanism to develop appropriate traditional technique to mitigate natural hazards such as earthquakes: The strategy is built on different levels, and suggesting an action plan as follows:

3.3.1 On Environmental Level

1-Focus on the aspects that have been applied extensively in the environmental pillar which are:

- Respect for nature, which includes several strategies within this principle: (integration with nature and minimal impact on the environment, using the materials available in the area and understanding the place, directing the buildings towards the southern side and following the buildings along the contour lines, and this reduces the change in geology and morphology Region)

- Taking advantage of natural resources and climate, and several strategies fall under this principle: (optimal guidance to reduce the impact of construction on the environment and choosing the most appropriate sites for construction, collecting rainwater through the roofs of buildings and creating a ground water tank in each residence, thermal insulation of buildings by doubling the external wall Place an insulating material between them and insulate the surfaces.

- Reducing pollution and reducing waste resulting from the construction process: (using building materials available in the study area, which are stones and soil. These materials are considered environmentally friendly and recyclable, and relying on skilled craftsmen in producing building stones from the same area)

- A built environment that contributes to health quality: (natural ventilation and natural lighting, by placing windows on the southern and northern sides, reducing the openings on the eastern and western facades to a minimum, and creating an upper opening at the highest level of the roof of the house to ensure air exchange and the exit of bad air. Placing the yard on the southern side of the house, as it is the preferred side in the region, to benefit from the insolation in the winter and to contain a number of plants such as vines and others, which contribute to shading and thermal comfort in the summer, and thermal insulation by using double the external surfaces or using thermal insulation materials).

2- The appropriate strategies for the region related to mitigating the natural risks to which vernacular architecture is exposed, especially with regard to earthquake risks.

Table 3.2 Summary of traditional earthquake resistant techniques classified according to the typologies defined and highlighting: a. type of damage avoided: and b. applicability or ease of use as a strengthening technique, "difficult" indicates that the technique should be better implemented at the time of the construction or during partial reconstruction, and "practical" indicates that the technique can be and have been successfully applied for strengthening. [26], Each one has been given a color so that it can be displayed with the appropriate technique.

Technique	Damage prevention			Applicability as strengthening technique		
	Separation	Out-of-plane	Delamination	In-plane	Difficult	Practical
1. techniques improving the connection between structural elements						

Table 3.2(continued) Summary of traditional earthquake resistant techniques classified according to the typologies defined and highlighting: a. type of damage avoided: and b. applicability or ease of use as a strengthening technique, "difficult" indicates that the technique should be better implemented at the time of the construction or during partial reconstruction, and "practical" indicates that the technique can be and have been successfully applied for strengthening. [26], Each one has been given a color so that it can be displayed with the appropriate technique.

Ring beam	yes	yes	yes	yes	yes	
Corner braces	yes					yes
Quoins	yes				yes	
Reinforced floor-to-wall and roof -to-wall connections		yes				yes
Ties	yes	yes				yes
2. techniques stabilizing structural elements and buildings						
Timber elements within the masonry	yes	yes	yes	yes	yes	
Wall subdivision		yes	yes	yes	yes	
Through-stones	yes	yes	yes	yes		yes

Table 3.2(continued) Summary of traditional earthquake resistant techniques classified according to the typologies defined and highlighting: a. type of damage avoided: and b. applicability or ease of use as a strengthening technique, "difficult" indicates that the technique should be better implemented at the time of the construction or during partial reconstruction, and "practical" indicates that the technique can be and have been successfully applied for strengthening. [26], Each one has been given a color so that it can be displayed with the appropriate technique.

Mended cracks		yes		yes		yes
Reinforcing openings		yes		yes	yes	
Stiffening floors and roofs		yes		yes		yes
Wall structural timber frame	yes	yes	yes	yes	yes	
3. techniques allowing partial collapse of structural elements						
Redundancy of structural elements					yes	
4.Techniques counteracting horizontal loads						
Buttresses	yes	yes				yes

Table 3.2(continued) Summary of traditional earthquake resistant techniques classified according to the typologies defined and highlighting: a. type of damage avoided: and b. applicability or ease of use as a strengthening technique, "difficult" indicates that the technique should be better implemented at the time of the construction or during partial reconstruction, and "practical" indicates that the technique can be and have been successfully applied for strengthening. [26], Each one has been given a color so that it can be displayed with the appropriate technique.

Walls thickening		yes		yes		yes
Urban reinforcing arches		yes				yes

Based on Table 3, we find:

The techniques are divided into four types in terms of (improving the connection between structural elements, stabilizing the structural elements and the building, allowing partial collapse of the structural elements, and resisting horizontal loads).

It becomes clear to us how effective of each of the traditional techniques to mitigate or resist the damage that occurs as a result of earthquakes, which are divided into four categories of damage, which are: (separation, out-of-plane, delamination, in-plane).

It becomes clear to us that the best techniques resist the damage of the four categories are (ring beam, timber elements within the masonry, through stones (diatons), wall structural timber frame), we see that these techniques are applied in partial reconstruction or new construction.

Techniques used in strengthening resist fewer damage from the four categories.

The techniques used for strengthening are more than the techniques used for partial reconstruction or new construction.

CHAPTER 4

THE ROLE OF ARCHITECTURAL HERITAGE MANAGEMENT IN RESILIENCE OF SMALL AND MEDIUM CITIES IN NORTH WEST SYRIA

More than 50% of the world's population live in urban areas of which cities are among the most important, this percentage is expected to reach two-thirds by the year 2050 [28] Statistics showed that cities containing architectural heritage exceeded half in most countries of the world, such as Italy, Turkey and others [29], also in Syria, almost no city of any size is devoid of ancient or historical architectural fabric [23]. Urban resilience of a given urban area is its ability to keep functioning in conditions of shocks and stress in a way that allows all its institutes, systems, and residents -especially the vulnerable demographics such as the poor and minorities- to resist, absorb, and thrive within these conditions. Urban risks have increasingly grown more unpredictable and uncertain raising the need for a holistic urban planning approach that can ensure the maximum range of urban resilience**.** Building resilience is a compressive, dynamic, and multidisciplinary process that needs to be planned on all levels of human lives, social, economic, administrative, and more. if the sectors do not work together, the overall plan would not be effective [30].

Cities and other urban classifications are complex networks of human activities that usually draw people because of their richness of opportunities and innovation. However, as they host more people, there have always been subjected to more risks from conflicts to natural disasters. Furthermore, the current era presents its own set of novel challenges, to mention a few, terrorism, pandemics, and the threats of climate change [28], that ICOMOS said it is one of the most important challenges facing contemporary civilizations and their immediate heritage contexts**.** Consequently**,** there has now emerged a great need to develop new and coherent policies focusing on the management, preservation and protection of the built heritage environment [31]. The United Nations International for Disaster Reduction and other organizations such as

ICOMOS and others have emphasized the important role that heritage plays in significantly improving urban resilience. Heritage is considered a source of resilience due to its ability to preserve traditional knowledge [32]. Because built heritage is closely linked to the built environment, especially in Mediterranean cities, and this requires us to analyze heritage within the context of the built environment and protect it [29].

In the study area, which has been exposed to civil war since 2011, architectural heritage can serve as a spatial icon for the community, and form a great familiarity with the social and cultural aspects of recovery that is important for the reconstruction process**,** which gives its preservation over time a major role in preserving traditions and National Identity[32], and contribute in many ways to enhancing the resilience of cities [33]**.**

The research aims to evaluate the resilience of small and medium Syrian cities in the face of crises according to the Rockefeller resilience framework and to find solutions and suggestions that can increase their resilience and link these solutions to the management of architectural heritage in them to discover the role that architectural heritage can play in this context, especially in cities. Northwestern Syria, in light of the war it has been witnessing since 2011 until now, and the crises that have resulted from this war in these cities, in addition to the earthquake they witnessed in February 2023.

The material and methods are as follow:

- Reviewing the literature related to the research topic in the world and in Syria to determine the relationship between architectural heritage management and resilience in cities.

-A case study of the city of Jericho in northwestern Syria according to the Rockefeller resilience framework, which consists of four categories, each category containing three goals that must be achieved.

- The practices applied in the case study will be compared with the practices specified in each principle, and will be evaluated by the value of one of the four categories as

shown in the figure to know the level of flexibility in the case study, and suggestions will be presented to fully achieve each of the goals.

- The importance of the proposed solutions for resilience will be determined through the number of iterations, and the weight of the solutions related to architectural heritage management will be monitored to demonstrate the role it can play in the city's resilience.

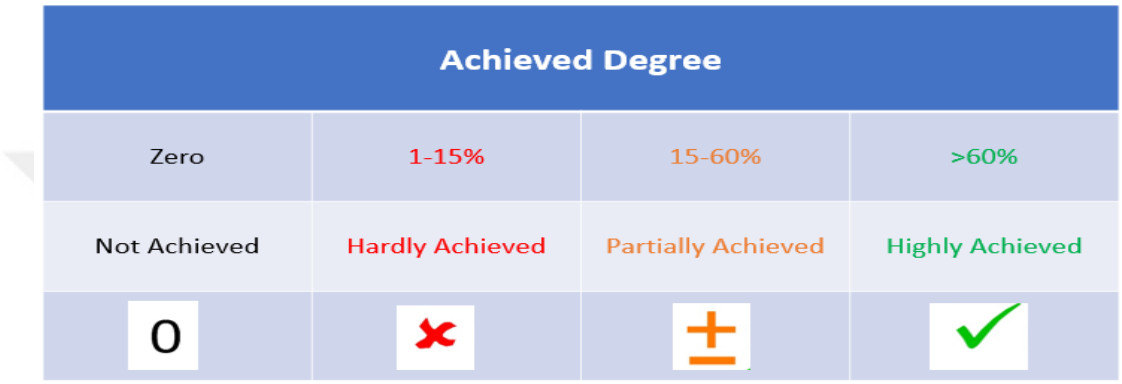


Figure 4.1 The Assessment and Evaluation Method (developed by author)

4.1 Literature Review

By literature review on the role of built heritage in the resilience of cities, it is clear that this role has not been clearly explored [29]. What expresses architecture are shapes, plans, and decorations, and it has two basic aspects: form and function. What happened in the definition of heritage by the European elites and the first founders of conservation Ruskin, Maurice, and Leduc was that they expressed heritage as only a tangible material state. Interest in the relationship between tangible and intangible heritage was very weak. Which created a lack of understanding of the role played by architectural heritage after disasters. Another reason is the lack of attention to cultural issues and their relationship to the resilience of societies. This means that issues related to heritage and its problems are secondary issues in the disaster response phase. Although there is an association in the early response and recovery phase with cultural issues and practices such as traditional and craft celebrations, some of which are linked to their occurrence within heritage buildings, here there is a tendency among

concerned authorities to separate tangible responses from intangible ones, which negatively affects the post-disaster society [32].

Cities have undergone several decades of development and change in the city center (representing the urban center), not to mention urban sprawl in neighborhoods and suburbs, which has led to the distortion of the historic urban landscape of the city in general. The process of revitalizing architectural legacy, which involves reconstruction, rehabilitation, and restoration, has also played a significant role in societies' capacity to bounce back after World War I and create resilient cities [33].

In some local contexts, cultural heritage plays a significant role in sustainable development, as highlighted by a number of scholars recently [31]. It is evident that the architectural heritage, with its traditional techniques and principles, has made a significant contribution to the resilience of Japanese cities context, which are constantly threatened by disasters. This traditional knowledge has also strengthened the recovery process to reconstruction through popular initiative [32].

In 1945, Jan Czachowatowicz presented a strategy for the reconstruction of historic city centers that were completely destroyed in World War II, through which he identified the basic assumptions for environmental conservation work in Poland. Its principles gave great priority to preserving the features of the historical urban form, which constitutes the cultural landscape that is considered essential. For the existence of the nation. So, the emotional and spiritual climate of a place have a major influence on how resilient it is. Taking care of them allows us to start a conversation that promotes more innovative resilience practices that are connected to integrating resilience into the community-making operations [33].

In literature of relation to resilience and architecture, two interconnected resilience components have been identified: Rebuilding the city and fostering a discourse of public memory that connects to the city's architectural legacy and establishes a public space for memory discourse [32].

Despite some inherent qualities of resilience in traditional built environments. they are affected by specific vulnerabilities, which may prevent the implementation of modern mitigation, resistance and adaptation models. The reasons are mainly due to: -

Increasing environmental pressures, mainly linked to climate change, which will lead to a somewhat unprecedented exposure to natural hazards (floods, earthquakes, rising temperatures, ...). - Performance deficiencies, in terms of functional, technological and normative obsolescence, due to increased requirements for safety, comfort, accessibility and historical and architectural values, the preservation and enhancement of which may conflict with performance improvement [34].

4.1.1 Rockfeller City Resilience Framework

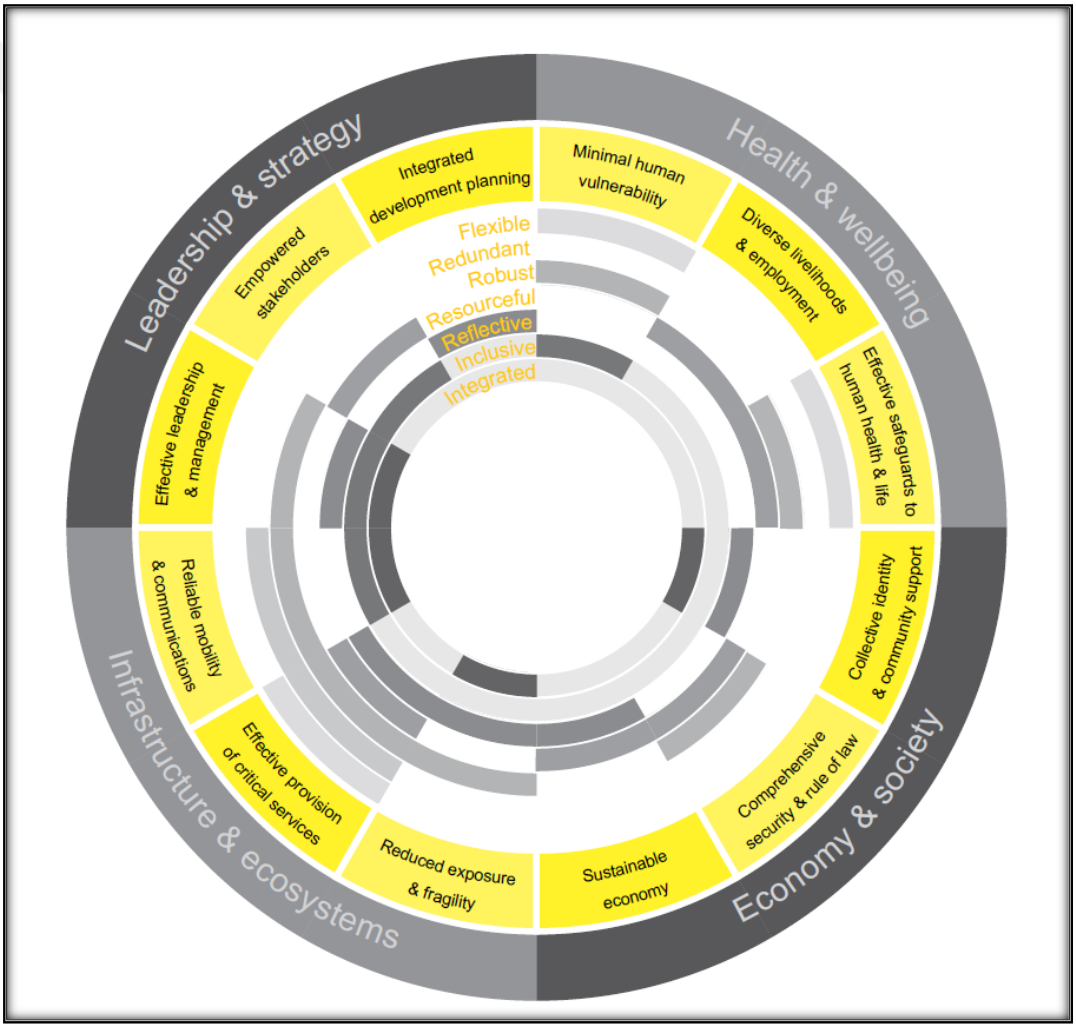


Figure 4.2 Rockefeller city resilience framework

There are multiple frameworks and approaches to evaluate the level of resilience a certain area has. Some approaches are assets-based, meaning that they measure resilience based on the physical and tangible losses an area has after being stroke with a disaster or suffering some sort of pressure. According to this method, the less the economic damage is, and the fastest the physical and seen recovery is the more resilient an area is.

Another approach is system-based meaning it focuses on the ability of an urban area to sustain the performance of its main systems during times of crisis. When systems are flexible, dynamic, and adaptable in all types of hazardous situations, it means the area in which these systems are operating is resilient [30]. A more comprehensive and holistic framework would combine both physical and intangible aspects in its evaluation by including social, economic, and administrative criteria, such a framework will be used in this study to assess the resilience of Ariha city, Idlib, Syria. And that is the Rockefeller city resilience framework.

This framework contains four categories that are concerned with different aspects of human activities, each category has THREE sub-goals to achieve. The goals may have SEVEN different types of qualities. Following is a brief explanation of each of the framework's components.

Table 4.1 Categories and Principles of Rockefeller city resilience framework

Rockefeller city resilience framework		
Pillars of sustainability	Principles	Practices

Table 4.1(continued) Categories and Principles of Rockefeller city resilience framework

Leadership and Strategy category	**Effective leadership and management**	Inclusive governments aim to include all stakeholders in an integrated decision-making process to create a clear strategy that promotes trust, unity, and effective coordination as well as preparedness.
	Empowered stakeholders	This can be achieved through good education for all and providing accessibility to all sorts of information to introduce individuals and institutions to what to be done in times of crisis, thus making a better decision based on their knowledge.
	Integrated development planning	Setting an integrated urban development strategy that includes city monitoring and land use planning is continuously reviewed and updated.
Health and Wellbeing Category	**Minimal human vulnerability**	by meeting the basic needs of human lives to enable people to achieve a productive livelihood. This can be done by providing easy and affordable access to food, water, energy, sanitation, and shelter, especially for vulnerable groups and especially in times of distress.
	Diverse livelihoods and employment	Diverse livelihood opportunities allow people to proactively respond to changing situations within their urban fabric. This can be achieved through offering skill training, business developments, social welfare, protective labor policies, and diversifying means of income.

Table 4.1(continued) Categories and Principles of Rockefeller city resilience framework

	Effective safeguards to human health and life	Through sufficient health systems that are accessible to all, affordable that can respond effectively to emergencies such as the spread of disease.
Economy and Society Category	**Collective identity and community support**	Promoting social cohesion and community engagement by establishing a strong cultural identity and sustaining it by encouraging artistic expression and preserving tangible and intangible cultural heritage.
	Comprehensive security and rule of law	Through law enforcement, crime prevention, and justice for all. This can be facilitated by creating inclusive public spaces as an opposite to alienated spaces where crime might prevail while ensuring the highest level of safety.
	Sustainable economy	By efficiently managing of city's finance, attracting investment, and building emergency funds that can be used to ensure fast recovery post-disasters.
Infrastructure and Ecosystems	**Reduced exposure and fragility**	Through effective land use planning and prepared infrastructure that can withstand hazards such as floods, earthquakes, and so on. It also includes preserving environmental assets and resources.
	Effective provision of critical services	Diversifying sources of critical infrastructures and actively managing them through regular maintenance and development to ensure their flexibility in changing conditions.

Table 4.1(continued) Categories and Principles of Rockefeller city resilience framework

	Reliable mobility and communications	By providing diverse and affordable transportation and communication networks and preparing them for emergency scenarios to support the overall disaster response including evacuations and rescue missions.

4.1.1.1 Qualities of Resilient Systems

Seven qualities to ensure their success. For example, *flexible* health services can reallocate staff to deal with an outbreak of disease. Protective infrastructure that is *robust* will not fail when disasters hit. Energy systems with *redundancy* can deal with disruptions to supply networks. Planning processes that are *reflective* can respond better to changing circumstances. *Resourceful* families can recover from disasters financially. The qualities are:

1- Reflective: accepts both uncertainties and changes and adapts according to challenges.
2- Robust: have well-conceived physical assets that can recover from shocks.
3- Redundant: it includes the presence of multiple alternative ways to achieve a given need or fulfill a particular function.

4-Flexible: developable and changeable.

5- Resourceful: implies that people and institutions can rapidly find different ways to achieve their goals or meet their needs during a shock.
6- Inclusive: engaging communities especially the most vulnerable groups.
7- Integrated: Integration between different systems promotes consistency in decision-making to achieve a common outcome.

4.2 The Case Study of Ariha City, NW Syria

Ariha district consists of 55 small towns and villages and 44 farms. It is located in an average place, in the Idlib governorate, linking the city of Idlib in the north and

Maarat al-Numan in the south, between Jisr al-Shughur in the west and Saraqib in the east.



A view from Al-Arbaeen Mountain



Historical Ariha

Figure 4.3 Pictures showing the case study

One of the essential features of the Ariha area is Jabal Al-Arbaeen, which is part of the Jabal Al-Zawiya chain, which was previously called Jabal Al-Summaq, its summit is 1000 meters above sea level. This strategic mountain overlooks the M4 highway that connects the coast and the interior, the Ariha-Idlib Road, and a large number of towns and villages in Jabal Al-Zawiya to the south of Aleppo Governorate.

The geographer Yaqut al-Hamawi described the city of Ariha in his Encyclopedia of Nations published in the thirteenth century as "a small town on the outskirts of Aleppo. The greenest and most luscious on God's land; endowed with green fields, trees, and rivers." [15], figure (4.3).

Ariha belonged to the state of Aleppo in the past. It is considered the most crucial tourist area for the city of Aleppo. Because of the important monuments and historical landmarks and its mountain and greenery, many people feel Ariha as an outlet for them. Its name is derived from the Aramaic language, which means "sweet scent of flowers." [15].

4.2.1 Assessing the Resilience of Ariha, Syria

According to the framework presented, we will conduct an assessment examining the extent to which Ariha in northwest Syria aligns with each of the twelve resilience goals within the four main categories. The evaluation of each goal will be either: (High achieved - Partially achieved - Hardly achieved – Not achieved).

By taking advantage of what has been implemented, weak points will be identified, and based on them, we can propose a set of improvement recommendations that will be analyzed according to their classification of the field to which they belong, and the iterations related to architectural heritage management will be determined to know the percentage that they can contribute to improving the city's resilience

4.2.1.1. Assessing Resilience in Health and Wellbing

4.2.1.1.1 Minimal Human Vulnerability

Among the most important needs to achieve this goal are food, water, energy, and shelter supplies. With regard to shelter, the population of Ariha city before the conflict was 80,000 people, but now it contains 55,000 people, of whom 30% are displaced from other cities and governorates. The damage is about 30% in residential building in traditional and new Ariha shown in figure 4.3. Consequently, many families live in inappropriate housing conditions. For example, in houses without doors or windows, or an intact room from a semi-destroyed house.

With regard to water, families are served by tankers that depend on purchasing water from the private sector, due to the lack of the ability to operate the water supply station continuously and the need for the water supply network for maintenance. Knowing that there are some projects supported by non-governmental organizations for temporary periods to relieve some of the burdens on the population.

With regard to energy recently, and a few months ago, the electricity supply reached the city by the (Green Energy) company, which rented electricity from the Turkish state and thus greatly reduced the burden on the population in terms of lighting and others. But it has not completely dispensed with the use of gas to cook food, which is

difficult for many middle-income and low-income people to purchase, and it is the largest population structure in the city.

Goal Status: Partially Achieved

Improvement suggestion:

- Introducing more renewable energy applications to ensure energy and water sufficiency at the building level. For example, solar panels (solar photovoltaic systems) can be implemented on the roofs and exteriors of residential, commercial and public buildings. Rainwater harvesting systems can be installed on roofs and used for irrigation and drainage.

- Finding a long-term solution to the housing problem through the establishment of renovation projects for residential homes and the provision of livelihoods for this vulnerable group.

- Establishing a station to take advantage of the city's waste and convert it into natural gas that can be a supplement to electric energy or a substitute for it in a crisis situation.

4.2.1.1.2 Diverse Livelihoods and Employment

The city of Ariha attracts families and people from middle to low income, most of whom are the original returnees, after being displaced in the recent offensive of the regime forces on northwest Syria at the beginning of 2021, And Idlib Governorate. the other part of the population is displaced, and both of these groups suffer from low income and lack of opportunities to livelihood and earn.

Residential styles in the city:

A-Low-rise (2 stories) single-family traditional housing in the historical city, figure (4.3) where the ground floors can be used, one room as shop or workshop and the rest is for living.

B- medium-rise (5 floors) residential buildings that accommodate 8 families with unit squares without parking spaces and the ground floor can be used as shops or workshops, figure (4.3).

Goal Status: Partially Achieved

improvement suggestion:

- The designs of residential buildings are more flexible to provide housing with suitable spaces for various families and provide secure parking.

- Renovation projects for traditional markets and shops in popular neighborhoods can provide job opportunities where the rent is low.

- We have to create specialized urban spaces for street vendors, giving more job opportunities to the city's most vulnerable groups.

4.2.1.1.3 Effective Safeguards to Human Health and Life

The conflict has led to multiple waves of displacement and asylum due to the changing borders of the conflict over 10 years in various Syrian territories, especially the youth group. Consequently, a large part of the homes, shops, and workshops remained in the hands of the old class, which left them neglected during their lifetime or vacant after their death.

With regard to healthcare infrastructure, there is no health insurance due to the state of war, but there are 4 hospitals supported by organizations and the public sector that provide the service largely free of charge, and a big problem has emerged to respond in the event of a crisis, especially after the outbreak of the Corona pandemic.

Goal Status: Partially Achieved

improvement suggestion:

- Preparing new medical points and centers and small clinics and providing them with the minimum requirements to respond effectively to crises and the epidemic and relieve the pressure imposed on large hospitals.

- Reviving abandoned homes and shops in traditional city by restoration or buying them from their heirs and using them as urban green spaces, public housing for vulnerable groups, or medical points.

- Providing model health care that covers all segments of society, including vulnerable groups (the category of widows and heads of families with disabilities has emerged significantly due to the conflict).



Demolished buildings because of bombing



Five floors residential buildings



Two stories traditional housing

Figure 4.4 Pictures showing the case study

4.2.1.2 Assessing Resilience in Economy and Society

4.2.1.2.1 Collective Identity and Community Support

With regard to the inclusive society, since the beginning of the conflict in Syria, a large number of people have been forced to leave their cities, towns and villages and move to other safer places, as a result, families from different cultural backgrounds gathered in one place and thus a kind of social isolation resulted. In Ariha, about a third of its population is now displaced from various Syrian governorates.

The Syrian people are open to each other and to other societies, but the matter needs urban spaces that allow the population to express their identity, culture, customs and traditions, and this ensures closeness and cohesion shown in Figure ((4.4), b, d).

With regard to urban identity and cultural heritage, the city of Ariha has a long heritage that extends to various Roman and Byzantine civilizations such as caves and cemeteries, in addition to the historical city that is still inhabited to this day, and some of its feature’s date back to the Mamluk era.

It also contains three traditional baths and an old commercial market, which reflects the civilizational identity of this city. Moreover, it provides the residents with the opportunity to walk and practice some rituals and customs, and provides a place to learn about the traditional professions and crafts inherited by generations

But most of this heritage is neglected, and a large part of it was damaged by the conflict or completely destroyed, shown in Figure ((4.4), a).

Goal Status: Hardly Achieved

improvement suggestion:

- Designing urban spaces that provide an opportunity for all residents of different backgrounds to meet and learn about each other's culture, traditions and customs, which Syria is rich in, within popular events and festivals that are held in it.

- Introducing the importance of ancient monuments and the urban and architectural heritage in the city and its rehabilitation.

4.2.1.2.2 Comprehensive security and rule of law

The city of Ariha is subject to perimeter control by security barriers deployed at the entrances and exits of the city, where they search cars and passengers due to the ongoing conflict so far for fear of any counter-action in these areas, but the attention to the city’s internal security from robberies and theft and others is much less There is only one police station in the city to follow up on these cases, but due to poor capabilities and technology, controlling security is very difficult.

With regard to urban planning, the management of risks that may affect vulnerable groups, such as children, in designing streets or setting certain speeds, or even streets in front of schools and others, has not been considered, figure ((4.4),f).

Goal Status: Hardly Achieved

improvement suggestion:

- Designing a security system based on modern technology in monitoring and providing the population with important information and instructions, in addition to distributing police booths within the city in an appropriate manner to follow up on the

internal security of the city and receiving any complaints or concerns related to this field.

- Issuing laws regarding speeds within the city, dividing streets into lanes, and placing lanes dedicated to children and the elderly in public places to ensure their safety.

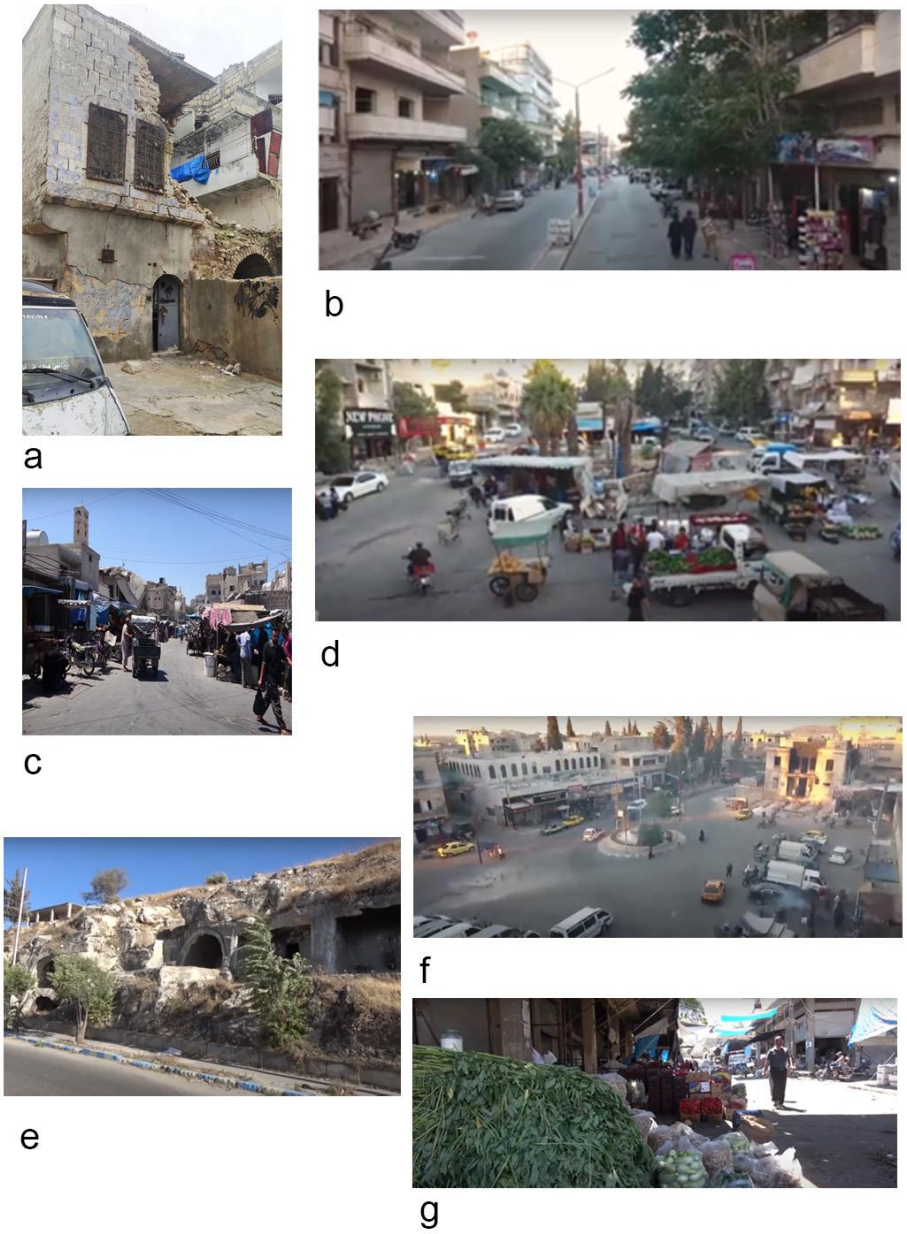


Figure 4.5 Pictures showing the case study

4.2.1.2.3 Sustainable Economy

One of the pillars of a sustainable economy is diversifying sources of income and finding an alternative in the event of crises and risks. Ariha is located as an area that attracts customers from nearby and rural areas to meet their needs. For the indigenous population, before the conflict, the shops located on the main streets, side streets, and alleys, in addition to the historical market, provided opportunities to establish businesses that provided them with an acceptable income. But after the start of the conflict and the repeated displacement and the loss of many fixed and non-fixed assets, the local community lost the ability to continue in many of their trades and businesses, figure ((4.4), c, g).

For most of the displaced in the city, they are low-income people who have taken refuge in this city because of the cheapness of life in it, and they are unable to start any commercial or industrial businesses. Rather, they depend on human power to earn their living, in addition to what is distributed by humanitarian organizations of food and other things.

Moreover, tourism is an important asset as it contains the old city, which is still inhabited, as well as the Roman and Byzantine monuments, in addition to the landscape, especially Jabal Al-Arbaeen, which is characterized by a stunning view of the city and the neighboring plains, where it contained many restaurants and Cafes and outdoor sessions, most of which were destroyed because of the strategic and military importance of this site and the struggle that lasted for many years to control it, figure ((4.4),e).

Goal Status: Hardly Achieved

improvement suggestion:

- Rehabilitation of shops, especially in the old city, and thus enabling traditional crafts to return to life as places to experience parents and grandparents and their creativity and encourage them to continue where they can secure an alternative productive asset in times of crises.

- Rehabilitation of the Jabal Al-Arbaeen path, and thus it can provide job opportunities for the original residents or the displaced alike, such as sales kiosks and others, which do not need a large capital.

4.2.1.3 Assessing Resilience in Infrastracture and Environment

4.2.1.3.1 Reduced Exposure and Fragility

environmental sustainability. The city contains 10% of the green spaces that have suffered neglect and some destruction due to the conflict.

With regard to the buildings in the city, the rate of destruction is 23%, and some of them are considered as a danger to the neighborhood and the residents due to the possibility of their partial or complete collapse. Earthquake risks were not considered in the design code, and therefore the occurrence of any earthquake is considered a major disaster risk. Not to mention the bombing that affects the city so far, which puts the lives of residents at risk day after day.

Goal Status: Hardly Achieved

improvement suggestion:

Preparing a project to remove the rubble from the city, restore repairable buildings, remove completely destroyed buildings, and take advantage of its place as a multi-use area during the conflict, until the country reaches the stage of comprehensive reconstruction. With regard to the old city, the buildings with light and medium damage should be rehabilitated, and the situation of the completely destroyed buildings should be evaluated to take a decision by specialists for reconstruction or removal to serve the historical city.

4.2.1.3.2 Effective Provision of Critical Services

The city is characterized by mixed-use zoning, which means that the land is used for many purposes, residential, commercial and industrial. Thus, most services are within walking or cycling distances to residences. This includes small parks, schools, and stores, Figure (4.5).

Goal Status: Highly Achieved



Figure 4.6: Pictures showing the mixed-use zoning

4.2.1.3.3 Reliable Mobility and Communications

There is no public transport from or to the city, but the residents depend on private transport, which are vehicles that can accommodate 10 people that travel when they are full, and therefore there is no reliable transport system that can be relied upon.

Most of the population depends on motorcycles for their movement to and from the city or within it due to their cheap price and the lack of public transport. These motorcycles cause noise pollution in the city in addition to the environmental pollution resulting from their exhaust and the emission of carbon dioxide.

Goal Status: Hardly Achieved

improvement suggestion:

- Preparing a transportation system to and from the city that meets the requirements of the population and can be relied upon.

- Encouraging the use of bicycles within the city by preparing an integrated system by making available spaces designated for them, including parking and paths, in addition to the possibility of renting and the spread of multiple points within the city.

4.2.1.4 Assessing Resilience in Leadership and Strategy

4.2.1.4.1 Effective Leadership and Management

There is no mechanism in the city for the participation of residents and stakeholders in decision-making, but decisions are taken by the concerned authorities directly.

Goal Status: Not Achieved

improvement suggestion:

Working to launch a community initiative in which the views of stakeholders and stakeholders are approached to demand the preparation of laws that allow stakeholders to participate in decision-making and thus access to an effective management that will have positive results on all parties

4.2.1.4.2 Empowered Stakeholders

Education is free in Syria, but after the conflict the education sector suffered from many problems. In northwestern Syria and in the city of Jericho, the education sector suffers from a significant weakness in support from the concerned authorities or humanitarian organizations alike. There are no training courses for students on dealing with disasters or crises, especially the situation in which the region lives, which is the danger of bombing, in addition to the absence of shelters or a plan to manage risks such as a warning network or evacuation plans and others.

Goal Status: Not Achieved

improvement suggestion:

- Designing shelters against bombing to provide safety for the residents, in addition to designing and preparing evacuation plans and a warning network that provides residents with maps, information, directions and instructions before and during the bombing.

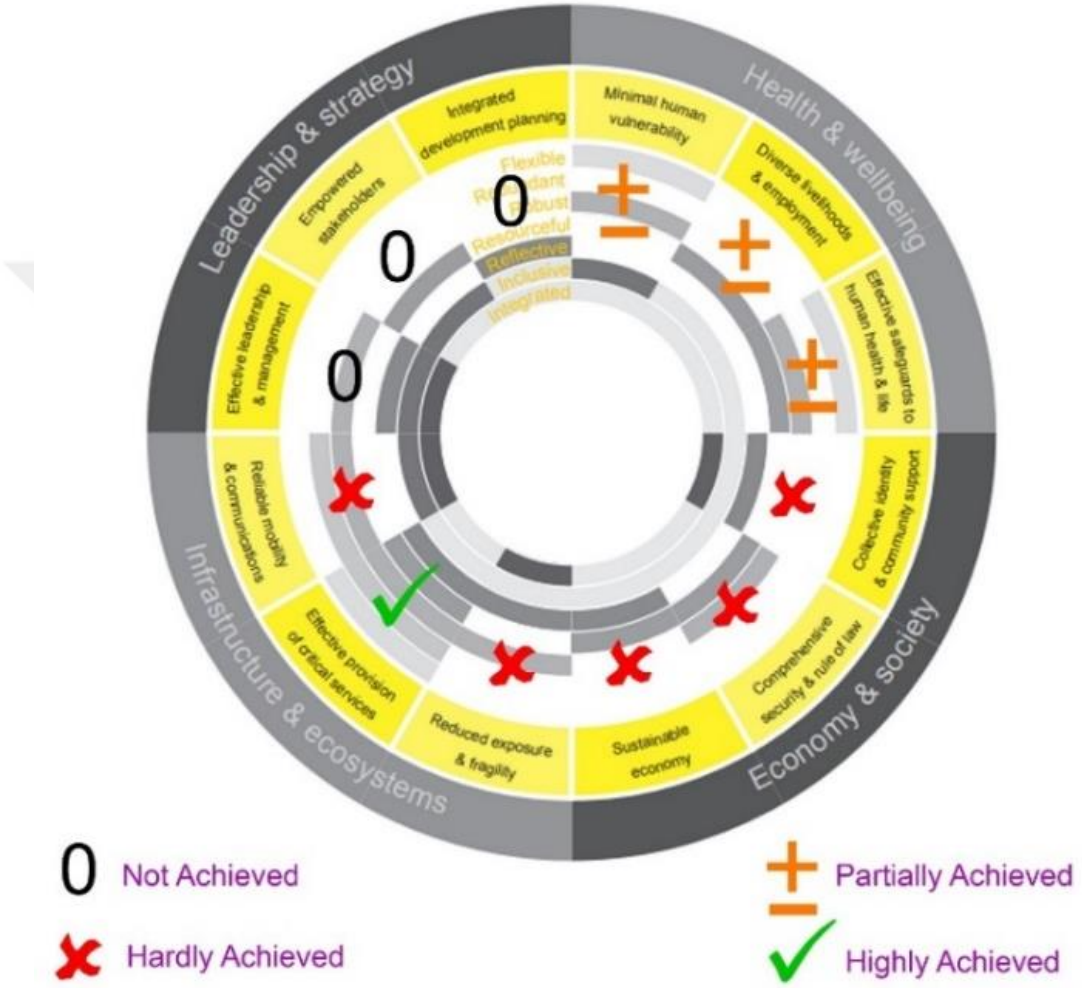


Figure 4.7 Analysis of Ariha Resilience

4.2.1.4.3 Integrated Development Planning

Weak coordination between stakeholders in the city, public or private institutions, developers, residents, and others, due to the lack of a mechanism for communication and coordination.

Goal Status: Not Achieved

improvement suggestion:

Establish a mechanism for coordination and communication between all stakeholders.

Table 4.2 Assessing the resilience of Ariha, Syria

Categories	Goals	The main aspects	Ariha city	Needs and Suggestions
1. Health and Wellbeing				
	Minimal human vulnerability	providing easy and affordable access to basic human needs (food and water supplies, energy, and shelter)	partially 1-Shelter: Carrying out restoration projects for the houses damaged by the bombing to secure decent housing for the returning and displaced families from other areas of Syria 2- energy: Establishing a project to convert waste into gas because of the high cost and the poverty of many families who cannot secure the price of a gas cylinder	Restoration projects Energy projects

Table 4.2 (continued) Assessing the resilience of Ariha, Syria

	Divers livelihoods and employment	This can be achieved through offering skill training, business developments, social welfare, protective labor policies, and diversifying means of income	Partially A-Low-rise (2 stories) single-family traditional housing in a historical city where the ground floors can be used one room as shops or workshops and the rest is for living. b- medium-rise (5 floors) residential buildings that accommodate 8 families with unit squares without parking spaces and the ground floor can be used as shops or workshops	Restoration projects Parks mobile sellers More flexible designs to suit a variety of family sizes

Table 4.2 (continued) Assessing the resilience of Ariha, Syria

	Effective safeguards to human health and life	Adequate health systems accessible to all, that can respond effectively to emergencies such as the spread of disease	Partially Many homes, shops and workshops were left vacant and neglected after the death of their owners or their asylum to other countries. With regard to health care infrastructure, there is no health insurance due to the war situation, but there are hospitals supported by organizations and the public sector that provide the service free of charge to a large extent, and a big problem has emerged to respond to the outbreak of Corona disease	Prepare small hospitals and clinics. Utilizing neglected and abandoned homes in traditional city as social projects and green spaces

Table 4.2 (continued) Assessing the resilience of Ariha, Syria

2. Economy and society				
	Collective identity and community support	- Promoting social cohesion - community engagement	Hardly achieved - Displaced people 30% that have different backgrounds. - the historical city that gives us an opportunity to walk and has destroyed shops because of bombing	- restoration and preserving tangible and intangible cultural heritage like traditional shops that promote identity and belonging. Multicultural festivals within safe public spaces
	Comprehensive security and rule of law	- law enforcement - crime prevention - justice for all	Hardly achieved - 1 police office. - Security barriers only on the city perimeter	- creating inclusive public spaces With high level of safety. - creating a safety system for children at all aspects. - creating outlines points over all the city

Table 4.2 (continued) Assessing the resilience of Ariha, Syria

	Sustainable economy	- efficiently managing of city's finance - attracting investment - and building emergency funds	Hardly achieved - there are small businesses without encouraging or supporting. - absence of company because of the conflict. - there are tourism locations in the city but they are neglected.	-Paying attention to and encouraging small businesses, especially craft and traditional businesses. -Rehabilitation of the tourist areas in the city.
3.Infrastructure and ecosystem				
	Reliable mobility and communication	- effective land use planning and prepared infrastructure that can withstand hazards - preserving environmental assets and resources	Hardly achieved - Private sector transport is unregulated and unreliable. - High use of personal motorcycles without parking in addition to the noise it causes in the city	Creating a reliable transportation system into and out of the city. - encourage using a bicycle with providing parks and safety system
	Effective provision of critical services	- Diversifying sources of critical infrastructures and actively managing them	Highly achieved have mixed-use zoning, meaning lands are being used for many purposes, residential, and others	

Table 4.2 (continued) Assessing the resilience of Ariha, Syria

	Reduced exposure and fragility	- providing diverse and affordable transportation and communicatio n networks and preparing them for emergency scenarios	Hardly achieved Green area 10% and neglected. - Many buildings are subject to partial or complete collapse due to the bombing	- Removing completely destroyed buildings that cannot be restored and their rubble in the modern city and traditional city and transforming them into green spaces during the crisis. -Restoration and rehabilitation of traditional buildings in the historic city.
4.Leadership and strategy				
	Effective leadership and management	- include all stakeholders in an integrated decision-making process	Not achieved - There is no system for community participation and involvement in decision-making	Sitting a strategy to involve stakeholders in decision making

Table 4.2 (continued) Assessing the resilience of Ariha, Syria

	Empowered stakeholders	- good education for all and providing accessibility to all sorts of information to introduce individuals and institutions to what to be done in times of crisis	Not achieved - Education is free but in the war, there is a lack of supporting education sector so learning process suffers of hard weakness. - There are no shelters or evacuation plans in cases of natural or human disasters such as the bombing of the city.	- Preparing evacuation plans and warning network - Design shelters against bombing to be a haven for people at the time of bombing.
	Integrated development planning	Setting an integrated urban development strategy that includes city monitoring and land use planning is continuously reviewed and updated.	Not achieved	Preparing a plan for the possibility of involving all stakeholders in development to ensure that there is no isolation between sectors

4.2.2 Define the Importance of Architectural Heritage

The number of iterations for each of the proposals that support the city's resilience was recorded to determine the number of iterations related to architectural heritage management.

Table 4.3 the repetitions and importance

	The Suggestions	The Repetitions
1	Restoration projects	2
2	Energy projects	1
3	Residential design- Design shelters against bombing to be a haven for people at the time of the bombing.	2
4	Prepare small hospitals and clinics	1
5	Utilizing neglected and abandoned homes as social projects and green spaces in traditional city	2
6	Rehabilitation	2
7	Urban planning (transportation-Multicultural festivals- creating inclusive public spaces -With a high level of safety - creating a safety system for children at all aspects - creating outlines points over all the city- Paying attention to and encouraging small businesses, especially craft and traditional businesses -Rehabilitation of the tourist areas in the city- mobile sellers- encourage using a bicycle)	8 2
8	Sitting a strategy to involve stakeholders in decision making	1
9	Preparing evacuation plans and warning network	1
		22

4.3. Discussion

Syria is considered one of the developing countries that does not have experience in the field of urban resilience. Therefore, assessing resilience in small and medium-sized Syrian cities according to a framework adopted by more than 100 cities truly demonstrates the level of resilience in them and clarifies the relationship of architectural heritage and its management to it. By looking at the tables and proposed solutions related to architectural heritage, it becomes clear to us that the sound management of architectural heritage can form an data base that supports decision-makers and stakeholders in developing more intervention plans and improving the life of the local community and developing the region from a social, cultural, health and economic perspective for the local community, as architectural heritage restoration projects at the individual and collective levels in the city meet a great need in the housing sector and improve health standards within the residential environment. In the other hand, rehabilitation projects at the building level or the city level (such as public squares and buildings) provide qualitative projects that may be social, cultural or economic that raise social communication between members of the local community and provide urban spaces that act as a breathing space and give the local community an opportunity to express its culture and identity in addition to providing job opportunities and ensuring the continuity of traditional crafts. The complex and dynamic situation that Syria is going through during the conflict that has not yet ended, which shows the cities' need for multiple methods and methods in confronting crises, in which architectural heritage and its management constitute an important part that can play a role in the ability of these cities for resilience during War, recovery, and then reconstruction. On the other hand, it offers a potential new approach to dealing with urban resilience in light of continuous changes that enables these cities to face all these challenges and make them continue to live in a consistent way during crises. This study is considered the beginning of the field of research into the role of architectural heritage management in urban resilience in developing countries that suffer from various crises, the most important of which are conflicts, as in Syria and the region under study, and it can be generalized in the same region to other cities and neighborhoods.

CHAPTER 5

RESULTS AND RECOMMENDATIONS

The thesis studied a sample of marginalized architectural heritage in northwestern Syria, which has been exposed to war for more than ten years, and found that, Architectural heritage constitutes one of the most important assets that support recovery during and after war, which is considered one of the most important reasons for the destruction and loss of this heritage. Studies concerned with architectural heritage focused on studying it in large urban gatherings and on the subject of documentation only, with the exception of a few studies, which led to the marginalization of architectural heritage spread over large geographical areas in small and medium cities and their countryside. The study included multiple topics related to architectural heritage and its management, which was carried out through conducting partial researches that was published in a conference and two journals. Its partial objectives were contributed into the general objective of the thesis, which is to shed light on the marginalized architectural heritage and clarify the role it can play in contexts of recovery from wars. It was based on several axes, namely the management of architectural heritage and the importance of introducing advanced management tools that help preserve and rebuild it. The second axis is the study of local rural architecture, during which many strategies and practices were concluded that can support the sustainability of contemporary architecture, and the necessity of preserving the rural style, which constitutes a supportive space for urban gatherings in general conditions, in addition to times of crises. The third axis is the relationship of marginalized architectural heritage to the ability of small and medium cities to withstand the contexts of war and disasters, as it has been shown that it constitutes one of the most important assets. The results of the thesis were as follows:

1. Small and medium cities such as Ariha, constitute a large geographical area, and therefore the proposed plan can play a key role in finding solutions to preserve this architectural heritage, not only at the level of Syria and the countries of the Middle East but at the level of conflict areas in general.

At the level of the case study, a comprehensive field survey of the architectural heritage and traditional fabric of the old city in Ariha was carried out, during which all components of the city were documented, such as mosques, baths, Caesareas, traditional houses, squares, the old market, and others. In addition to documenting the architectural heritage, which was completely removed in the past by-laws, a map was created showing the location of the architectural heritage within the city, also a table for this heritage, which was analyzed and concluded with the following results:

- The percentage of architectural heritage in use is 53%, and this is an important indicator of the importance of this heritage to the local community.

- 33% of the architectural heritage was removed by the laws and administrations in the past, and this is an indication of the absence of administrations and integration of the architectural heritage into the development plans in the country.

- The percentage of heavy damage is 14%, and therefore the need to use advanced management strategies for reconstruction by virtual reality, which facilitates taking appropriate decisions for the community before embarking on real reconstruction.

- 17% of the conflict's impact on the architectural heritage completely destructed, based on field surveys, and this is an indication of the importance of developing a short-term plan to preserve what remains of the architectural heritage in the city.

- 35% of the impact of laws and legislations on the architectural heritage in a way that cannot be restored, and therefore the need to develop a long-term plan to integrate the architectural heritage into development plans based on advanced management strategies.

The proposed strategy to deal with the heritage of Ariha city is divided into two parts:

Short term: Documentation of Architectural heritage by Digital Advanced tools and establishing a cloud database for the old city to preserve the records from the loss in the state of emergency conflict scenario. This documentation will be on two levels:

- city level, take action to mitigate risks, (using GIS tool for collecting all information about the historical city, which doesn't need to show 3D modeling, design an interactive map, create a building card for architectural heritage)

- building level, (create a 3D modelling for the significant historical building based on available tools like Laser scanning to be used in conservation work in the future if the conflict risks happened)

Long term: Implementation of a protection plan for the architectural heritage that includes:

- Reconstructing the lost architectural heritage in virtual reality and consider the investigations and archaeological data as a formal reference [8].

- Work on building capacity of a dedicated team in the use of advanced technologies through training courses by specialists.

- Raising awareness of the importance of architectural heritage as a component of these cities to the community and local administrations through seminars and workshops to integrate stakeholders into the protection plan.

2. Rural areas are considered a large and essential geographic component in the world that can be a supportive point in the field of sustainability and mitigation of global warming. The rural areas in Syria play great importance in absorbing population flows due to the population change that occurred in search of safer places since 2011 war. Regarding the case study, a massive displacement and large population flows occurred in northwestern Syria after the 2011 war, especially after the wave of displacement in 2019-2020 and the recent earthquake, which makes it important to think about contemporary architectural solutions based on traditional local architecture that has lasted for decades. In contributing to the sustainability of human settlements and reducing the burden on cities and large urban agglomerations.

A field survey was conducted for the study area, which Al-Zawiya Mountain, and three villages with different models were chosen for the possibility of generalizing the study. The researcher made field visits to the local rural architecture in the study area. The methodology for collecting information included observation, personal interviews, and focused dialogue sessions, and Some articles and references that discussed topics about the study area or were part of it.

The local architecture in the study area was evaluated based on the Versus project to determine the proportion of sustainability pillars that were applied in the study case, which concluded as follows:

- A large portion of local architecture is still in use today, and this is an indication of the importance of studying this architecture for the local community and the importance of preserving the rural system in line with development.

- Local rural architecture was damaged by several factors:

- Neglect: The influence of weather factors due to time without restoration due to migration to cities or the desire for modern construction and keeping pace with technical development.
- War: A large part of it was subjected to bombing, resulting in total or partial destruction, which requires a strategy to deal with it.
- Laws and legislation: A large part of it was affected by the absence of laws and regulations that guarantee the protection of this type of building, and it was replaced by modern housing.

Contemporary rural architecture is completely separated from its environment, and we can say that the model of modern architecture in cities is the system followed in rural areas. A large number of villages began to turn into towns and cities randomly due to the absence of laws and urban regulations that respect the nature of the region, and the rural system began to disappear little by little. so, the traditional vernacular rural architecture must be preserved through restoration and rehabilitation. And to consider it a cultural heritage that carries within it a system of life that must continue.

- Rural geography constitutes an important environmental resource and large areas to which we should direct our attention and work to form an institution specialized in rural development.

- Working to establish an urban system that ensures the continuation and preservation of the rural lifestyle.

- Inclusion of the earthquake-resistant study of contemporary rural architecture.

- Classifying vernacular rural buildings according to the degree of damage, restoring and rehabilitating them to protect them from destruction and extinction.

- Applying traditional earthquake-resistant techniques (reinforcement - partial or total reconstruction) in the process of restoring and rehabilitating vernacular rural buildings.

In the future, we can discuss the mechanisms of development at the economic and cultural levels by proposing appropriate strategies for the context based on the framework of the principles of sustainability for local architecture. Such as autonomy in agricultural production and the use of lands and adjacent spaces. And the establishment of social spaces that enable rural communities to establish stronger relationships and bonds, in addition to spaces for children's play and entertainment.

- Awareness of the importance of the environment and communication with the relevant institutions, to integrate these strategies into the comprehensive plan for rural architecture in case study location

- Advantage of the expert local craftsmen in dealing with local building materials and techniques.

- Holding Materials technical training courses on the use of local building materials, stone-cutting workers.

- Establishing a specialized team to conduct research on the best earthquake-resistant technologies that are appropriate for the study area.

3. By analyzing of Ariha city according of Resilience Rockefeller framework and looking at the figure, we find that the level of resilience is generally very weak in the city of Ariha. Some principles of resilience, such as leadership and strategy, have not been achieved at all. And they are very weak in the principle of economy and society, and also in two of the principles of infrastructure and the ecosystem, and they are partially achieved in principle of Health and wellbeing.

After looking at the frequencies of suggestions that increase the level of resilience of the city, there are 9 suggestions and solutions to improve resilience in the city, which constituted 22 iterations. Proposals related to architectural heritage management represent 36%, and this indicates the important role it can play in the resilience of cities exposed to conflicts and disasters.

Following a comprehensive planning approach that ensures the integration of resilience and the preservation and rehabilitation of architectural heritage.

Dealing with architectural heritage as an asset for resilience in order to support these cities in recovering during and after the war.

REFERENCES

[1] Alrebat, N , “Protecting heritage... Destruction by more than one tool,”, 2020, May 7, https://www.alaraby.co.uk/%D8%AD%D9%85%D8%A7%D9%8A%D8%A9-%D8%A7%D9%84%D8%AA%D8%B1%D8%A7%D8%AB-%D8%A7%D9%84%D8%AA%D8%AF%D9%85%D9%8A%D8%B1-%D8%A8%D8%A3%D9%83%D8%AB%D8%B1-%D9%85%D9%86-%D8%A3%D8%AF%D8%A7%D8%A9,The New Arab.

[2] SANA, “Preserving and protecting Syrian cultural heritage...an urgent necessity and a collective humanitarian duty,”, 2019, July 22, https://www.sana.sy/?p=983526#:~:text=%D9%88%D9%84%D8%AD%D9%85%D8%A7%D9%8A%D8%A9%20%D8%A7%D9%84%D8%AA%D8%B1%D8%A7%D8%AB%20%D8%A7%D9%84%D8%AB%D9%82%D8%A7%D9%81%D9%8A%20%D8%A7%D9%84%D8%B3%D9%88%D8%B1%D9%8A%20%D8%A7%D9%84%D8%AB%D8%A7%D8%A8%D8%AA,%D9%88%D9%81%D9%82%20%D8%A3%D8%B3%D8%B3%20%D8%B9%D9%84%D9%85%D9%8A%D8%A9%20%D9%88%D8%AA%D9%88%D8%AB%D9%8A%D9%82%20%D8%A7%D9%84%D8%A7%D9%86%D8%AA%D9%87%D8%A7%D9%83%D8%A7%D8%AA, SANA.

[3] Alshekh H, doha , “Reviving cultural heritage after armed conflicts.”, (2016, June 25), https://aljumhuriya.net/ar/2016/06/25/35277-2/, aljumhuriya.

[4] Morishita, N., Wien, T. U., Cetin, R., & Dilsiz, A. (n.d.), “A Vital Proposal for Re-Establishing Post-War Rural Housing in Syria.”, International Multidisciplinary Scientific Conference on Social Sciences and Arts / SGEM Vienna 2017 [Online]. https://www.researchgate.net/publication/348730284

[5] Bose, S , “State and management of architectural heritage in Kolkata,” Journal of Architectural Conservation, *vol. 21, no. 3, pp. 178–194*, Sep. 2015.

[6] Lorenzo Aspres, A , “La reutilización hotelera del patrimonio monástico gallego,” Cuad Estud Gallegos, *vol. 64, no. 130, p. 431*, Sep. 2017.

[7] Trizio, I., Brusaporci, S., Luigini, A., Ruggieri, A., Basso, A., Maiezza, P., Tata, A., & Giannangeli, A , “Experincing the inaccessible, a framework for virtual interretation and visualization of remote,risky or restricted access heritage places ” The International Archives

of the Photogrammetry, Remote Sensing and Spatial Information Sciences, *vol. XLII-2/W15, pp. 1171–1178*, Aug. 2019.

[8] Piquer-Cases, J. C., Capilla-Tamborero, E., & Molina-Siles, P , "The virtual reconstruction of architectural heritage and rrs methodological application," In EGA Revista de Expresion Grafica Arquitectonica, *(Vol. 20, Issue 25, pp. 258–267)*, 2015, *Universitat Politecnica de Valencia*. doi: 10.4995/ega.2015.3674.

[9] Allegretti, F., Del Curto, D., & Mazza, S , "Advanced geomatics and conservation management plan for preserving 20th century architectural heritage," in ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Copernicus GmbH, May , *pp. 63–70*,2019.

[10] Barakat, S , "Necessary conditions for integrated approaches to the post-conflict recovery of cultural heritage in the Arab World," International Journal of Heritage Studies, *vol. 27, no. 5, pp. 433–448*, 2021.

[11] Belal, A., & Shcherbina , "Post-war Planning for Urban Cultural Heritage Recovery," in E3S Web of Conferences, EDP Sciences, May 2021.

[12] Kousa, C., & Pottgiesser, U, "Post Syrian-war material recovery, reuse and transformation in the Old City of Aleppo," Journal of Cultural Heritage Management and Sustainable Development, *vol. 10, no. 1, pp. 90–103*, Jan. 2020.

[13] Belal, A., & Sliclieibina, "Heritage in post-war period challenges and solutions," in IFAC-PapersOnLine, Elsevier B.V. *pp. 252–257*, Nov. 2019.

[14] Angelini, M. G., Baiocchi, V., Costantino, D., & Garzia, F, "Scan to BIM for 3D reconstruction of the papal basilica of saint Francis in Assisi In Italy," in International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives, International Society for Photogrammetry and Remote Sensing, *pp. 47–54*, May 2017.

[15] Kousara, F, *Travelers in Idlib Governorate"الرحالة في محافظة إدلب"*, The first., vol. the second. Aleppo: Aleppo - Alsharq Prenter, 1988.

[16] Romão, X., Paupério, E., & Pereira, N , "A framework for the simplified risk analysis of cultural heritage assets," J Cult Herit, *vol. 20, pp. 696–708*, Jul. 2016.

[17] Mileto, C., Vegas López-Manzanares, F., Lidón de Miguel, M., & Hueto Escobar, A , "Guest editorial: Vernacular architecture: sustainability and risks," In Journal of Cultural Heritage

Management and Sustainable Development, *Emerald Group Holdings Ltd, (Vol. 12, Issue 2, pp. 89–91)*, Apr. 26, 2022.

[18] Dipasquale, L., Montoni, L., Montacchini, A., & Mecca, S, "Vernacular and World Heritage Impact Assessment: the case study of Patmos," Journal of Cultural Heritage Management and Sustainable Development, *vol. 12, no. 2, pp. 150–170*, Apr. 2022.

[19] Daghfal, G. P., & Professor, C. A, "Vernacular architecture: Changes in the tradition folkloric forms and narrations in old lebanese houses", In IJASOS-International E-Journal of Advances in Social Sciences, *(Vol. 13)*, 2019.

[20] Salgın, B., Bayram, Ö., Akgün, A., & Agyekum, K, "Sustainable Features of Vernacular Architecture: Housing of Eastern Black Sea Region as a Case Study," Arts, *vol. 6, no. 4, p. 11*, Aug. 2017.

[21] Hardiilla, D., & Nugroho, A. C , "Resilience Capacity Planning: A Strategy Requirement for Vernacular Architecture Existences as a part of Sustainable Development in Lampung," in IOP Conference Series: Earth and Environmental Science, Institute of Physics Publishing, Jan. 2020.

[22] Al Asali, M. W., & Shahin, I , "Rural habitation in Syria: The culture of traditional architecture and its role in the reconstruction process," Metu Journal of the Faculty of Architecture, *vol. 33, no. 2, pp. 101–119*, 2016.

[23] ALTAH, H., & HAJISMAIL, S , "Architectural Heritage in Medium and Small Syrian Cities: Management Advanced Strategies for Postwar Recovery" International Journal of Architecture and Design, *vol. 8, no. 1, pp. 51–65*, 2022.

[24] Correia, M., & Dipasquale, L , "VERSUS heritage for tomorrow: Vernacular Knowledge for Sustainable Architecture", 2014, Firenze University Press, http://digital.casalini.it/9788866557425

[25] Kandakji, N , "Earth Architecture in Syria between the Past Heritage and The Contemporary Experiences," International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies. 15 December 2017 .

[26] Ortega, J., Vasconcelos, G., Rodrigues, H., Correia, M., & Lourenço, P. B, "Traditional earthquake resistant techniques for vernacular architecture and local seismic cultures: A literature review,", In Journal of Cultural Heritage, Elsevier Masson SAS, *(Vol. 27, pp. 181–196)*, Oct. 01, 2017.

[27] el Ssayed, H. M., Zaineh, H. E., Dojcinovski, D., & Mihailov, V, "Re-Evaluations of Seismic Hazard of Syria," International Journal of Geosciences, *vol. 03, no. 04, pp. 847–855*, 2012.

[28] Ritchie, H., & Roser, M., "Urbanization," Dec. 12, 2021,https://ourworldindata.org/urbanization, Our World In Data.

[29] Amico, A. D.', & Currà, E . Currà, "The Role of Urban Built Heritage in Qualify and Quantify Resilience. Specific Issues in Mediterranean City," Procedia Economics and Finance, *vol. 18, pp. 181–189*, 2014.

[30] The Rockefeller Foundation | Arup, "City Resilience Framework,"Rockefeller grantee workshop, New York City,2014.

[31] Prieto, A. J., Verichev, K., & Silva, A, "An approach concerning climate change and timber building resilience: araucanía region, south Chile," Buildings, *vol. 11, no. 10*, Oct. 2021.

[32] Dewi, C., & Rauzi, E. N , "Architectural heritage in post-disaster society: A tool for resilience in Banda Aceh after the 2004 tsunami disaster," in IOP Conference Series: Materials Science and Engineering, Institute of Physics Publishing, May 2018.

[33] Jeleński, T , "Practices of built heritage post-disaster reconstruction for resilient cities," In *Buildings*, MDPI AG, *(Vol. 8, Issue 4)*, Mar. 30, 2018.

[34] Fatiguso, F., De Fino, M., Cantatore, E., & Caponio, V, "Resilience of Historic Built Environments: Inherent Qualities and Potential Strategies," in Procedia Engineering, Elsevier Ltd , *pp. 1024–1033*, 2017.