URBAN GARDENS OF THE FUTURE: WADI HAWA

Imagining the urban gardening community of the future in Az Zubayr from an equitable perspective

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حدائق حضرية في المستقبل: وادي الهواء

COLOPHON

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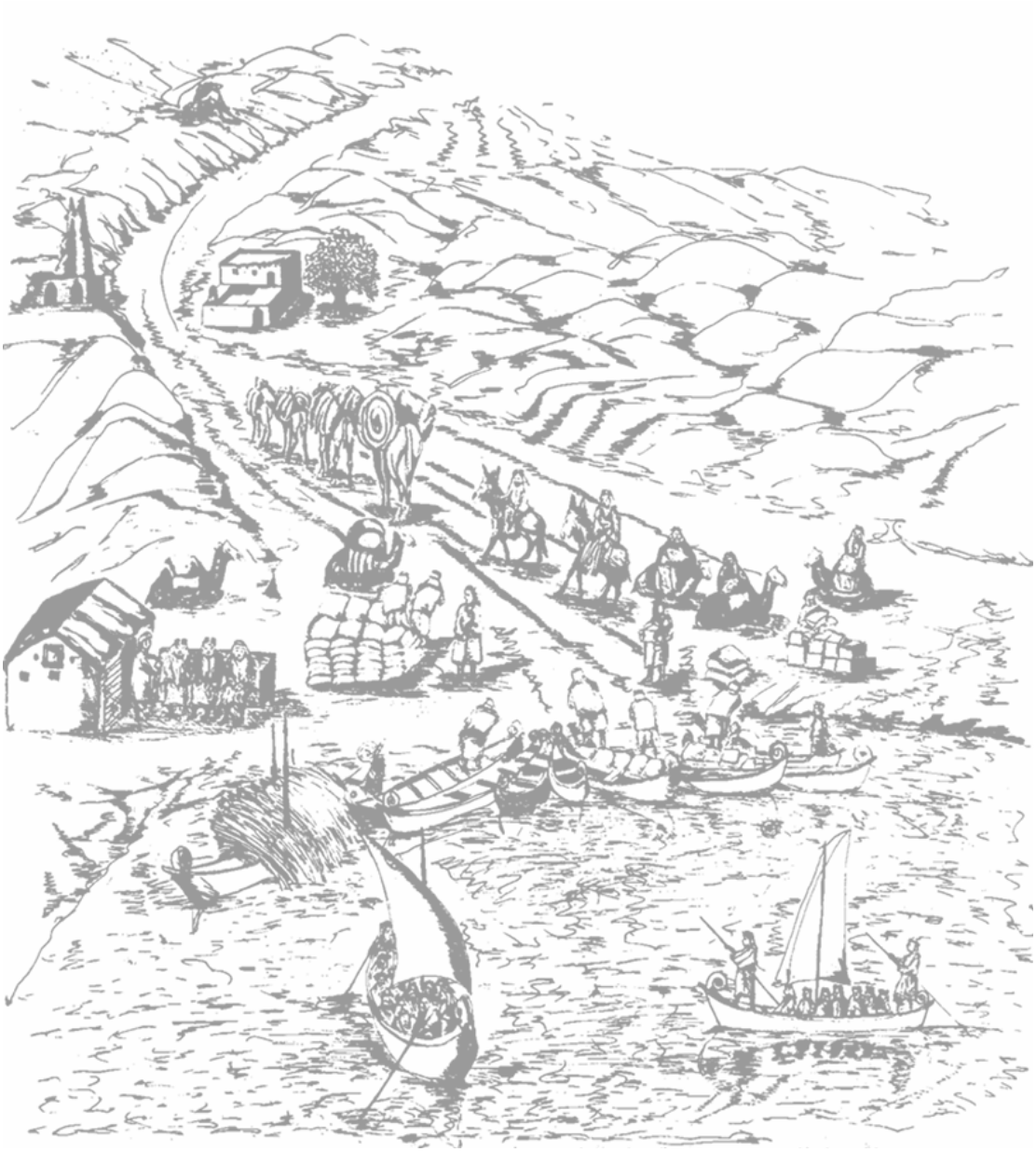


Figure 1a: Drawing which represents the early establishment of Az Zubayr in southern Iraq in the 7th century. It emphasizes trade through water and land by various ancient infrastructure - by Abd Al-Aziz Amr Al-Ali, 1985 (Iraq)

1 Introduction

Location and positionality

Iraq is in an era in which the country has been going through a transformation after decades of conflict. This transformation involves the design, planning and implementation of ambitious infrastructure projects (UNDP, 2023). According to the Iraq's Prime Minister's adviser on transport affairs Nasser Al-Asadi, these projects are aimed to not only rebuild the nation physically, but also to come back stronger economically. These transformations take place on multiple scales throughout the country, one of the regions being the most southern gouvernante of Basra (CNN-News18, 2023). This region is highly impacted by conflict and environmental degradation since the 1980s (Zwijnenburg, 2020). This research explores the context in which these phenomena occur. This concerns the dynamics that arise from the introduction of major infrastructure projects in relation to existing environmental problems, and their impact on people and ecosystems.

Hence, the capital city of this gouvernante – the context of these phenomena – is the eponymous Basra city, the second largest city in Iraq, behind Baghdad (The Editors of Encyclopaedia Britannica, 1998). The two main rivers of the country called the Tigris and the Euphrates, combine in Basra to form the Shatt Al-Arab river, see figure 1. These rivers create the "land between the two rivers", the ancient fertile land of Mesopotamia, also referred to as the Fertile Crescent, see figure 2. Basra was built in the year 636, and had an important role as a regional hub of trade and commerce during the period of the Islamic Golden Age. Sinbad the Sailor, a famous fictional character, journeyed from the port of Basra (Dagher, 2007).

Figure 1b: Map of Iraq, marking the Basra Gouvernante (by author)

Figure 2: This map is a copy of Ptolemy's 4th Asian map from 1486 by Johann Reger, which shows the area known as the Fertile Crescent (Cartographic Collection, 2022)

Interconnectedness sites & hypothesis

Following up on the ambitious infrastructure aiming to transform Iraq, a major port project has been on display. This port is called the 'Grand Faw Port', and is being built in the most southern city of Iraq of Al-Faw (Basra Gouvernante), along the Persian Gulf. Iraqi, Turkish, Emirati and Qatari politicians involved in this project are claiming that it is supposed to become the biggest and most modern port in the world. These countries, Turkey, the UAE and Qatar are the main investors in this project. The project is estimated to cost 17 billion American dollars (Alaca, 2022). Furthermore, this port should function as a 'terminal' for goods coming from Asia by ships, to further transport them. This is intended to be done by the 'Iraq Development Road', a modern high-speed railway network reaching from southern Iraq up to the northern border with Turkey. New roadways are also included in this plan (CNN-News18, 2023).

According to the Iraqi government, this major infrastructural project is aimed to strengthen Iraq's geopolitical position in the Middle East (CNN-News18, 2023). The economists Al-Zahidee and Al-Adam from the University of Baghdad, support this claim. They argue that because of the low competitiveness of the Iraqi ports compared to the developed ports of the region (other Gulf countries), Iraq needs a major port that is able to fill the deficit that hit Iraqi ports. This is because it cannot join the developments that the world's ports and the ports of the region have reached, with the current condition of the Iraqi ports (Al-Zahidee & Al-Edam, 2021). According to Alaaldin (2024) from the Middle East Council of Global Affairs, the success of the Iraq Development Road depends on an effective coordination among stakeholders, including Turkey, the UAE, and Qatar. The project may lack the strategic depth and resilience needed in order to withstand Iraq's unpredictable political environment if there is no proper collaboration (Alaaldin, 2024). Furthermore, according to Rodgers (2012), major infrastructural projects can cause marginalization and disruption. This phenomenon is called *'infrastructural violence'*, which will be elaborated on later in this research.

The Grand Faw Port's arrival is reshaping the region's urban and environmental dynamics. This is particularly the case in relation to two other sites, the cities of Umm Qasr and Az Zubayr. Umm Qasr was Iraq's only deepwater port. It is located a few kilometres away from the border with Kuwait (AlMirbad Media, 2022). According to Hein (2020), port cities function as complex and interconnected nodes in global trade networks. They belong to their surrounding environments, social structures and political dynamics, and should therefore not be seen as isolated economic zones. Thus, they are often shaped by not only economic expansion, but also by the state of the environment and socio-political shifts taking place.

'Underdeveloped' port city is used as a term to refer to port cities that thrived once, but face challenges due to both competition from newer ports and systemic neglect. This means that an underdeveloped port city – usually older and smaller – is experiencing decline because of competition and the prioritisation of newer and more modern port by national and global actors. This neglect

could potentially lead to the inactivity of infrastructure while existing social inequalities (Hein et al. 2021).

Hein (2020) also looked into the effects of global trade networks and stated that shifts in shipping patterns could excessively affect the less competitive. She gives Liverpool (in the United Kingdom) and Detroit (in the United States) as an example of a port city that faced economic decline and reform due to the emergence of newer, larger ports. This leads to the concept of 'relational identity' of port cities. Hein et al. (2021) describes how Diesch and Hansen were concerned with relations between port cities. According to them, *"attention to port cities should not be singular but rather relational. This means that ports obtain their identities and various characteristics due to connections with other ports."* This involves interplay of ports with their neighbours, which avoids isolated and competitive planning. This relational identity also includes long-term sustainability and integration plans, which ensures that ports contribute to regional prosperity in a way that does not overwhelm or surpass their counterparts. This approach focuses on synergy between ports, encouraging complementary roles that benefit regional trade networks.

Even though these studies were done in western contexts, which may inevitably entail different dynamics, there are still certain parallels with this research. Firstly, Umm Qasr port is the older port compared to the new and modern Grand Faw Port. This might create that competitiveness mentioned earlier. The city has already been facing many problems related to severe air pollution, bad health care facilities and economic stagnation, which has been leading to displacement (AlMirbad Media, 2022). These existing challenges along with the competitiveness and (possibly) worsening current conditions of Umm Qasr might lead to Umm Qasr becoming an 'underdeveloped port city' in some way, and decrease in importance.

Another possible future is the not so necessary decrease in importance, but rather change in the role it has: adopting a different importance. As mentioned by Hein et al. (2021), if ports take up a relational identity rather than a singular one, a synergy (instead of competitiveness) between them could be accomplished. The Grand Faw Port and the Umm Qasr Port should strive for a relational identity, and complement each other in their roles within Iraq's maritime infrastructure and trade networks.

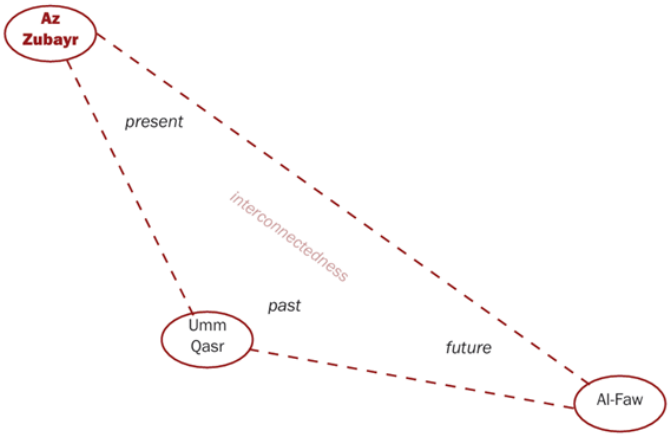
In reality, the poor living conditions of Umm Qasr and its politically sensitive situation, are already creating displacement of its residents. In this research, it is speculated that this will form a trend over time creating more migration flows from the city of Umm Qasr to other cities in the region. Even though the port of Umm Qasr has been the most important port of the country, the current position it has is expected to change with the rise of the Grand Faw Port. It is expected that the Grand Faw Port will take a leading role as it becomes Iraq's biggest and most modern port. It seems possible that this change will be in a way in which the port will decrease in importance since certain services will move to the port in Al-Faw.

Thus, even though in theory, like noted by Hein

et al. (2021), a relational identity between ports is an ideal scenario, this does not seem to be the current reality or expected future of the ports of Umm Qasr and Al-Faw. It is therefore expected that the 'bigger the rise' of the Grand Faw Port, the 'bigger the decline' of the Umm Qasr port will be. This shows the importance of understand that the ports are interconnected, which means their state is related to each other. This latter also goes for the other dynamics in this region, one being the environmental conditions.

The rural areas in the Basra region, including Al-Faw, have been dealing with major environmental catastrophes. For hundreds of years, the main source of income of the rural areas was the fishing and farming industry. Nevertheless, due to many reasons, the communities living in and around Al-Faw have been leaving the area, looking for better living conditions elsewhere. They typically go to Az Zubayr, Basra city or in some cases even further away, to Baghdad (Hadeel et al., 2010). Az Zubayr, southwest of Basra city with a population of 350.000 citizens, has been experiencing rapid growth over the years. It has even led to overrun housing in certain neighbourhoods (Al Kaabi & Al Darwish, 2023). Hein (2020) illustrates this as a trend seen in many port cities, which involves a growth in urbanisation of secondary cities as a result of migration from deteriorating port cities since displaced populations seek better opportunities.

Furthermore, Az Zubayr has shown over the last years that it has started experimenting with innovative agricultural technologies in a climate adaptive manner (Was Here, 2023). This can be seen as an example of city resilience (Hein, 2020). The factors causing migration from Al-Faw and Umm Qasr, and the rise of Az Zubayr pose both opportunities as well as challenges for the rapidly growing city of Az Zubayr. That is why these shifting dynamics between Umm Qasr (site of old port), Al-Faw (site of new port), and Az Zubayr (site of urban growth) highlight their interconnectedness within the Basra Gouvernante since they represent the past, present and future of the region.



Scenario

This research employs *scenario thinking* as a methodological and conceptual tool. According to Godet and Roubelat (1996), a scenario is *"a description of a future situation and the course of events which allows one to move forward from the original situation to the future situation."* Therefore, scenario thinking is a way to not only anticipate, but also to respond to future developments by constructing one or more different possible trajectories.

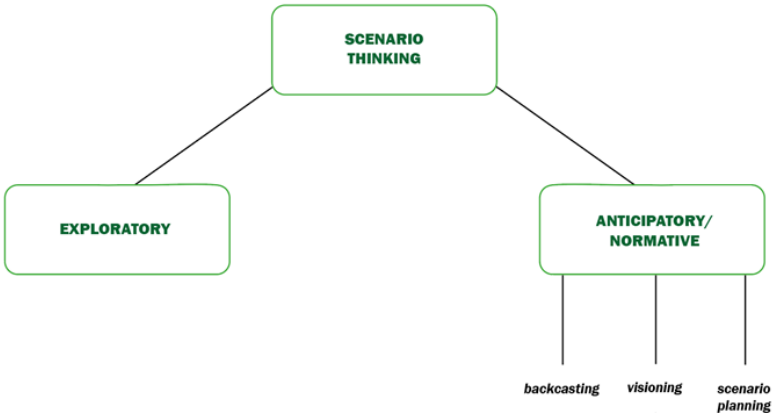
Scenario thinking enables researchers to systematically anticipate and respond to future developments by constructing different possible trajectories. Scenarios can be divided into two primary types of scenarios: *exploratory* (or descriptive) and *anticipatory* (or normative). The authors argue that: *"Exploratory scenarios examine a range of plausible futures, based on potential trajectories of drivers."* However, this is done without any assumption of what should be the answer.

When looking at the intentions of this research, an *anticipatory scenario approach* is most appropriate to the trajectory of the research. This means that this research does not limit itself to solely extrapolating existing trends. Instead, the study envisions an alternative future that challenges and attempts to mitigate infrastructural violence: the perpetuation or reinforcement of structural inequality and harm, caused by major infrastructure projects, which will be further discussed in chapter three (Rodgers, 2012). This anticipatory approach allows this study to integrate both existing as well as expected trends, along with design-based responses through the lens of equitable environmental sustainability.

Anticipatory scenario approaches can be divided into the following types: backcasting, visioning and scenario planning. *Backcasting* aims for a preferred future scenario, and then works backwards to identify the steps needed to achieve that scenario. It is especially useful when the current trends are viewed as problematic and therefore need a transition towards a sustainable goal (Jaoude et al., 2022).

Visioning focuses on creating a preferred future scenario by defining clear, long-term goals and ensuring stakeholder engagement. It is primarily used in cases where local authorities have strong implementation power.

Scenario planning is defined as: *"A disciplined method for imagining possible futures. It identifies critical future uncertainties and develops a wide range of plausible alternatives for the long-term future."* This approach considers past and present events and their independencies to understand their impact on future developments. The approach begins with a contextual analysis to identify the factors bound to happen. This improves decision-making under uncertainty. It is essential in scenario planning to differentiate between the contextual environment – events that planners cannot control (like the economy and climate) and the transactional environment – events that planners can influence and where the community plays an active role in. This could involve local policies, infrastructure projects and community development plans, where negotiations and decisions are made by local governments, businesses, and residents (Jaoude et al., 2022).



Within the types of anticipatory scenario approaches, my research resonates with each of them to an extent. This phenomenon is also mentioned by Jaoude et al. (2022), where this is called a mixed approach. They note that there is a growing need among urban designers to customise and integrate diverse scenario approaches in order to maximize the effectiveness of the scenario exercise.
The approach of this research is exploring a possible future, and aiming to shape and influence that future through my desired vision, which is based on a probable scenario, as mentioned earlier. The focus of this study is to critically examine the current context on the one hand, and to identify potential strategies to mitigate their negative impacts on the other hand.

This starts with employing *scenario planning,* meaning that it starts with analysing the context of the challenges and identifying critical future uncertainties. This is done by taking into account the interconnectedness of the sites and imagining a possible outcome.
In this case, the research recognises that the major infrastructure projects cannot be stopped in this design and research project. Even though it is not possible to halt them, a critical design approach to address these challenges is adopted. This is done by *envisioning* an equitable, sustainable development project that considers all stakeholders. Through the insight (resulted from *scenario planning*) that most of the displaced communities have a background in agriculture, a scenario will be *backcasted*.

In other words, after recognising (uncertain) trends in urban infrastructural projects, environmental degradation and migration trends, a need for certain spaces is identified. These spaces have to take into account the needs of the newcomers to the city; the displaced communities, as well as the long-term residents; the host community. This means that - as was *envisioned* – protecting the specific environment of the project area, preserving and nourishing that particular ecosystem, is part of the design-based responses. As was found, most displaced communities in the context of this research have an agricultural profession. For that

reason, this research attempts to find a way to imagine the urban gardening community of the future in the city of Az Zubayr.

Shortly, this research adopts a *mixed anticipatory scenario approach* where each type of anticipatory approach is represented to an extent. For instance, even though scenario planning seems to resonate the most with my research in terms of decision-making under uncertainty, it contradicts to it as well. In the context of Jaoude et al. (2022), residents are portrayed as having active agency in shaping local policies and infrastructure through engagement with governments and private actors. However, this study engages with contexts marked by exclusion and infrastructural violence. In other words, a context where communities and the environment are marginalized or bypassed altogether by governments (on a local, national and international level) and corporate interests in the pursuit of development. This divergence does not reject scenario planning, but rather extends it, by applying its principles to settings where participatory parity is lacking, and where the aim is not only to imagine preferable futures but also to critique and expose the socio-political forces that constrain them. Such a mixed approach enhances methodological flexibility and supports a more holistic, adaptive framework.

This aligns with the notion of Hein et al. (2021), where they show how scenario thinking can serve both as a research method and a design strategy, ensuring that interventions remain adaptable, sensitive to difference, and responsive to the complexities of urban change. That is why this research uses scenario thinking as a foundational departure point, to actively understand and shape the discourse involving the sites and see the connections between them.

Research questions

All in all, the research positions itself as a response to *infrastructural violence* (the action). The research and design take a reactive position to the infrastructural violence, where the aim is to find ways to imagine a future otherwise, which is done through a *mixed anticipatory scenario approach.* In order to do this, it is crucial to be as sensitive as possible to all vulnerable stakeholders. This needs to be done through an equitable lens since an equity model takes a needs-based approach and pays attention to difference. This research will therefore look into the theory of *ecofeminism* (the reaction), in order to see how it could contribute as a response to infrastructural violence, as it links feminism and environmental protection together. The research proposes a set of questions. The main research question is:

In which way could we imagine the urban gardening community of the future in Az Zubayr, from an equitable perspective?

The sub questions:

1. What are the historical and urban backgrounds of the three interconnected sites, through the lens of infrastructure?

2. Through which spatial interventions can urban gardening and commoning translate in a way that enhances social bonds within the envisioned new community, through an equitable perspective?

2 Methodology

The research question presented by this paper is answered through literature research. The sources used for the existing literature will consist of books and scientific papers. These include critical reflections on the used material throughout the study. The books and scientific papers will include materials written by both Iraqi writers as non-Iraqi writers. Since the project is situated in Iraq, particularly southern Iraq, it is important to use literature derived from that place. Additionally, it is relevant to note that Turkish and Farsi sources from neighbouring Turkey and Iran will be used as well. This is because the representation of the wider region is relevant, especially in the context of the geopolitical climate and the many stakeholders involved in the cross-national infrastructure projects that are discussed in this research. Furthermore, these sources will also include non-regional writers, since certain concepts and stakeholders mentioned in this paper derive from others parts of the world.

On top of that, I will use media sources, consisting of newspapers, videos and social media narratives. Videos, especially in the form of documentaries, are powerful tools to use. This is due to the combination of both visual and verbal explanation in a simultaneous way. In the context of this paper, video material is really beneficial due to the combination of both visual and verbal explanation in a simultaneous way. Especially since the research pays attention to recent developments in the urban and environmental fabric of Iraq, visual material produced by locals or journalists, can provide the latest updates. These tend to be captured by local actors or independent journalists, that can highlight perspectives that are otherwise marginalized in other, official narratives or outlets. On top of that, video is able to convey affect, temporal sequences and spatial atmospheres. These are crucial elements for analysing infrastructural change and lived experiences. That is why video does not only serves as documentation, but also as a tool to critically tell a story and show evidence.

Since my research focuses on community well-being, it is fruitful to look at the narratives of citizens. This will be done by incorporating interviews done with the people by local newspapers. At the same time, for some people it is the only way to share their experiences because they might not have a different platform to make their voices heard (Hoekstra et al., 2022).

Another key point of using videos is that they provide visual material of the site. This includes local residents of the site area filming and uploading videos on eye height level, showing their town and their neighbourhoods. In this day and age, street view imagery has become a tool that is used as a valuable tool for architects and urban planners, providing accessible and up-to-date visual data of the built environment.

However, even though street view imagery services tend to have geographically dense coverage, the coverage is unevenly distributed. The spatial distribution of street view imagery is hotspot-shaped. It therefore occurs frequently in some areas or cities and remains unavailable in about half of the countries worldwide, including (parts of) Iraq. On top of that: *“Smaller towns and rural areas may not always be included in areas*

where such features are available" (Li et al., 2022). That is why using videos and photos accessible through social media platforms, in combination with satellite images which are universally available, is considered the best method to gain visual data of the built environment of the site area in Iraq.

Moreover, both existing maps and my own mapping will be used to support the literature review and further insights. It provides clarity when talking about both the infrastructure projects and the environmental issues on a transnational level, which is crucial in this paper. They are useful to not only get a better understanding of the site characteristics, but also of the shifting dynamics within the Basra region, and the interconnectedness between the sites, as mentioned in the introduction. Evidently, this applies to each one of the sites as well, particularly with the focus on the project design site.

The core of the paper will be divided into four chapters. The first two chapters will answer the first sub-question: *What are the historical and urban backgrounds of the three interconnected sites, through the lens of infrastructure?* In the first chapter, a theoretical framework will be provided that builds on the concept of infrastructural violence. The concept of infrastructural violence tells the story, the action. Other concepts related to the topic will be looked into as well to provide greater insights. Then, the second chapter focuses on this lens of infrastructure in the context of the region, while zooming into the three interconnected sites. The third and fourth chapter will answer the second sub-question: *Through which spatial interventions can urban gardening and commoning translate in a way that enhances social bonds within the envisioned new community, through an equitable perspective?* Chapter three will therefore provide a theoretical framework regarding ecofeminism, since the concept of ecofeminism tells the way forward, the reaction. The framework will be supported by references. Afterwards, chapter four will provide design-based spatial interventions, based on insights from the literature, as well as their specific implementation in a context-specific way. A conclusion will follow, where the research question will be answered. Finally, a discussion will be provided where I reflect back on the research and the results.

As the author of this research, I am aware of the factors that influence my positionality. This firstly includes the impact of my personal connection to the site, as mentioned in the introduction chapter. My identity as a woman and a minority shape and frame my research, whether consciously or unconsciously. This also applies to the fact that I have lived and been educated in The Netherlands my entire life. My frame of reference and academic approach will therefore inevitably be influenced by the Dutch cultural and educational context. This brings me to my awareness of the knowledge I am producing, and the fundamental limitations that come with it. This includes the inability to visit the site of the project, due to safety concerns that raised because of attacks in Iran, and the proximity of the site to the Iranian border. All these factors are variables that model my frame of reference and limitations involving this research.

3 Uncovering violent infrastructures and urban inequality

This chapter forms the first part to answering the first sub-question of this research: *What are the historical and urban backgrounds of the three interconnected sites, through the lens of infrastructure?* This chapter will therefore uncover the concept of infrastructural violence and related theories in order to get a better understanding of the problematics of the research.

Infrastructure is long considered to be a technical tool that is managed by engineers and urban planners. However, it is also described as one of the major vectors for the organisation of society by the state. It is the place where the practices of the state join the 'global economy' and processes of 'development'. It is the site where both social control and oppression can be seen, as well as a place where more positive politics can be imagined. In this case, social improvement and progress can be distributed throughout society.

Infrastructure plays a role in how people relate to the city and to each other, and therefore where and how people and things move across time and space. According to Susan Leigh Star (1999), infrastructure is ecological and relational at the same time: *"This duality arguably marks infrastructure as a particularly productive site for exploring questions about the political economy of social suffering in cities from an ethnographic perspective."*

Rodgers (2012) introduced the term *'infrastructural violence'.* When doing so, he refers to the findings of Mann (1984), who describes infrastructure as a privileged institutional channel for social regulation. He also brings forward Graham's (2010) notion that highlights the vivid suffering that can occur as a result of the deliberate targeting of infrastructural networks. The foundation of the theory lies on three concepts: structural violence, de-development and gentrification, and biopolitics. Each of these concepts will be elaborated on in the following paragraphs.

Structural violence is a concept introduced by Galtung (1969), it describes that harm is caused by infrastructure through social structures that systematically disadvantage certain groups. Harvey (1973), was a critical urban theorist and argued that *de-development* of infrastructure is a deliberate strategy, one that neglects marginalised groups by only benefitting dominant economic classes. In addition, Smith (1996) noted that *gentrification* illustrates how infrastructural transformations cause displacement of vulnerable communities, which then further exacerbates social and economic disparities. Lastly, the concept of biopolitics by Foucault (1977) describes how governmental powers regulate populations through infrastructure and policies. In this way, they determine who has access to life-sustaining resources.

That is why infrastructural violence underlines the systemic and structural harm embedded within the built environment and institutional practices, in which marginalised communities are disproportionately disadvantaged. This is done by perpetuating

social inequalities and the reinforcement of power imbalances.

Interestingly, the concept of 'infrastructural violence' does not only play a critical role, it also plays a practical role. The framework does so by reminding society's responsibility to itself, as well as provides a foundation to identify those who undermined this responsibility by addressing systemic disparities in infrastructure and urban planning. This is relative to each city since each place has its own, unique context (Rodgers, 2012).

In my point of view, almost all infrastructure is somehow violent, in the sense that it entails a sense of violence over the existing ecosystem, and inevitably causes a certain level of harm to it. What is important to note however, is the part of infrastructural violence involving the disproportionate disadvantaging of marginalised communities. This could be in the form of exclusionary urban planning, that for example segregates communities and restricts access to quality housing. This could then cause gentrification, leading to the displacement of communities. This happens because of rising property values, due to developments that were perhaps tailored to wealthier people, influencial companies, and high-profile jobs. This exclusionary urban planning does not limits itself to urban neighbourhoods, but takes place on larger scales, like urban renewal projects that could also involve highways and ports.

This research employs the position that that is the part where designers, policymakers and affected communities can have an impact by challenging these infrastructures and transformations. This could be in a way where they either demand inclusive development and equitable resource distribution. Or they could play into them if the latter is not possible, and attempt to creating realistic, but innovative and hopeful models. This can be done by designing other ways to mitigate their impacts through creating sustainable, equitable urban development strategies, with respect and understanding to the local and affected communities and ecosystems.

The diagram (figure 3) shows an overview of the concepts that involve *the infrastructure violence (the action: de-development, rimland theory),* and the concepts that involve the *equitable feminist approach (the reaction: sustainable urbanism, ecofeminism, regenerative design, urban gardening)* that are relevant to this research. As is visible, these concepts are related to each other.

In this chapter, the concepts that provide the understanding of the problematics proposed by the research were presented. The next chapter builds on that, by providing the historical context of the interconnected sites. The reactive position – the way we can imagine a future otherwise (as mentioned in the introduction) – will come forward in the fifth and sixth chapter.

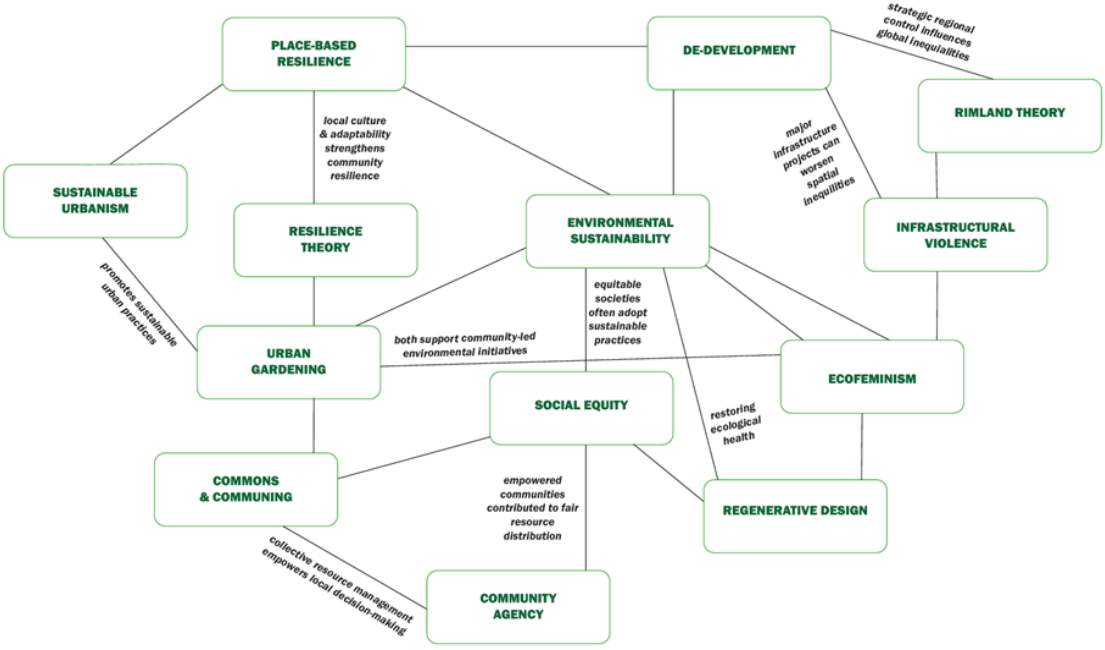


Figure 3: Diagram of the theoretical framework providing concepts of both the action and reaction

4 Historical context of the interconnected sites

This chapter builds onto the historical context of the three interconnected sites within the Basra Gouvernante, which are the cities of Umm Qasr, Al-Faw and Az Zubayr. The previous chapter provided a framework for understanding the 'action', the problem identified by the research. This chapter elaborates on that by identifying those theories in the contexts of the interconnected sites, which will help to comprehensively move forward towards the 'reaction', which will be discussed in chapter five and six. First, a regional overview of the wider region, the Basra Gouvernante, will be provided. In this way, the chapter will move from the bigger scale to the smaller scale. That is why the interconnected cities follow after the regional overview.

The Basra Gouvernante: a regional overview

The Basra Gouvernante is the most southern region of Iraq (see figure 4) and has historically been one of the most significant regions in the Middle East. This is due to its rich cultural heritage, economic importance, and strategic location. It was found in 636 CE as a fort town during the early Islamic conquests. Over centuries, It became a flourishing centre for trade, culture, and scholarship over centuries. This contributed to its reputation as a cradle of Islamic civilisation (Dagher, 2007). It is situated at the confluence of the Tigris and Euphrates Rivers near the Persian Gulf (see 'a' on the map in figure 4: written as 'Arabian Gulf' in Arabic), where the Shatt Al-Arab is formed (see 'b'). It borders with Iran on the east and Kuwait on the south (see 'i' and 'k'). Basra is Iraq's only region that has access to sea, and therefore serves as Iraq's gateway to maritime trade (Al-Mansory, 2018). According to EPC (The Emirates Policy Center), it has major oil fields, accounting for approximately 70% of Iraq's oil production. Hence, the strategic location of Basra serves as Iraq's primary trade hub housing its current biggest port (in use) – Umm Qasr port – and therefore facilitating most of Iraq's imports and exports. (Shuker, 2022). The Basra region contributes to 80% of the country's revenue (Vox, 2019).

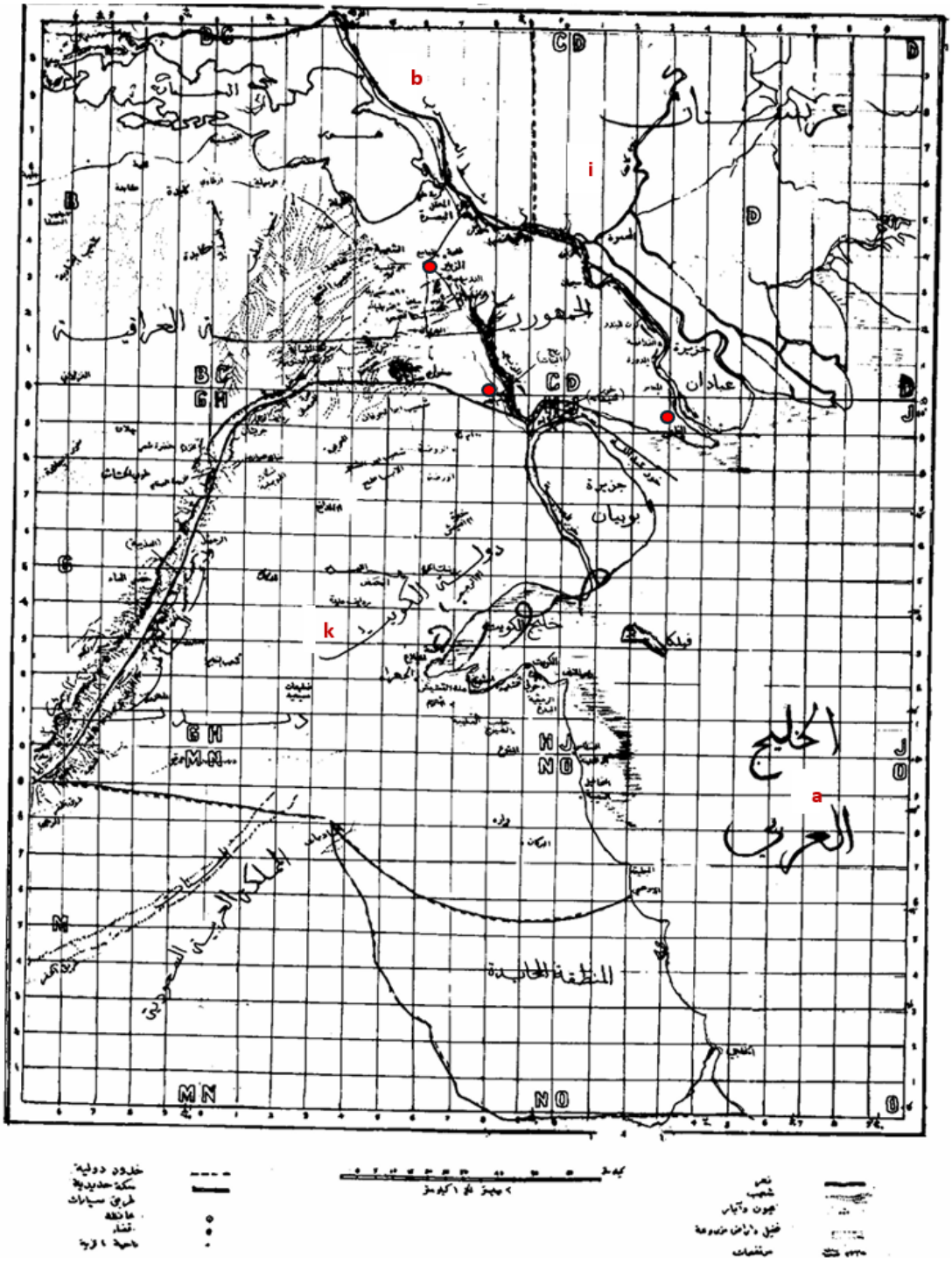


Figure 4: Map of the Basra gouvernante from 1985 (Al-Sanea & Al-Ali, 1985)

Displacement

Despite the earlier mentioned economic sources of income, decades of conflict, including the Iran-Iraq War (1980–1988), the Gulf War (1991), the 2003 US-led war and the ISIS war (2014-2017), have severely impacted the region. These wars left Basra's infrastructure in a deteriorated state. Its environmental condition has been called a catastrophe by many since it has been suffering from salinisation, desertification, and pollution. Due to the decrease in annual rainfall and rising temperatures because of climate change, desertification is taking place in the highest affected areas because of the drought (Partow, 2001). Almost half of Iraq's farmland has been damaged due to rising temperatures, sometimes reaching up to 55°C. Sandstorms have become more frequent. Many farmers in the south have fled their villages, facing unbearable conditions (Al Jazeera English, 2023).

Figure 5 shows a map of internally displaced people (IDPs) – displacement within the country – in Iraq. The IDPs in the north of the country were displaced years ago due to the ISIS war and their direct control over those regions. As highlighted in the map, the reason for displacement in the central and southern regions (including the Basra gouvernante, the focus region of this research) is caused by environmental degradation. There are approximately 10.000 IDPs living in the Basra gouvernante, and an estimated 3000 specifically in Az Zubayr due to these environmental issues. The main root cause for the salinisation, drought and desertification, all depart from the water scarcity. This eventually leads to population displacement. Appendix A provides a diagram of a case study on the experiences of displaced people and their host community conducted in North Iraq by the United Nations. So, due to its relevance to the region and therefore the research, it will be further elaborated on in this paragraph.

Water

Furthermore, the two main rivers of the country, the Tigris and the Euphrates confluence in Basra and then form the Shatt Al-Arab river (see figure 5). Nevertheless, Iraq does not control the flow of the Euphrates and the Tigris rivers, since they both begin in Turkey. About 71% of Iraq's water comes from Turkey, and 10% is controlled by Syria and Iran as the rivers move south. So 81% of the Iraq's water is controlled by its neighbours. For the last 80 years, Turkey has built over 20 (major) dams and reservoirs, on the Euphrates and its tributaries, while Iran is doing the same (more than 600 dams in the last 30 years) for the Tigris and its tributaries, see figure 6 (Vox, 2019). According to the reports of Al-Mahmood (2015), the average inflow to the Shatt was around 40 cms from the Tigris River and around 12 cms from the Euphrates River (see figure 7), while there was no flow from the Iranian tributaries: Karun and Karkheh. The Karun river confluences with the Shatt Al-Arab, however due to latest diversion of the Karun by Iran, the inflow is cut off completely (Rahi, 2018b).

Thus, the furthest country downstream – and the furthest province of Basra (see figure 8) – are not getting enough water to drink, irrigate crops and generate energy.

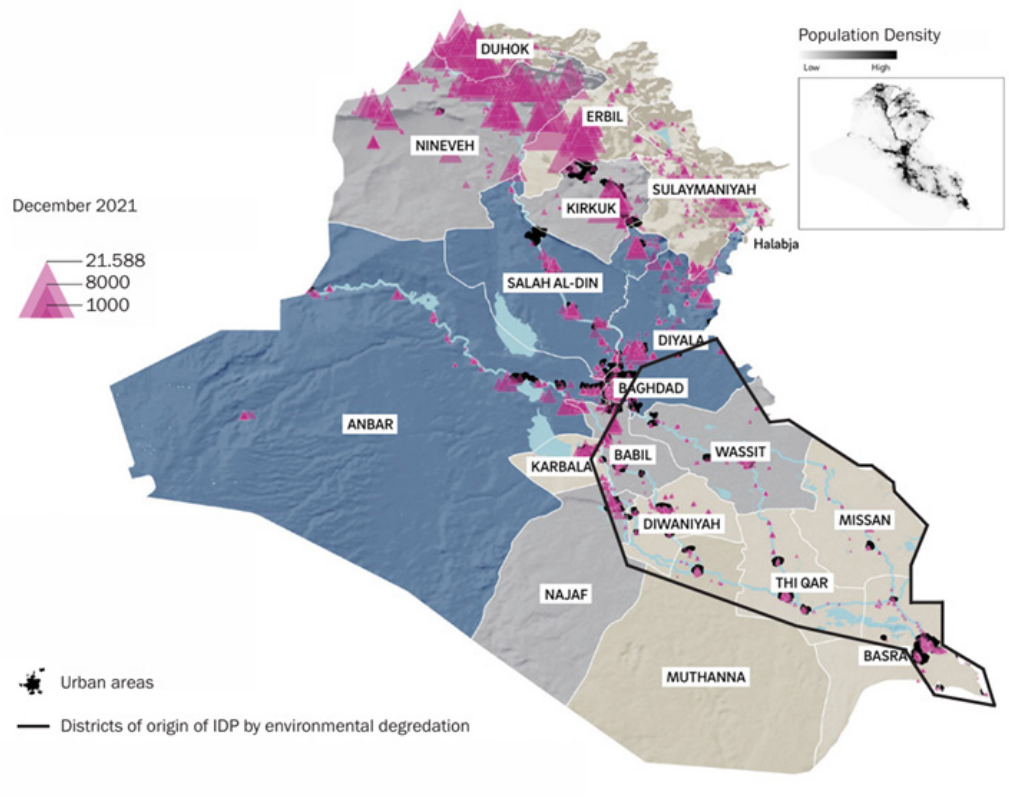


Figure 5: National displacement profile, edited (UNIOM, 2023)

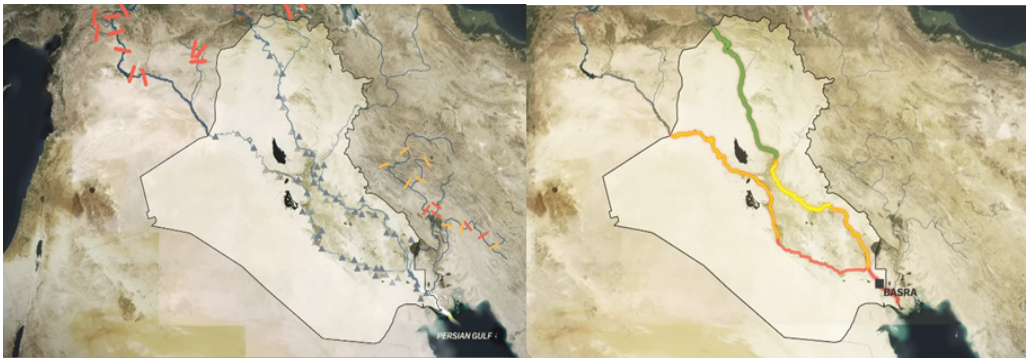


Figure 6: The left map showing the dams built by neighbouring countries. The light grey triangles show the dams of Iraq that are damaged due to wars. Right shows how central and especially southern Iraq suffer from inadequate water infrastructure (Vox, 2019)

To make matters worse, it also makes the rivers more contaminated. Generally, a river is able to dilute many of its toxins due to a normal flow. However, when the water levels are low, these pollutants become more potent (Vox, 2019). The weaker water flow is also causing saltwater from the Persian Gulf to move upstream – due to high tides from the Gulf upstream compared to the weak flow downstream – increasing the salinity, and killing fish and crops (Rahi, 2018b). In 2022, the salt levels of the Shatt Al-Arab contained 6800 parts per million, which is nearly seven times that of fresh water (AFP News Agency, 2022). Furthermore, the quality of the water has been worsened by oil spills from oil tankers and waste, see figure 9 (Rahi, 2018b).

On top of that, Abdul-Hameed en Hatem (2021) conducted research on the effects of the salinity of the Shatt Al-Arab on the groundwater of the Basra region, as channels branch out from the river.
Abdul-Hameed en Hatem (2021): *"The groundwater contains very high percentages of total dissolved solids (2880–10415 mg/l) and electrical conductivity (4450–14190 µs/cm)."* Despite the values of the pH levels (7.1-7.5) and its indication to be a light alkaline, the high salinity makes the water unsuitable for drinking, irrigation, or industry.

An important note to understand the water management issues in the country, is that much of the water infrastructure has been destroyed due to all the wars mentioned earlier. Iraq's infrastructure got bombed by the US-led coalition during the Gulf War, including four hydro-electric dams, which in turn disabled the water treatment facilities that relied on electricity. Additionally, a sewage treatment plant in Baghdad was also bombed which led sewage to flow into the Tigris. This poisoned the water supply for southern Iraq. Iraq also dealt with strict sanctions, which included the restriction of construction supplies and water purification chemicals (Normand et al., 2003).

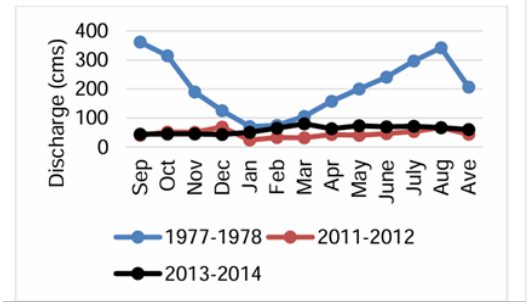


Figure 7: Three different periods showing the inflow from the Tigris and the Euphrates rivers into the Shatt al-Arab (Rahi, 2018b)

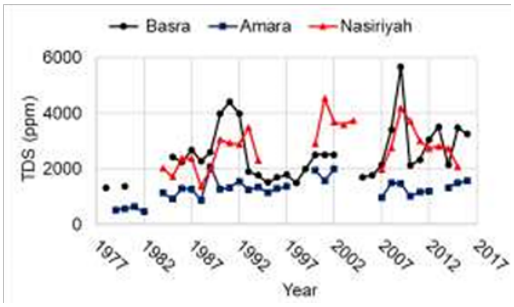


Figure 8: Graph comparing the salinity of the Shatt al-Arab salinity at Basra, the Euphrates at Nasiriyah and the Tigris at Amara to each other (Rahi, 2018b)

Another catastrophe was Saddam's fights against rebels in the marshlands in 1993, in which he diverting the rivers away from the marshes. This lead to the drainage and disappearance of many marshes, along with displacement of its original inhabitants. The wars and instability in the early 2000s led to the worsening of the water infrastructure and plans to rebuild its infrastructure could only be realised to a certain degree. The 600 million dollars that were pledged in 2006 for water projects in Basra, alongside an upgrade of its sewage network, was never completed. The mismanagement and corruption caused the loss of millions of dollars (Vox, 2019).

In 2014, ISIS controlled the dams in the north and cut the water flow down south. According to multiple reports, ISIS militants poisoned the water with oil in Tikrit and destroyed most of a major barrage in Fallujah. Even though they were defeated in 2017 by Iraqi forces, the damage ISIS caused was already done (Jaafar, 2021).

Multimillion dollar project promises were made again in 2018 to provide clean water for Basra's residents (Jaafar, 2021). Only in 2023, several water treatment plants were realised like the Khor Al Zubayr complex, which provides clean drinking water to a 100,000 residents in the Zubayr, Safwan, and Umm Qasr sub-districts. Together with two other treatment plants, these projects collectively serve approximately 279,000 residents (UNDP, 2023a). Even though this is an improvement, it only serves around 8% of the population of the Basra gouvernante. The promises made for the renewal of the water infrastructure of Basra failed. Infrastructure projects often promise significant societal and economic benefits. However, many fail to realise the created expectations for many reasons. These commonly include inadequate planning, lack of clear leadership, political instability, and financial mismanagement (Wang et al., 2023).

Figure 9: Severe oil pollution near the Shatt Al-Arab (Al Jazeera, 2023)

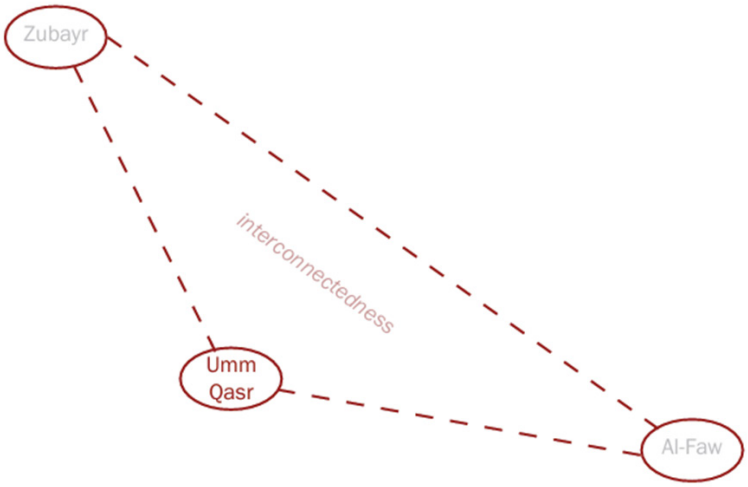
All these factors, especially the political instability and the corruption within Iraq (which is tied with lacking clear leadership and financial mismanagement) are estimated to be the causes of either the failures, or major delays of these infrastructural transformations.

Besides, solutions for water issues for other purposes, like switching to modern and sustainable irrigation systems, are not on the agenda of the Iraqi government. When Iraq's Minister of Water Resources is asked about why the government reserved a budget for the oil industry that is ten times more than that for water (almost none for agriculture), he blames it on the instability of the country. He mentions that the government is in a difficult phase and he is not able to make decisions due to all the other parties involved. He also points out that the government is 'forced' to get along with the oil industry because they form the main source of economic revenue to the country. While officials keep pointing fingers at each other, farmers are bearing the brunt (figure 10 and 11). They explain how it hurts them to leave their land, how they do not know what other work they could do, since farming is all they know (Al Jazeera English, 2023).

Despite the combination of ecological, economic, and social challenges, Basra remains central to Iraq's development aspirations. The Iraq Development Road project and the Grand Faw Port project – introduced in the first chapter – are key to these efforts, aiming to establish Basra as a major international trade hub. Hence it seems like the problems are being ignored and neglected, and the priorities lay somewhere else.

Figure 10: Buffalo herder Haddam fills his boat with drinking water purchased miles away to keep his animals alive (Malfatto, 2021)

Figure 11: Golden cracks in Al-Faw due to drought, showing human presence (Kamel Abd, 2023)


Zubayr
interconnectedness
Umm
Qasr
Al-Faw

I. Umm Qasr: the decline of a port

In this paragraph, the city of Umm Qasr will be highlighted, which forms one of the three elements of the interconnected model.

Umm Qasr is located near the Kuwaiti border, and has approximately 50.000 citizens, see figure 12. The modern-day port of Umm Qasr was Iraq's first deepwater port, which was established in 1961 under the regime of General Abdul-Karim Qassem. The facilities of the port were constructed by a group of companies from West Germany, Sweden, Lebanon and the Iraqi Republic Railways. The operation of the port officially started in 1967 (Al-Maliki, 2018).

The aim was to support Iraq's maritime trade, especially since the discovery of oil in Basra in the late 40s. The port is fundamental to Iraq's economy, facilitating the export of oil and the import of essential goods (Alfayyadh, 2017).

Based on research on other port cities and contexts, this study suggests that a probable scenario is that the port will either decline, or adopt a different function. Evidence from this specific site shows early markers to this. One of the reasons for that is the fact that the port's infrastructure is older compared to that of the new, hypermodern Grand Faw Port.

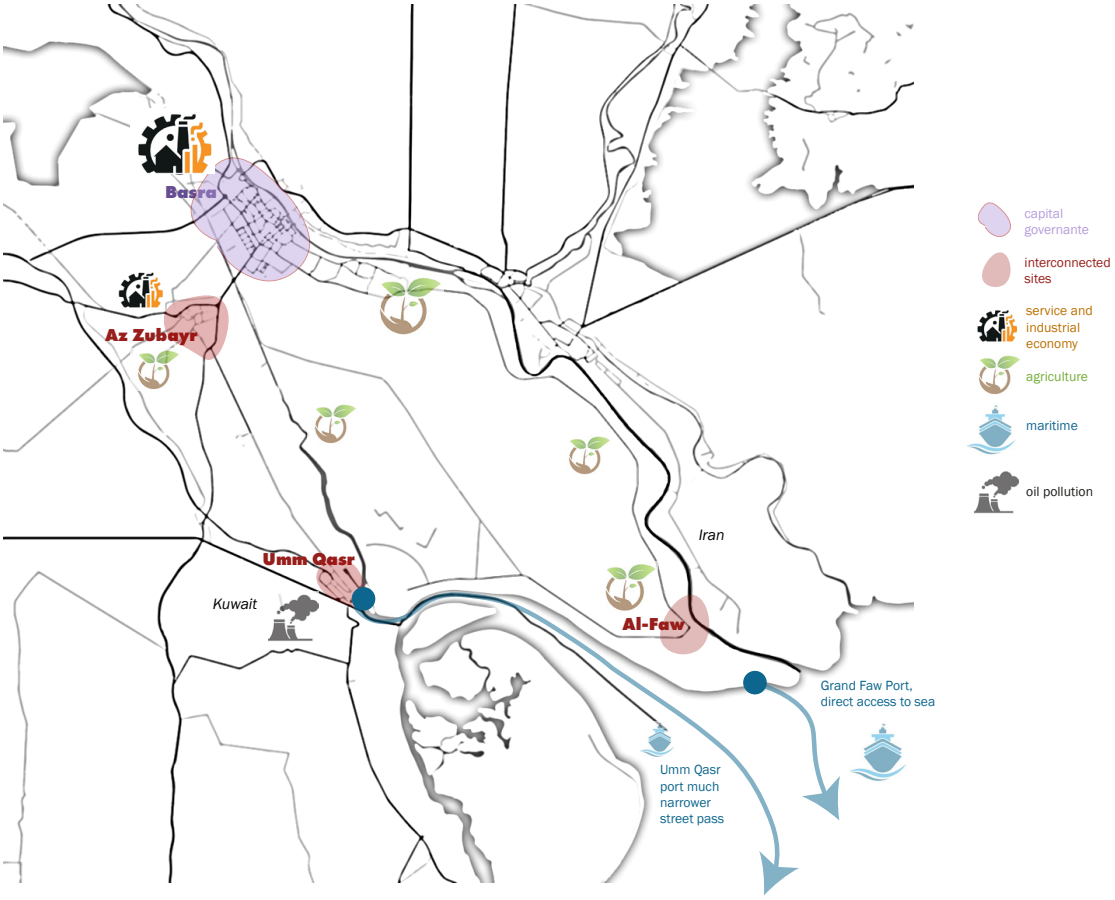


Figure 12: The Basra governante and its interconnected sites

Umm Qasr, like many other cities in this region, has dealt with extreme damage during the wars of the last decades. As was mentioned earlier regarding Iraq's water infrastructures, attacking and damaging the port – and therefore another crucial infrastructure to the country – was used as a way to not only tore down their enemy (in this case Iraq) financially, but also to cause long-term (irreversible) and systematic damage. Especially since Umm Qasr had the main port, it became a serious target.

In 1991, during the Gulf War (Iraq vs. Kuwait and US-led coalition), Umm Qasr port was bombed, see figure 13.

This caused significant damage; nineteen ships of Iraq's navy sunk, leaving another six damaged. After the war, Iraq faced major sanctions; they had to hand over the control over the inlet to the port, to Kuwait (Pike, 1997). Additionally, a bridge that connected Iraq and Kuwait was removed. All these post-war events gave birth to ongoing tension along the border. Following the Gulf War and the detrimental sanctions put on Iraq, Umm Qasr port handled 3500 tonnes of oil-for-food humanitarian aid on a daily basis, organised by the United Nations Then, in 2003, during the Iraq War (Iraq vs. US-led coalition), the port became one of the first objectives. The port was captured by a landing force led by

Figure 13: Coalition air strikes inflicted serious damage to the Umm Qasr Port in March 1991 (Pike, 1997)

the British, American and Polish marines after battling with the Iraqi forces for four days (Rossiter, 2009).

According to the Brits involved in the operation, much of the infrastructure of the port was neglected at the time. Due to the sanctions of the 90s, investment and modernisation was not possible. Many of the approach channels had silted due to lack of dredging and wrecks littered the general area. However, it still functioned, and was crucial since it was vital in maintaining the flow of basic commodities like food and medicine following the initial combat phases (Defence, 2021).

In 2016, a new greenfield terminal was opened at the port, which aimed to boost the port's efficiency by adding cargo handling capacity. In 2019, two new deep-water berths were opened to accommodate container vessels of up to 14,000 TEU capacity. The port also contains an automated reception area (MediTelegraph, 2019). Regardless of these renewals, sedimentation in the port's channels has increased maintenance costs and inevitably reduced its operational efficiency. This shift underlines the uneven nature of infrastructural development where new projects often come at the expense of existing systems. Those existing systems can even be strategically neglected in order to benefit certain dominant economic classes, as mentioned in chapter three. In spite of the latter and the damages it has faced in the past, Umm Qasr port is still able to function reasonably effectively to the standards of this day and age Al-Zahidee & Al-Edam, 2021).

As mentioned earlier, this research adopts scenario thinking as a methodology. That is why both existing systems as well as probable futures are considered. In terms of accessibility, Umm Qasr Port has a depth limit of around 12-14 meters, compared to the planned 19-21 meters of the Grand Faw Port. Furthermore, Umm Qasr Port is accessed via a relatively narrow canal, limiting ship sizes, whilst Grand Faw Port is built directly on the Persian Gulf, allowing an easier access for larger vessels (Arab Sea Ports Federation, 2022). This could determine why certain larger ships could prefer the port in Al-Faw over the port in Umm Qasr, potentially causing a change in the role of the Umm Qasr Port. It could potentially become a more regional and local port, operating on a smaller scale compared to the port in Al-Faw. Another important factor to consider, is the habitability of Umm Qasr, which adds up to whether or not it is (or will be) a liveable city for port workers, impacting employment in the city.

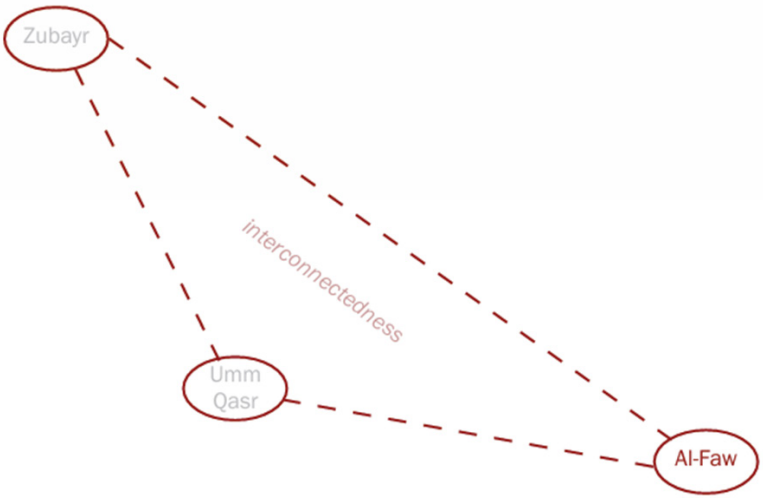
Regarding the liveability of Umm Qasr, the city has been facing several issues. The city is dealing with extreme air pollution. The air pollution is caused by the oil fields of Kuwait, a few kilometres away from Umm Qasr. It has led to severe air and water contamination, making the area increasingly dilapidated. Residents face chronic health issues due to poor air quality. Locals emphasise that this is caused by the oil fields in Kuwait that are less than 5 km away from the city. Field research in the port was conducted and proved that the port activities were not causing the contamination (AlMirbad Media, 2022).

This is problematic for Umm Qasr since it is extremely difficult to deal with the source of the problem as it is a transnational issue. In May 2023, Alaa Al-Haidari, member of the Iraqi parliament, said that Kuwait started digging new oil wells a few meters away from Umm Qasr. He described it as a provocation to Iraqis and the people of Basra in particular (Mustafa et al., 2023).

To make matters worse, the city is dealing with a lack of adequate healthcare facilities. There is only one hospital in the city, limited to three specialisms. It is reported that in case of an emergency, people are forced to drive for a minimum of 40 minutes to Az Zubayr in order to get proper healthcare. Citizens and local spokesman express that the state of the city has become unbearable (AlMirbad Media, 2022). These narratives show that it is likely that the quality of life keeps decreasing in Umm Qasr, which is expected to lead to more migration within the Basra region. It is probable that this takes place towards the direction they are already headed towards during an event, up north to Az Zubayr.

On top of that, in the past decade, border demarcation between Iraq and Kuwait has been an ongoing and a sensitive issue. This is due to the border delineation established by the United Nations after the Gulf War of 1991, mandating certain territorial concessions by both countries. It has been leading to clashes and affecting the residents of Umm Qasr. It has even led to the demolition of houses and the displacement of people from Umm Qasr in 2013, which led to protests from the affected Iraqi families (Fares, 2023).

In 2023, the matter rose up again. Dr. Fahd, a Kuwaiti that worked for the United Nations, mentions that the reason that this issue is brought up again, is because there must be a buffer zone between the countries. This must be a one kilometre zone between Iraq and Kuwait that is observed by both sides. Furthermore, a number of voices have argued that Kuwait paid 3 million Kuwaiti dinars to the Iraqi government as compensation. Some reports have raised concerns about the effectiveness of this compensation and whether or not the Iraqi families received the direct benefits. He also points out the disruptive humanitarian consequences of demolishing homes and the displacement of families. He addresses the situation to be potentially unfair since Kuwait is supposedly not implementing the buffer zone on their own side of the border (Qanat Altaghyir, 2023).
Considering these insights, a scenario where the Grand Faw Port is expected to further overshadow Umm Qasr's role as Iraq's primary maritime port together with an increase in migration from Umm Qasr, seems closer to a possible future scenario.


Zubayr
interconnectedness
Umm Qasr
Al-Faw

II. Al-Faw: the rise of a port

The previous paragraphs illustrated the relation between the expected decline of Umm Qasr Port and the Basra Gouvernante. In this paragraph, the city of Al-Faw will be discussed, which forms the second element of the interconnected model, and elaborates on the expected rise of the Faw port.

Al-Faw is a city of approximately 35.000 residents, situated at the tip of the Persian Gulf. It is strategically a crucial urban settlement. The city has a history reviving around fishing, farming, maritime, and oil-related industries, which shaped its urban fabric (figure 14 and 15).

Historically, during the period of the Arab Empires (8th-13th century), Al-Faw's coastline was used as a stopover for boats which navigated between Basra, Persia and the Arabian Peninsula. This is because Basra was the main port city of the region, further inland. During the Ottoman period (16th-20th century), Al-Faw became a small coastal settlement which was mainly used for fishing, pearl diving and small-scale local trade. After the fall of the Ottoman Empire following World War I, Iraq came under the British occupation. The British used Al-Faw as a strategic outpost for their maritime and logistic purposes, due to its direct location at the mouth of the Shatt Al-Arab, see figure 12 (Biggs, 2023).

The Shatt Al-Arab was in control of the Ottomans, and ever since their fall it has also been a matter of issue how much of it would be given to Iraq and how much to bordering Iran, yet Iraq still controlled most of the Shatt. In 1975, The Algiers Agreement led to Iraq ceding half of the Shatt to Iran, in exchange for Iran halting Kurdish support in the north. This did not last for long since the Iran-Iraq war started in 1980, where both sides fought again over control of the river. After the war in 1988, they turned back to the agreement of dividing the control over the river in half (Lesaffer, 2022).

During the Iraq-Iran war in the 80s, the city suffered significant urban destruction, especially during the first and second Battles of Al-Faw. During the first battle in 1986, Iran captured the Al-Faw peninsula, which was reclaimed by Iraq in 1988 close to the end of the war (Al-Dulaimi, 2021). This left much of Al-Faw's infrastructure in a poor condition due the extensive use of chemical weapons. This did not only damage the infrastructure, and led to casualties, but also harmed the local ecosystems in and around Al-Faw (Russell, 2005). During this war, many farmers and fishermen from Al-Faw got displaced to other places within the country seeking safety (Al Jazeera English, 2018). When they came back after the Gulf war, the were confronted with the damaged soil due to the chemicals used during the wars, and oil that was being spilled in the Shatt Al-Arab by the oil industries. They did not get any governmental support to reclaim and restore their land, which worsened the water scarcity and drought that increased massively since the 21st century, as discussed earlier. This created a new wave of internally displaced people from the Al-Faw peninsula towards other cities in the region (Alkhudary, 2023).

Figure 14: Al-Faw Port in 1951 (Old Iraq, 2015)

Figure 15: Date pam groves in Al-Faw city in 1955 (Sabri, 2021)

Moreover, the Grand Faw Port and the masterplan designed for the peninsula aim to revitalise the area. Al-Faw is supposed to turn into a bustling economic and logistical hub (Joe, 2021). The project of the Grand Faw Port, was proposed in the early 2000s by the Iraq government, the Ministry of Transport. They announced it after the 2003 war in an attempt to enhance the country's maritime trade capacity, and become a bridge between the east and the west through the Iraq Development Road (Ministry of Foreign Affairs, 2023). The proposal emerged in a period of political and social instability in Iraq due to growing public anger with the weaknesses in the way the country was managed. Critiques mention that in contrary to how the government talks about the project themselves, the government primarily used this project to alleviate public dissatisfaction. They did so by showing their intention to undertake megaprojects and diversify the economy which mostly depends on fossil fuels (Hasan, 2024).

Besides, connecting Iraq to Europa is not a new idea, as it was already proposed over a hundred years ago. In 1903 the Germans came up with this was called the Berlin-Baghdad railway. They wanted to establish a port on the Persian Gulf that would connect Berlin to Baghdad, which technically meant a connection between the ports of Hamburg and Basra (see figure 16). This is because the British controlled the Suez Canal, so the Germans wanted to strengthen their position in the Middle East by establishing an alternative transportation route (Franzke, 2003). The Germans and Ottomans got to an agreement and started building in the early 1900s, see figure 17. However, regular delays took place, at the start of World War I 960 kilometres of the intended 1600 kilometres was not realised yet. The line was completed in 1940, and the first train from Istanbul to Baghdad departed. Today, the infrastructure of this railway is damaged in certain areas due to the wars in Syria and northern Iraq. On top of that, the infrastructure is considered outdated, and does not meet the standards needed to achieve the goals set by the current plans (Bilgin, 2004).

The projects became part of the National Development Plan after the Iraq War, then the building process started in 2010. Investors included local and international ones, particularly from China, Turkey and Qatar. These stakeholders (see figure 18) also aim to benefit from the access to the trade routes, form economic partnerships and take part in the infrastructural development. Daewoo Engineering & Construction, a South Korean firm has been involved in the key phases of the project. Technital, an Italian design firm has been responsible for most of the industrial and urban planning of Al-Faw, alongside some engineering tasks as well (Cafiero, 2025).

The construction got on hold between 2014-2017 due to the war with ISIS. It has been reported to be finalised in the first quarter of 2025. The Iraq-Turkey trade corridor is a massive, high-risk project aimed at transforming regional trade routes. This $17 billion initiative, includes the construction of one of the largest ports in the world and a modernized network of roads and railways, is seen as a potential competitor to the Suez

Canal (Alaca, 2022). The plan is financially backed primarily by Qatar and the UAE, and on then Turkey. It aims to create a direct trade route from the Persian Gulf through Iraq and Turkey to Europe, bypassing the Suez Canal. The project involves rebuilding Iraq's infrastructure, including a new freeway and rail system, to support efficient transport for both cargo and passengers. The Grand Faw port is supposed to have a capacity of nearly 100 million tonnes (DesignZip, 2025).

Figure 4 shows a historical map of the Basra gouvernante, with Al-Faw hightlighted in the south. It is clearly visible that there were no port activities happening on see, due to the port of Al-Faw primarily focusing on local trade. The Grand Faw Port aims for the complete opposite, as you can see in the current map (figure 12). It is widely extended from the shore making place for the biggest breakwaters that currently exist around the world (Cafiero, 2025).

Figure 16: Berlin-Baghdad railway, Bagdadbahn (Menzel, 2014)

Figure 17: The share (12.240.000 Reichsmark), issued 31 December 1903 (Nimmergut, 1991)

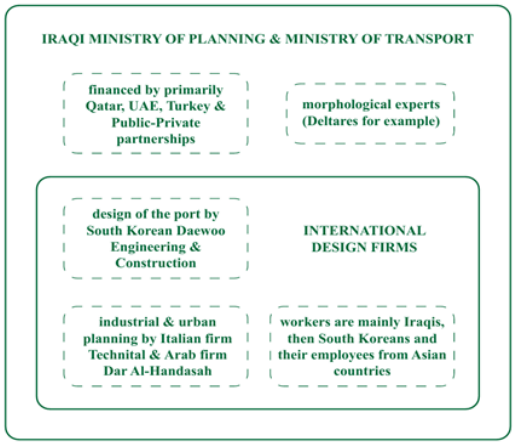


Figure 18: Stakeholders Grand Faw Port

Figure 19: Aerial render of the port (Shaw-Smith, 2023)

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On a regional level many infrastructural interventions are planned and built as well, which are necessary to accommodate the bigger scale interventions. These include for example the Connecting Road, a new road that will connect the (under construction) port of Al-Faw to Umm Qasr and the urban settlement of Safwan, close to the Kuwait border. The Khawr Abdallah channel between Al-Faw and Umm Qasr will be crossed by an underground tunnel for about 2 kilometres (Technital, 2024). This shows how ports can

Figure 20: Al-Faw city from birds eye view (Eiraqiin, 2021)

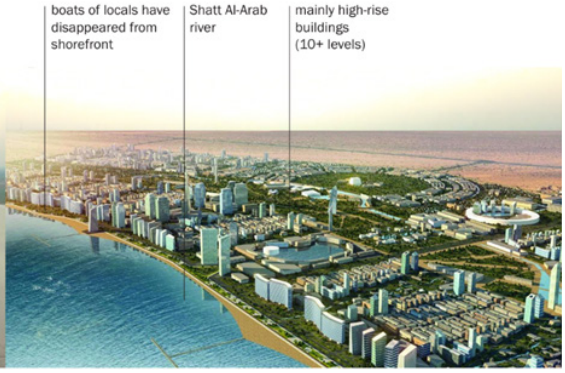


Figure 21: Al-Faw masterplan by Technital Italian engineering firm (Technital, 2024)

drive urban transformation. This urban trend of port-induced developments take place because ports attract projects such as roads, railways and industrial zones. The main reason for that is because they become necessary to enable the functioning of the desired logistics and transport system. They reshape cities economies and regional connectivity (Lugo & Martínez-Mekler, 2022).

The Khawr Abdallah channel is an example of a transportational project, but it is not only limited to transport. New masterplans and city expansions are part of this port-induced development too. Figure 20 shows an aerial view of the current shore of the city of Al-Faw on the left, compared to the masterplan render made by Technital on the right (mirrored). Clearly, the current urban fabric seems to be replaced, almost as a tabula rasa. The low-rise buildings are mostly replaced by high-rise buildings, while the small boats of local fishermen have disappeared from the coastline. This showcases how the entire skyline of a city is planned to be drastically changed which induced by the Grand Faw Port. It raises the question whether the housing planned on the right is able to accommodate the people living on the left.

That is why this research recognizes that these projects bring substantial consequences. Looking at these images through the lens of Rodgers (2012), the connection between infrastructural violence and its significant socio-environmental effects that it has on the area can be witnessed. Existing local building typologies, and with that, current ways of living, are barely found on the proposed masterplan. This is not only limited to the buildings, but throughout the built environment as a whole, such as the coastline and the disappearance of the small boats of local fishermen.

Infrastructural violence is defined as the systemic and structural harm embedded within the built environment and institutional practices, in which marginalised communities are disproportionately disadvantaged. In this context, the marginalised communities, are

not only the affected people, but also the fragile ecological ecosystems. As mentioned earlier, Star (1999) finds that infrastructure is ecological and relational at the same time.

Environmental concerns regarding these major infrastructure projects involve the destruction of fragile ecosystems, and the displacement of people. Many farmers and fisherman have already been struggling with the environmental problems in the region. Social critics have also pointed out uneven distribution of benefits, with many fearing that the project will worsen existing inequalities rather than promote inclusive development (Joe, 2021).

Even though the construction of the port is almost finished, the notion of it functioning along with the Iraq Development Road project offers challenges. These include financing and implementation, corruption and the potential for insecurity and instability in Iraq. Moreover, other Asian countries are presenting alternatives routes to Europe, see figure 22. These include the India-Middle East-Europe Economic Corridor (IMEC). This is an initiative to connect India with the Middle East and Europe, that bypasses Iraq. This also applies to The Belt and Road Initiative (BRI), which is China's global infrastructure project that builds trade corridors and has partnerships with Iraq's neighbours (Hasan, 2024). Another issue is the fact that the Iraqi government did not conduct an adequate feasibility study. This would give insights in whether the Development Road project would provide strategic value, which is now uncertain. Hasan (2024) also mentions that it could be possible that certain dominant parties in the parliament would not like see Prime Minister Al-Sudani strengthening his position, and could therefore hinder funds for the project.

Hasan sumps up his critique in the following way: *"The idea of transforming borders into connecting points between countries and continents has flourished in recent years. But many such projects, driven by internal calculations and wrapped in nationalist populist rhetoric, may ultimately increase competition and fuel conflicts rather than promote economic integration."* (Hasan, 2024).

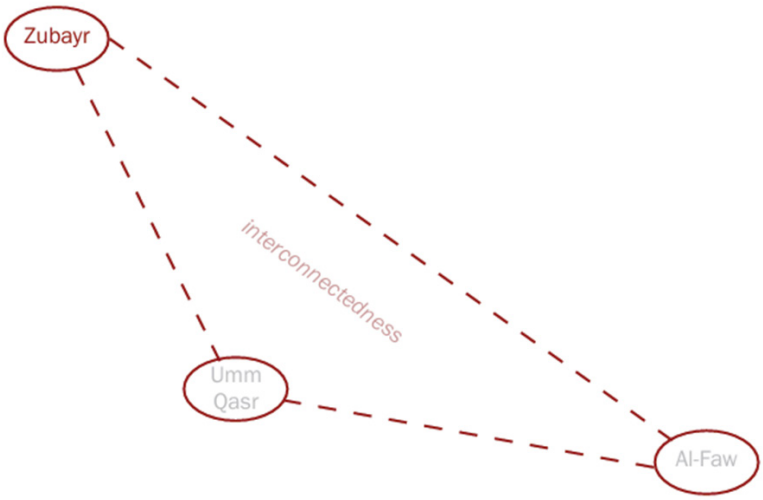
He showcases how such infrastructure projects are not genuinely attempting for cross-border cooperation, but are rather serving each stakeholders' own agenda in gaining power. Additionally, while they promise economic growth, it may be limited to certain groups, while other problems like geopolitical tension and rivalry over resources worsen. Not to mention the fact that the existing environmental issues are completely ignored in this process and the impact such a port has on it. Tollast and Aldroubi (2021) have addressed their critique, by noting that the Umm Qasr port (only 60 kilometres away from Al-Faw) could have been expanded instead. *"Umm Qasr port has ample existing additional capacity and plenty of space for further berths and yards being constructed and can be upgraded to handle the world's largest vessels by dredging its channel for a fraction of the cost of dredging Al-Faw."*

Figure 22: The corridors in the Middle East including Iraq Development Road and its 'rivals' (Hasan, 2024)

All in all, despite the promises of the project, such as the significant economic benefits for Iraq and its partners, the scale and the risks of the project are enormous. The expectation is that it will not only reshape the region's trade dynamics, but also its environmental, social and urban condition. On top of that, its success depends on overcoming logistical challenges, political stability, and long-term funding. This is because it has a timeline extending to 2050.

It is speculated that it is likely that external investors and regional and global powers will primarily benefit from this major project (DesignZip, 2025). They are therefore seen as the key stakeholders in a project with significant economic and geopolitical impacts for the entire Middle East. The well-being of the current communities in these regions, seem to be left out of the story, see figure 23.

Figure 23: Sara (8) looking over at her family's empty boats (Garthwaite, 2023)


Zubayr
interconnectedness
Umm Qasr
Al-Faw

III. Az Zubayr: a growing multidimensional city

The previous paragraphs illustrated the relation between the expected decline of Umm Qasr Port, the rise of the Grand Faw Port and the negative impacts it entails and the connection to the wider region of the Basra Gouvernante. This also involved the environmental impacts on the region and how these contribute to the migration flows. One of destinations mentioned of the displaced communities mentioned earlier is the city of Az Zubayr, the last element of the interconnected model. In this paragraph, the city of Az Zubayr will be discussed, followed by a probable scenario employed by the research and how this scenario forms the basis of the 'reaction', the way forward.

Az Zubayr is situated southwest of the city of Basra. Historically, the area was known for its agricultural heritage, with palm cultivation being a major economic activity. Currently, retail and service industries are dominant to the economy of the city, while a significant amount of citizens work in the oil and petrochemical industries. Within a radius of a few kilometres just outside of the city there are oil fields and chemical companies (MBC1, 2023).

Historically, the city of Az Zubayr has a heritage in being an commercial hub for trade since its emergence up to this day. The trading routes that are known from the 8th and 9th century are made visible in a historical map made in 1970 by Tariq Al Kateb (figure 24) that shows Az Zubayr on the left and Basra on the right. It shows the many connections the city had, as well as the many souks (markets) within the city centre. Najdi tribes from the Arabian Peninsula would bring wool, leather, truffles and ghee to Az Zubayr. The Zubayries would then produce goods from it, including fabrics like sandals (Kharaza), traditional headbands (Agaal) and cloacks (Bushut). They were also known for their dates, sugar, tea and vegetables like tomatoes, melons, cucumbers and aubergine (Al-Sanea & Al-Ali, 1985).

Apart from goods, the exchange of knowledge has been a major part of the city's heritage too. From the early Islamic years, the place was habited by prominent Islamic figures like Hasan Al Basri and Wasil bin Ata. They were known for their extensive debates on philosophical matters which even led to the emergence of sub-ideologies within Islam. When looking at the more recent history, Az Zubayr and Basra were known as a literary hub in the 20th century. People would practice artistic writing, known as Al-Khat. Literary forums were held in the traditional houses and compete with each other in order to produce great poets or seasonal writers. The city developed its own form of poetry, which is called Nabati poetry and differed from other Iraqi poetry. It was highly influenced by the poetry of the people from the Arabian peninsula (Hadami poetry: from Hadramout) that would come to the city for trade. Later, they combined contemporary, popular poetry with classical poetry which had similarities with marine poetry. Furthermore, the city produced some important novelists, theatre and is still known for their craftsmanship in iron and carpentry (Obeid, 2022).

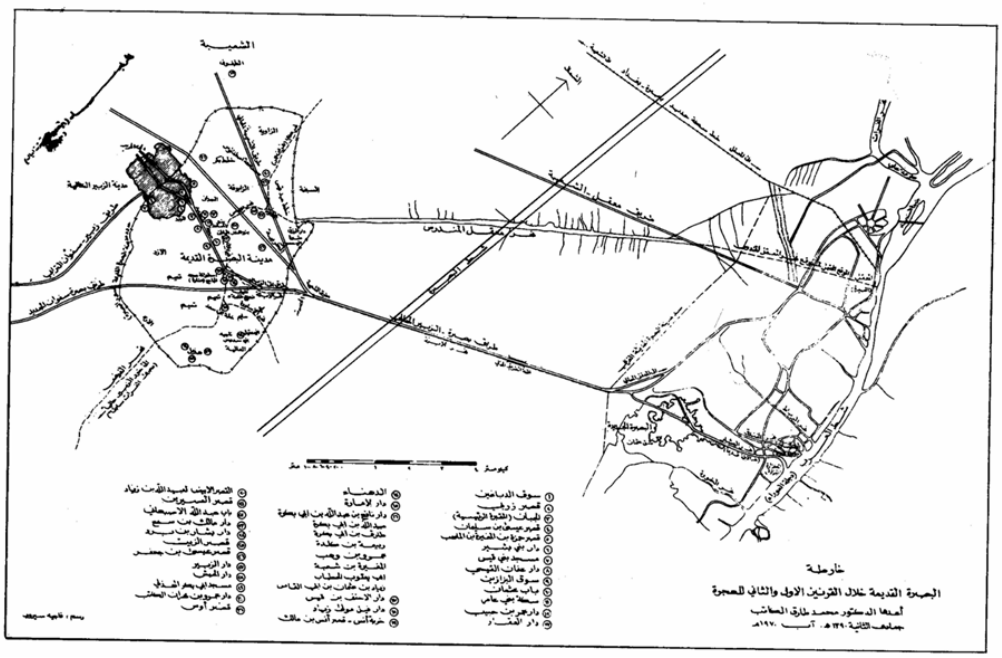


Figure 24: Routes from the 8th and 9th drawn in 1970 by Tariq Al Kateb, Az Zubayr left, Basra right (Al-Sanea & Al-Ali, 1985)

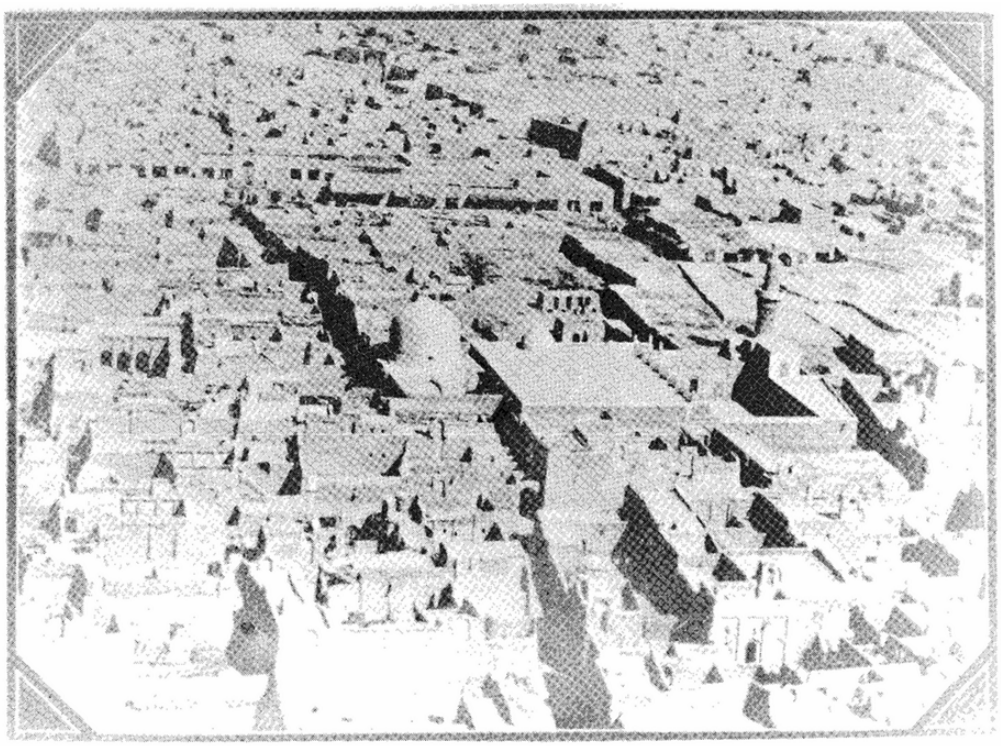


Figure 25: Aerial photo of Zubayr in 20th century (Al-Sanea & Al-Ali, 1985)

It is extremely important to acknowledge and take into account that the city has a rich history in various fields. This is not only limited to agricultural practices, but also involves the exchange of knowledge, and the creative fields like craftsmanship and literature.

In this day and age, people in certain neighbourhoods in the city of Az Zubayr have been practicing livestock breeding. Grazing of the animals has spread in the alleys where the animals feed on waste. Alqatrani (2018) calls this phenomenon the ruralization of the city: the emergence of rural pockets within the urban zone due to some people seizing areas in the alleys and using them as shelter for their livestock and wagons.

These practices take place in multiple areas of the city, primarily in the southwestern outskirts, where constructional and environmental deterioration happen alongside it. However, another affected region of these uncontrolled (illegal) rural practices take place in the city centre of Al Jumhuriyah First, see figure 26. It is part of the Old City quarters that were constructed during the first morphological phase of the emergence of the city and used to be walled. Despite its issues with construction and sanitary weakening, the area is distinguished by constant raise in land price and rent due to its proximity to the central commercial business area.

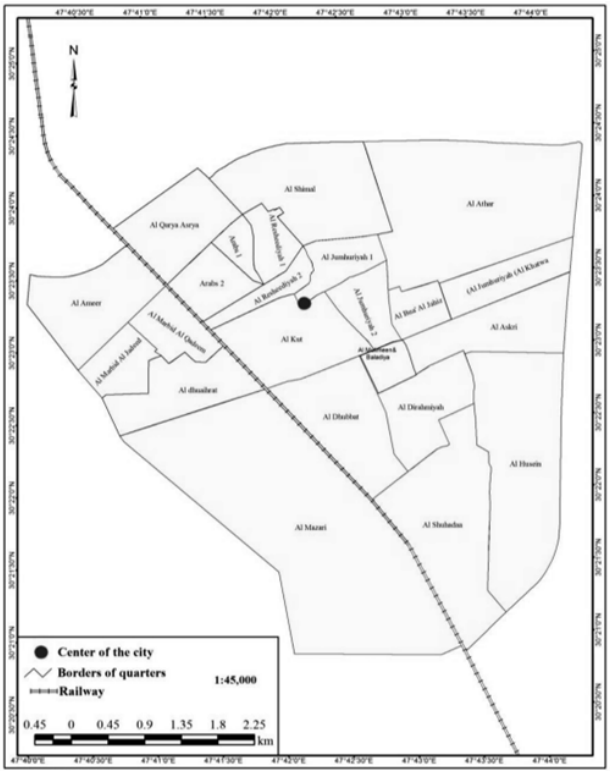


Figure 26: Neighbourhoods within the city of Az Zubayr (Alqatrani, 2018)

That is why many housing units have been converted into competing commercial and industrial uses, which is clearly seen in the main streets, particularly in Al Batin Street (Alqatrani, 2018).

These insights are relevant for this research, as they showcase that the urge, need or desire for agricultural practices is imbedded in the city of Az Zubayr. Whether these small scale, uncontrolled and unplanned, agricultural practices are practiced by the long-term residents or by newcomers, is not of significant importance for this study. It can be speculated that a possible reason for these practices could be because the migrants coming to the city from rural areas take their (still surviving) livestock with them to the city. Perhaps they might rely on them as a second income due to the difficulties in finding feasible jobs. Other possible reasons could include tradition and culture preservation. In my point of view, the significance lies in the occurrence of these agricultural practices. It relates to the interconnectedness of the broader region, the dominant agricultural heritage of the region 'seeping' into the urban environment through these small scale agricultural practices. More importantly, because they are not planned, regulated or controlled, they could lead to undesirable outcomes in the urban fabric.

At the same time, large scale agricultural practices take place outside of the city within the same district (Obeid, 2022). Recent initiatives by farmers in the Az Zubayr district included experimenting with modern irrigation techniques, such as drip irrigation, have revitalised the region's agricultural sector. An example of this was a project launched in 2018. Between 2018 and 2019 this small-scale project involved successfully planting and growing 500 palm trees. This number has expanded to include 370.000 trees in 2023. This showcases the community's openness to innovation and climate adaptation, as shown in figure 27 (Was Here, 2023).

Furthermore, the city has currently become an important destination for migration and is growing rapidly, see figure 28. The migration from surrounding towns and cities to Zubayr is

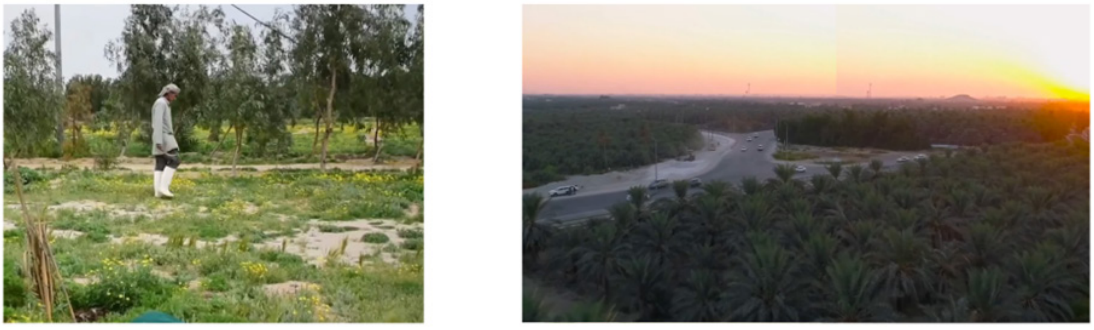


Figure 27: Local farmers have planted over 370.000 palm trees (primarily Barhi) in Zubayr district (Was Here, 2023)

mostly caused by pollution, water scarcity, and declining agricultural and fishing opportunities. Az Zubayr has approximately 350.000 citizens, and faces challenges such as inadequate infrastructure and the pressure of accommodating a rapidly growing population. Just like the rest of the region, extreme heat and salination of the water are present as well (Alqatrani, 2018). As mentioned earlier, there is an estimated amount of 3000 internally displaced people due to environmental degradation in Az Zubayr, based on data from 2023. However it is expected that this number is higher in reality due to missing reports and rapid and unexpected changes in migration flows (UNIOM, 2023). Besides, this research proposes a scenario where current migration flows will intensify due to predicted future gentrification in Al-Faw and the further worsening of living conditions in Umm Qasr.

Nevertheless, its dynamic and resilient community offers a unique model for sustainable urban development. The urban growth of the city is expected to keep expanding, since the living conditions of nearby towns and the city of Umm Qasr are getting worse. Especially with the rise of the new port in Al-Faw and the planned drastic urban transformation for it, the possibility of gentrification occurring seems a realistic future scenario. By studying Az Zubayr as a design and research site, the aim to propose innovative solutions that balance urban development with ecological sustainability, are expected to be met.

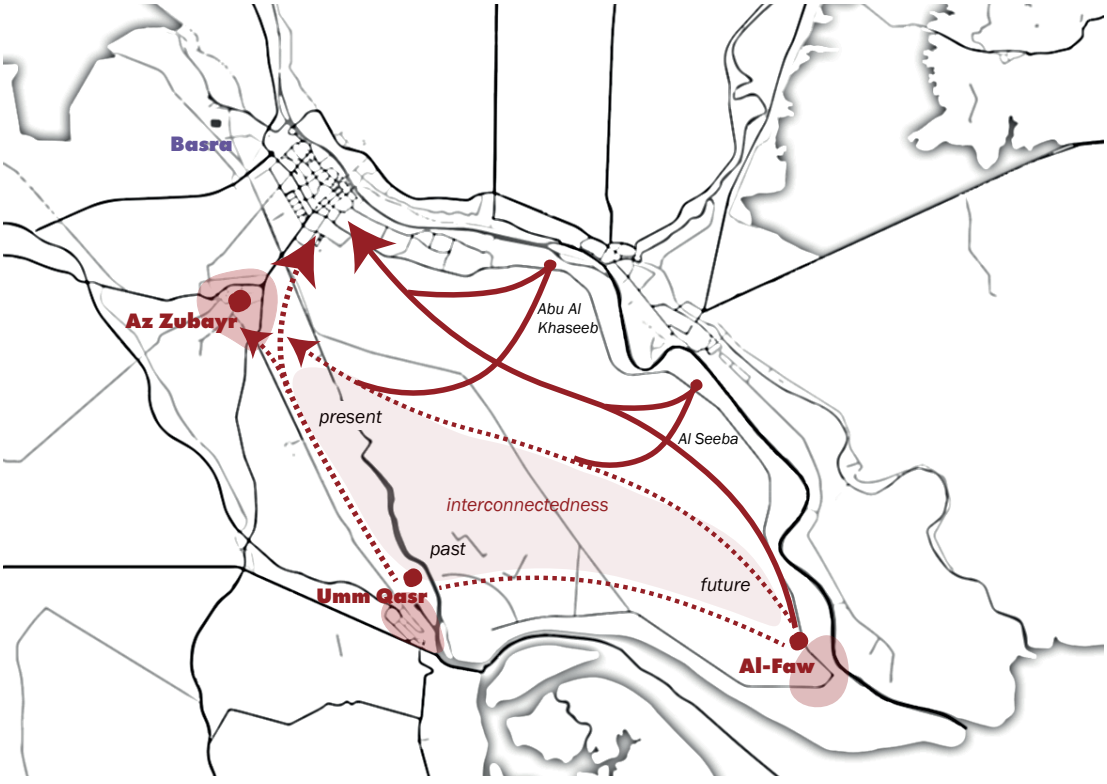


Figure 28: Migration flows to Az Zubayr, from smaller towns in the gouvernante, Umm Qasr and Al-Faw

5 Theoretical framework: Ecofeminism

The previous two chapters involved a theoretical framework about infrastructural violence and the interconnectedness between the three sites. These two chapters aimed to understand the problem presented by the research – the action – by answering the first sub-question of this paper: *What are the historical and urban backgrounds of the three interconnected sites, through the lens of infrastructure?* The results led to the notion that the city of Az Zubayr as a research and design site, will provide the tools needed to meet the aim of the project, which is proposing innovative solutions to balance sustainable urban development and ecological sustainability.

The following two chapters aim to provide the response to the research problem – the reaction – by answering the second sub-question of this paper: *Through which spatial interventions can urban gardening and commoning translate in a way that enhances social bonds within the envisioned new community, through an equitable perspective?* That is why this chapter will provide a theoretical framework for this response, which will involve ecofeminism and the related concept of commoning.

Ecofeminism is proposed as a concept which is able to understand the challenges within the research and provide a way forward to imagine a future otherwise: a sustainable future that is designed through an equitable perspective. In order to do this, a theoretical framework for ecofeminism will be provided. This will be supported by looking at references that implement certain principles related to the theoretical framework. Then, the relevance of these theories relating to the research will be addressed through a reflection.

The theories

Ecofeminism is a movement that rose up in the late 20th century. It is a framework that integrates feminism and political ecology. It does so by connecting environmental degradation with systemic oppression. Vandana Shiva (1989) and Karen Warren (1990) are of the opinion that patriarchal and capitalist systems are exploiting nature and marginalised groups, especially women. This form of dual exploitation can be seen in for instance industrial agriculture, extractive industries and deforestation. These practices prioritise profit over ecological and social well-being.

There are several branches of ecofeminism, that vary in their approaches and analyses. These include liberal ecofeminism, spiritual or cultural ecofeminism, intersectional ecofeminism, and materialist ecofeminism. The latter is also referred to as social or socialist ecofeminism. Even though each branch views ecofeminism from a different angle, they all strive for an egalitarian, collaborative society in which there is no one dominant group, all through a feminist perspective (Warren, 1990).

On the other hand, there is also critique to the concept. Biehl (1991) is of the opinion that the spiritual foundations of ecofeminism might reinforce essentialist ideas about the connection of women to nature. An example of such an essentialist idea about the connection of women to nature is the belief that women are naturally more nurturing and caring. They are more in tune with the natural world due to biological reasons, such as their ability to give birth. This perspective assumes that all

women share these characteristics universally and that they are innate, rather than shaped by cultural, social, or individual factors. So according to Biehl (1991), essentialist ideas risk the reinforcement of traditional gender roles and therefore limit the diversity of women's experiences and identities.

Even though it could be true that in some cases ecofeminism might be generalising certain parts of womanhood, this research builds on the concept of ecofeminism because of its relevance due to its ability to frame environmental issues within broader social contexts. It is inevitable that a theory might contribute to some degree of generalisation, because it is simply impossible to know each individual case by case. However, when a certain group is making their voices heard by putting their values in a broader context, they contribute to understanding the bigger picture in a better way. That is how we can move forward as researchers and designers, since urban and environmental issues are so multidimensional.

Additionally, viewing Biehl's (1991) notion from a different side is found more fruitful. So rather than seeing essentialist ideas as some sort of threat that 'might' reinforce traditional gender roles, this research accepts ecofeminism as a relevant frame which acknowledges women's strengths. Acknowledging that (most) women have certain innate traits, that naturally increase their ability to be compassionate and mindful towards others, does not have to mean that this has to limit the diversity of women's experiences and identities or to reinforce traditional gender roles. It rather shows an awareness of our capabilities instead of forming a threat. Embracing ourselves in whichever way we are, will only strengthen our capabilities more, instead of somehow 'preferring to embrace' certain parts of ourselves and trying to 'hide or neglect' other parts. Therefore, it could essentially be an innate tool, that can help us achieve our visions and goals during our lifetimes.

Another concept worth mentioning, is the concept of *commoning*. The practice of commoning involves the creation, maintenance and governance of shared resources, spaces or knowledge in a collective and self-organised manner. This happens outside of market and state control. On the one hand, these practices help define the boundaries of shared spaces. On the other hand, they help strengthen community bonds. Practices include social and alternative economy cooperatives, as well as solidarity initiatives (Pllumbi, 2020).

In that reading, it can be argued that the philosophy of commoning and ecofeminism are deeply linked. They both address the importance of care, sustainability and collective action. They underline the relevance of a holistic approach, and therefore the interconnectedness between the well-being of communities and the well-being of ecological ecosystems. This is emphasized by Plumbi (2018) as she mentions that a deeper exploration of the interactions between human and non-human elements within commoning practices is needed to create and nourish communal spaces.

References

In this paragraph, global references will be provided that have implemented certain principles related to ecofeminism and commoning. This is relevant because they provide insights into how the theories can take form in practice by specific strategies, which is the goal of this research: providing sustainable interventions.

A study developed in small communities in Brazil showcased how women empowerment has been conducted in the agroecological field with different techniques. It was found that women feel better and more empowered when they can relate to their colleague's situations, as it makes them feel supported. They discovered that redefining and appropriating a space exclusively for women could transform it into a place for women's liberation (O'Donnell, 2023).

In addition, educating women in urban gardening is extremely important. This gives them the opportunity to take the initiative to create small businesses and associations related to urban gardening in cities. Women have been encouraged to work more in the agricultural field, and share their knowledge about urban gardening with other women, so they can facilitate this education. Moreover, labour participation and social enterprises contribute to their empowerment. This is because the income generated, helps them financially to be more independent and have the opportunity to support their families (Nowysz et al., 2022). They worked on traditional farming methods to restore their degraded ecosystems. Their success lies in blending indigenous knowledge with modern advocacy techniques. This highlights the relevance of spiritual ecofeminism, an approach that values indigenous traditions for a holistic relationship between humans and nature. This case study showcases the power of integrating cultural heritage with environmental restoration, a lesson that resonates with Iraq's need to balance heritage conservation and ecological renewal (Carruthers & Rodriguez, 2009).

Another example from Tanzania, is a project involving the support of education (of women and children) and community initiatives in Makuyuni Village. It contributes to sustainable agricultural development, women's empowerment and economic growth (IVHQ, 2023). In Jordan, an organisation supports agricultural cooperatives and women entrepreneurs through sustainable farming techniques and market access. These include the implementation of hydroponics and livestock, as well as enabling financial independence through selling their obtained products (Acted, 2022).

Even though all these references are in a different part of the world, they all show commonalities in the techniques that seems to benefit both the empowerment of women (and other vulnerable groups) as well as the ecological ecosystems. Providing spaces for interaction, the exchange of knowledge, skills and goods, lead to empowerment, in a mental and a financial way. It shows the potential for community-driven projects to address food security and social cohesion. Appendix B and C show an assemblage of the components of each of the projects, along with the important takeaway principles for this research.

Relevance to the research

In the context of this project, the relevance of this theoretical framework lies in its call for localised, community-driven design solutions that integrate social equity with environmental sustainability. This equitable approach is essential for grasping the region's challenges, where economic growth often conflicts with environmental and social needs, as explained earlier by the concept of infrastructural violence. The latter contributed to the understanding of the challenges within the research. It also led to the notion that designers could mitigate the negative impacts of infrastructural violence by designing sustainable and equitable urban development strategies. The diagram in figure 3 (chapter three) incorporates the concepts that involve *the action (i.e. infrastructural violence)* and *reaction (i.e. ecofeminism)* relevant to this research, and shows indeed how both perspectives are interwined.

Hence, the principles brought forward in this chapter, allow the development of a program on the design site where the collaboration of different (marginalised) groups can take place, in both inside as outside spaces. This includes building a community centre, where educational, recreational and social facilities will be accommodated. This centre and the shared outside spaces need to be collectively run by the community themselves, and not be seen as a governmental body. This could be done by introducing a board (and sub-boards), with members representing each (marginalised) group. In this way, decisions about the shared (inside and outside) spaces can be made democratically, where no group is excluded and every voice is heard. Figure 29 shows a diagram of the design principles that I formulated based on insights from the approaches and principles so far in this research. The next chapter will investigate how these principles can be translated spatially on the project site in Az Zubayr.

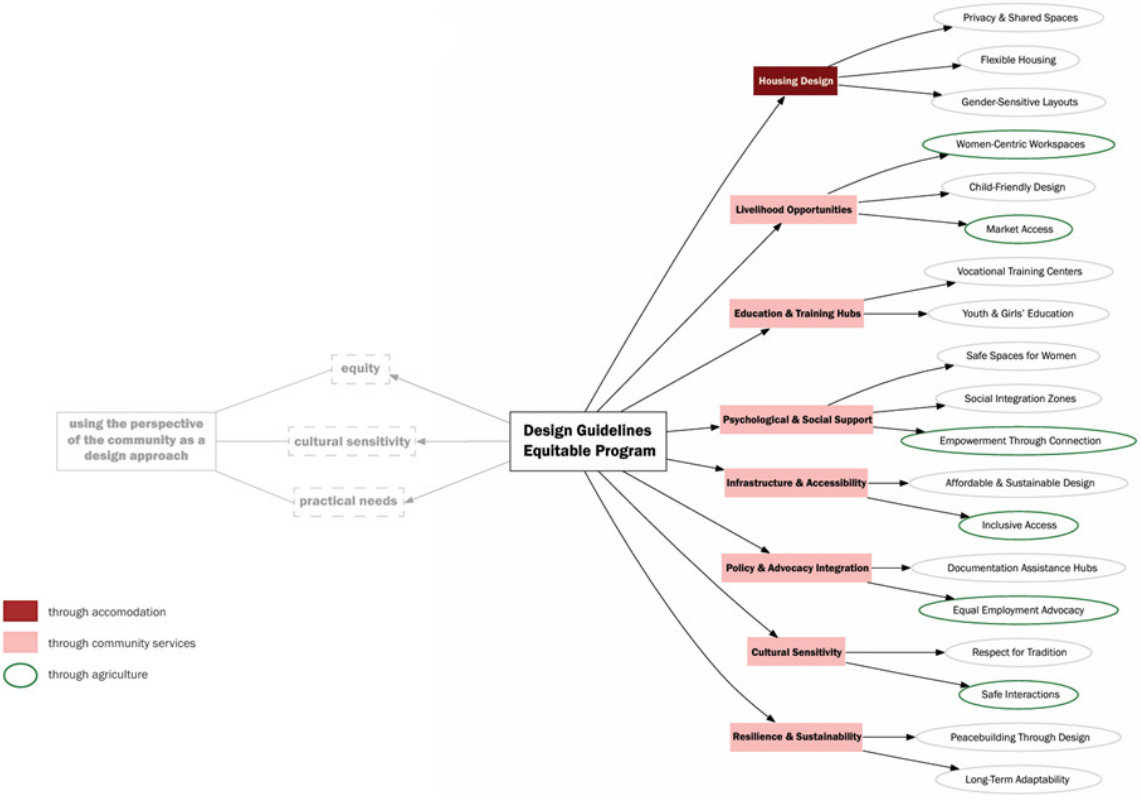


Figure 29: Diagram of the translation of insights into design principles

6 Interventions for spatially translating urban gardening and commoning

In this chapter, design interventions will be provided, which will translate the concepts of urban gardening and commoning spatially. This is due to the fact that this study aims to mitigate the negative impacts of infrastructural violence caused by major infrastructural projects, by proposing a plan for an area within the city of Az Zubayr. As was mentioned earlier in this paper, this project intends to create spaces for a new community: formed by the host community of Az Zubayr and the displaced communities from the surrounding areas. The research showed how infrastructural violence either creates or reinforces (existing) displacement patterns. That is why it is important to respond to these patterns by imagining a future otherwise, which was done by scenario planning.

As was envisioned through scenario planning, playing into the reality of the original profession of the displaced families and considering the heritage of the city is crucial to this project, along with the preservation of ecological ecosystems. The city of Az Zubayr has a rich heritage in both its history as well as in its current form. These involve (uncontrolled) agricultural practices, as well as a love for craftsmanship and literature.

That is why the main program on the design site will consist of three parts: housing (accommodation for the displaced families and the Zubayries), agriculture and community services (through commoning practices that serve the social, recreational and educational services). This program and the tools it provides, along with a careful design of inside and outside spaces, will allow for the empowerment of the vulnerable groups within the new community, like women and children. In order to create this *envisioned* new community and ecological preservation, I *backcast* the necessary spatial opportunities to achieve the desired program. I will discuss a few methods to this based on literature, and simultaneously implement relevant insights into the project site.

First of all, in order to realise this program, it is important to pay close attention to the fact that this program involves all living species on the site, not only humans. Solomon's work reflects this view, as she borrows concepts such as ecofeminism and the practice of commoning, which were discussed in the previous chapter. According to Debra Solomon's 'multispecies urbanism', cities can be designed in a way in which they support humans, non-human species, foster biodiversity and ecological resilience. Animals, plants and microorganisms should be integral to urban ecosystems. The main takeaway from her work is the importance of cohabitation and the restoration of ecological balance in city environments. She mentioned that her work is inspired by concepts like regenerative agriculture, CPUL (continuous productive urban landscape) and permaculture (Centre for Urban Studies Amsterdam, 2021).

Regenerative agriculture is usually applied on larger-scale rural farming with a focus on improving soil health, through a scientific approach which is usually led by farmers

(Durkin & McCue, 2021). *CPUL* is an urban design concept that integrates food production into cities by connecting together existing open space and disused sites into a landscape that connects to the countryside. CPUL can also be in the form of for example green spaces, corridors or rooftop farms (Viljoen & Bohn, 2009). *Permaculture* is an approach to land management design that touches upon food, water, energy and housing in a way to flourish natural ecosystems. Permaculture can take place on any scale varying from a single garden to a city, compared to CPUL that often depends on policies (Morel et al., 2018).

Yet, all of them can still be adapted to different environments and scales. All three of these concepts share that they advocate for sustainable land use, biodiversity and ecological regeneration. The production of food, the conservation of water, the reduction of waste and local resilience is inherent to all of them (Sol, 2020). They also align with the philosophy of ecofeminism in their approaches. This is due to their shared importance of working with natural systems rather than exploiting them, and focusing on nurturing relationships and equitable solutions for both people and the environment.

Implementation on project site

The project proposes a combination of these methods, based on a high sensitivity to the site's specificities and the exploration of their feasibility. David Holmgren first principle of permaculture design is 'observe and interact'. So, in order to start shaping the site, it is important to know where we are and what the specific forces on the site are. Especially water is a major aspect in that. In fact, water forms the foundation of permaculture design (Millison, 2021). That is why water will be leading the principles used for the spatial configuration of the site. In order to do to, the chosen project site of Az Zubayr, will be analysed on a few scales regarding the water flow.

Figure 30 shows a map from 1952 where a geographical study was conducted on the alluvial boundaries of the Mesopotamian plain. This is relevant because it showcases that Az Zubayr falls within the alluvial boundary. This means that agriculture can geographically be very productive within alluvial boundaries, due to the deposition of sediments from rivers, streams or floods. These are rich in nutrients and organic matter and create a soil that is naturally fertile (Leeds & Falcon, 1952). That is why soil remediation becomes crucial to restore the original state of the soil, which will be elaborated later on. Another important source of water to Az Zubayr is the Basra Canal (also known as Shatt Al-Basra). This canal has an average width of a 110 meters and derives its water from the Hammar marsh to the north of Az Zubayr, marked in red in figure 31 (Masboob, 2023).

The water levels are not always constant and therefore seasonal. According to Aqrawi (1993) and Heyvaert & Baeteman (2007), fluctuations in sea level and varying sediment deposition rates, were responsible for shaping these marshlands over 4000 years. So both natural and geological forces contributed to the

emergence of the marshlands. As discussed in chapter four, the major Iraqi rivers and the groundwater is extremely high in salinity. Even though the marshes are partially seasonal and in some areas even dried up completely, they still form a source of fresh water, see figure 31.

Zooming further into the site for reaccommodating the displaced people from the region, satellite images of the city of Az Zubayr from the west side are provided, which is also the side where the Basra Canal flows (see figure 33).

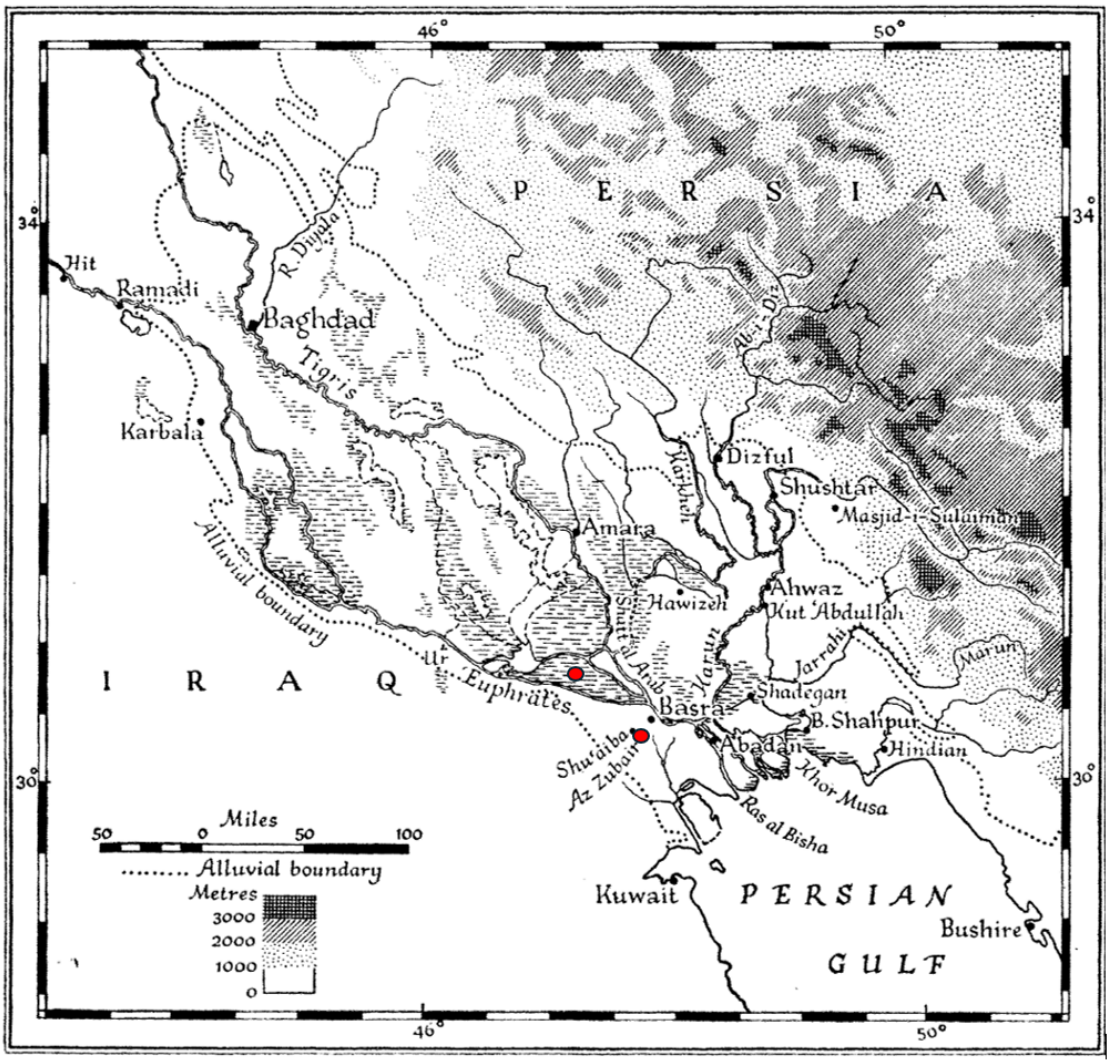


Figure 30: The Mesopotamian plains (Lees & Falcon, 1952)

As is clearly visible, the water and green structures on this area are not constant but rather intermitted, creating small-scale wetlands and microclimates. This phenomena takes place in the urban environment of the city as well, especially in the northwest on a walkable distance from the city centre and 6 kilometres away from the Basra Canal (figure 34). This site is fruitful to achieve the design goals (figure 32) since it provides the ecological assets and space, in an urban setting.

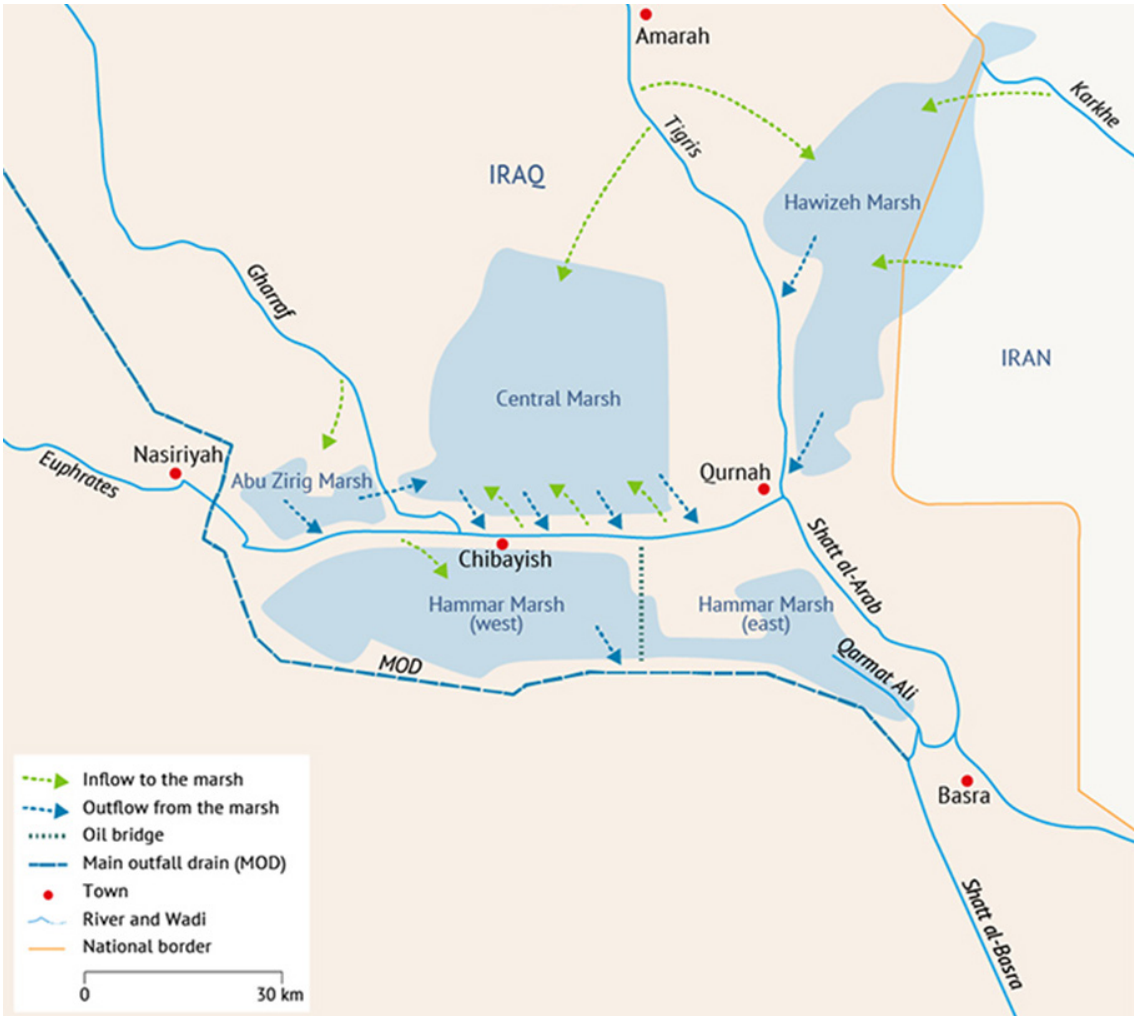


Figure 31: Southeastern Iraqi marshes (Masboob, 2023)

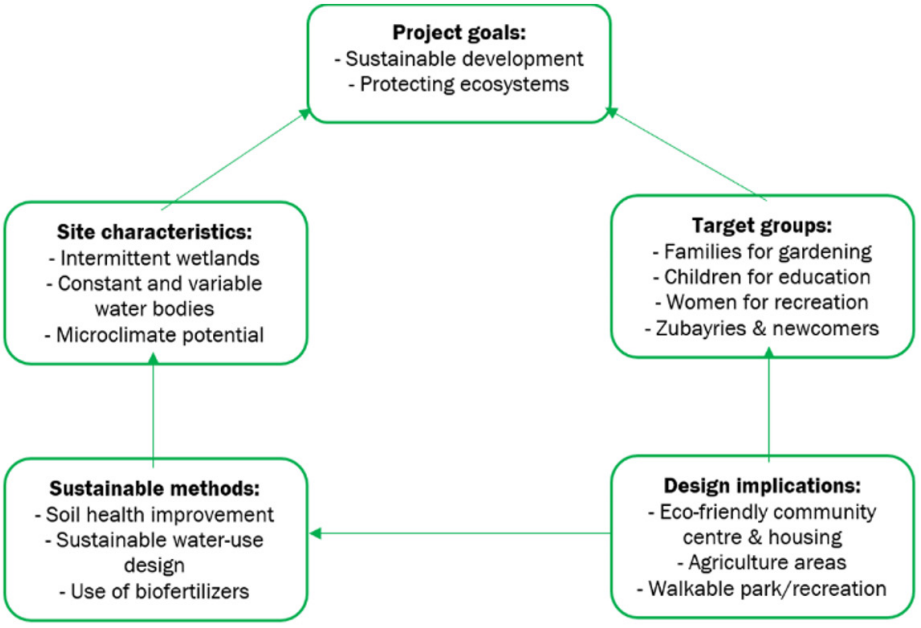


Figure 32: Project goal diagram

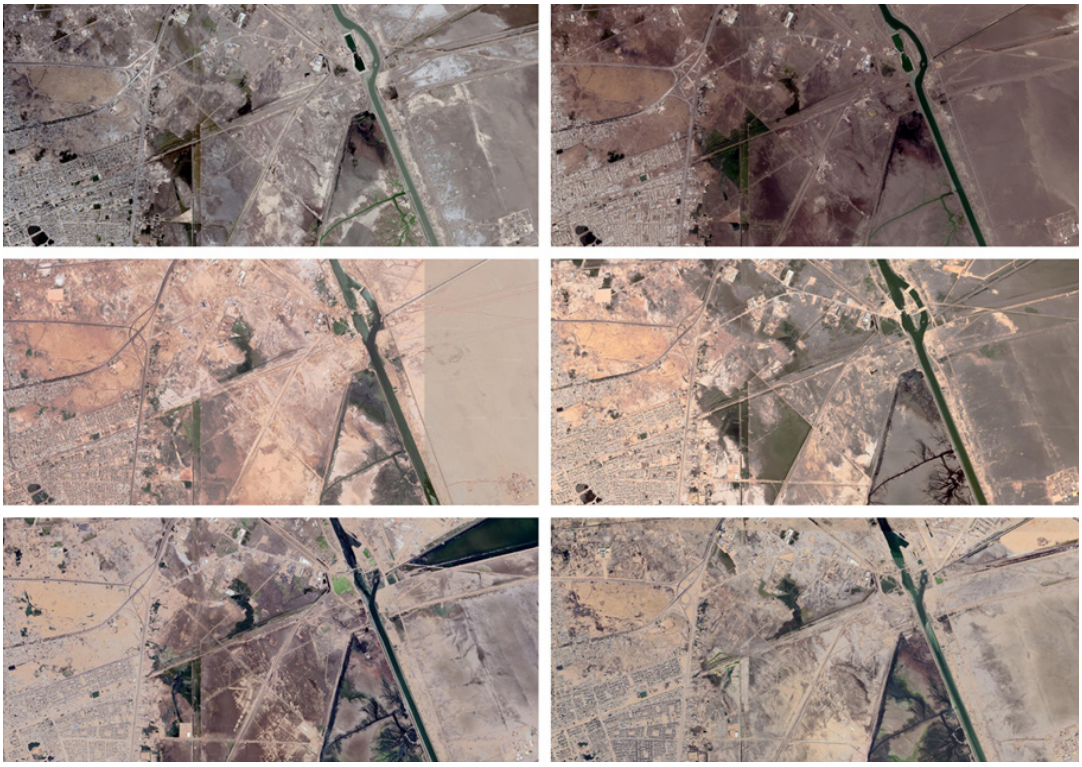


Figure 33: Satellite images of western Zubayr along Basra Canal, varying in time (Google Earth, 2024)

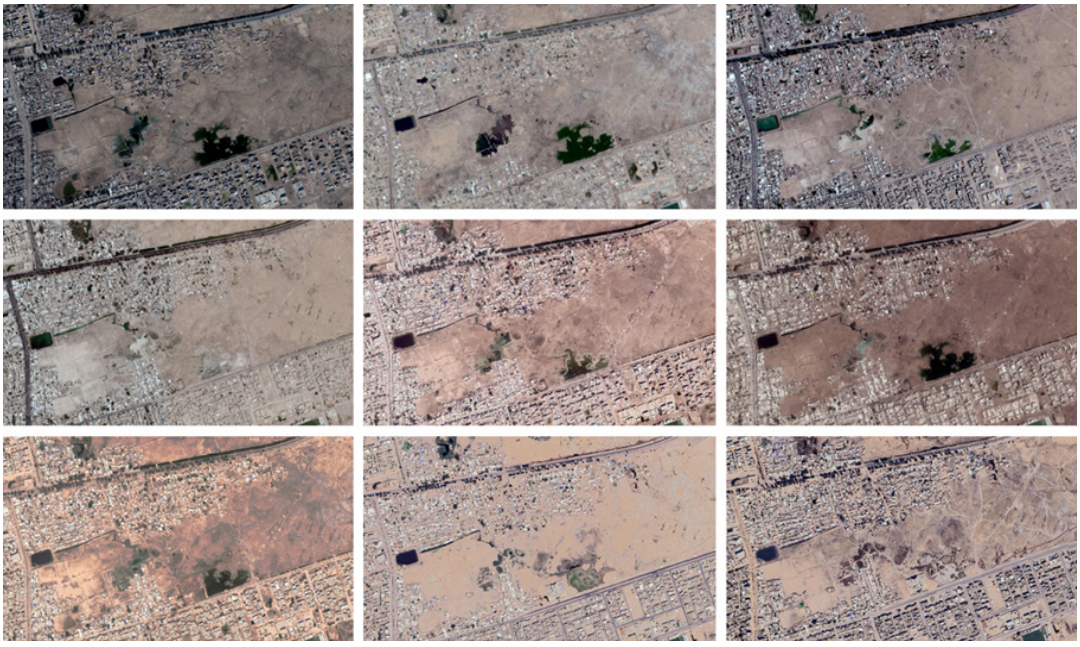


Figure 34: Satellite images of project site in northwest Zubayr, varying in time (Google Earth, 2024)

Due to the changing nature of the landscape, an analysis is made of the different scenarios of the greenery and water, see figure 35. In this way, locating them on the site and identifying potential locations where the gardening can take place is made possible. The goal is to build around the intermitted bodies by building around them instead of stacking buildings on top of them. While doing this, protecting and nourishing these ecosystems is part of the strategy as well. The site does not only provide fertile greenery for gardening, but also empty space for building design for the needed accommodation and community services. Thus, through *backcasting* what is needed to create the desirable new community, the project site is chosen.

Since water forms the foundation of this design-approach, the water-based permaculture design principles will be presented which will help the configuration of the space. These principles are supposedly universal and could be applied in any context (Tallarico, 2024). Appendix D will provide a demonstrative visualisation of an imaginary location created by permaculture designer Andrew Millison.
The first steps taken are identifying the water flow on site, and locating where the slope changes from steep to gentle. This is supposed to be a beneficial location for locating a pond. A drainage ditch alongside roads can direct water into ponds or wadis. Permaculture emphasises the importance of this knowledge for the use of gravity-based watering. This means that areas below the pond can benefit from gravity-fed irrigation. Furthermore, drier zones are suitable for trees that do not need regular watering. These trees could then provide organic material for compost and soil health. The lower areas can be used for crops that are more water-demanding (Mollison, 2021). In terms of livestock, it is beneficial to use rotational grazing. In this way, livestock move through a series of subdivisions called paddocks. This allows plants to rest and regrow to grazing height while livestock graze other paddocks, so it enhances soil fertility and land productivity in an animal friendly way (Sol, 2020). In terms of (farm) housing, permaculture advocates for placing these buildings alongside roads between the farmland to provide a good view and easy access, without excessively disturbing the plants (Mollison, 2021).

In the context of the project site, the water flow is made visible earlier on, through identifying where water is stored by comparing different satellite images and seeing the location in time. This was supported by analysing height differences. This showed that the drier zones (particularly on the east of the plot) can be up to 5 meters higher than that of the intermitted waters where the water flows towards. Furthermore, the tracks on the site (in pink), which divide the big space into smaller ones, are highlighted. Height differences between the track zones were found, as these can vary from 8 up to 11,7 meter in height. A man-made pond and a drainage ditch are already present on the site. The drainage ditch is located on the southwest and directs water into a wadi alongside a main road. The pond, which is the size of a football field with a maximum depth of 1,5 metres, is situated on the east of the plot and is constant in water capacity, see figure 36.

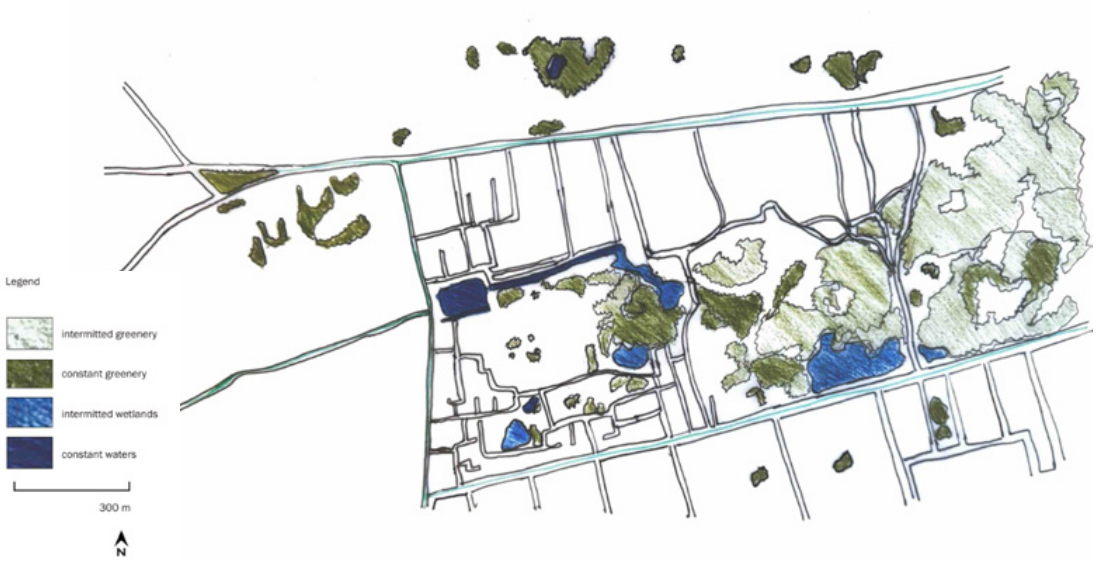


Figure 35: Green and water analysis project site

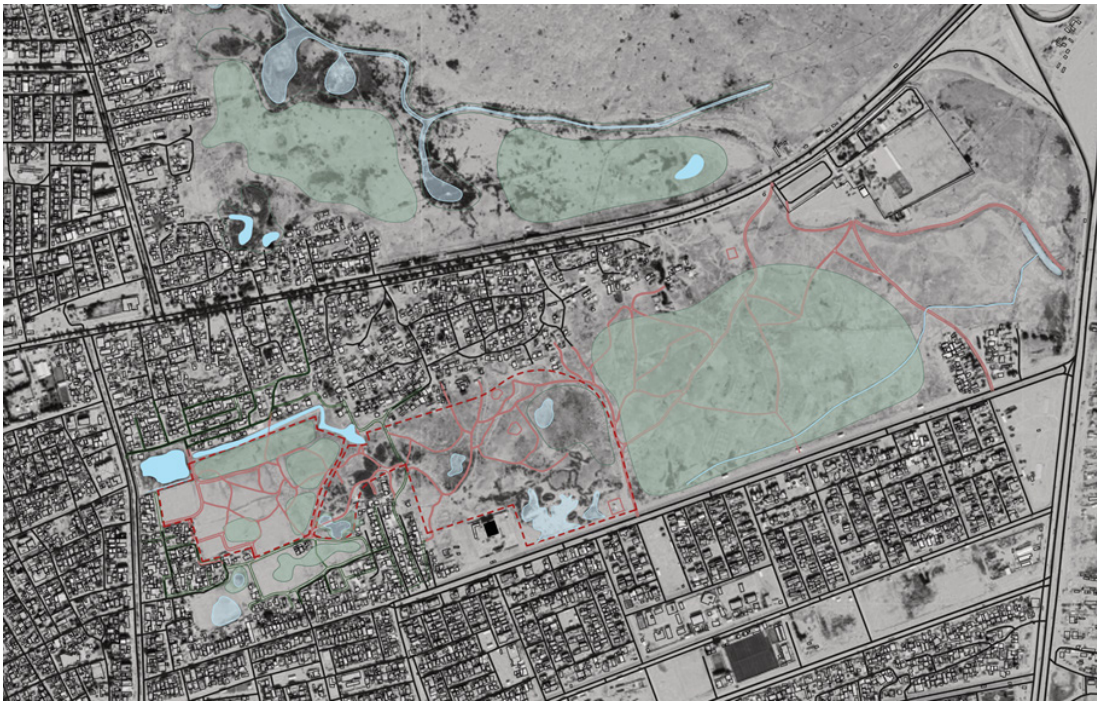


Figure 36: Identifying the water flow and existing tracks on a larger scale

In terms of irrigation, combining the principle of gravity-fed irrigation with drip irrigation is suitable for this specific environment. As mentioned in chapter four, experimenting with drip irrigation has been successful in Az Zubayr. It is a water-efficient system, as it delivers water directly to plant roots with minimal evaporation, while preventing over- or under-watering. It also reduces costs since no pumps are required, and therefore ideal in case of no electricity (Van Der Kooij et al., 2013). Since clean drinking water to the city is partially provided by the Khor Al-Zubayr water treatment plant and supported by groundwater, water for irrigation depends primarily on groundwater (Mohammed et al., 2023). To reduce the reliance on groundwater and to prevent excessive stress on the soil, alternative sources are proposed.

Rainwater harvesting systems will be installed to collect rainwater in tanks and use it for irrigation. Furthermore, the Basra Canal is located only 6 km away from the site and is an important source. Even though the salinity of the canal is lower compared to the Shatt Al-Arab due to the inflow of cleaner water from the Hammar marsh, desalination is still necessary (Masboob, 2023). This could be done by installing a compact reverse osmosis system with pre-filters close to the canal, which will be powered by solar energy. Using solar energy as a renewable source is key here because of the strong and high sun in this area. About 5 kilometres from the site along the Canal, multiple industry buildings are present, where the RO system can be placed. The canal is on a much lower elevation than the surroundings, which is why a gravity-fed pipeline is not possible. Therefore, a ground-based solar pump will be used to move the water towards the site in a circular way. An insulated underground pipeline will then be connected towards to site, to reduce water evaporation in the hot climate. This pipeline partially connects to the drip irrigation system on the zones within the site where it will be used, and partially to the pond on the site as storage.

In order to productively use the pond on the site, it needs to be cleaned first. Then it can be used for water storage for the irrigation, coming from the Basra Canal and from rain water. This will be done by using plants. Hyacinth, cattails and elodea will be planted to absorb excess nutrients like nitrogen and phosphorus from the water. Hyacinth is a floating plant and should be planted in the shallower areas of the pond. Elodea is a submerged plant and therefore thrives the best in the deeper parts. For oxygenation, reeds and pickerelweed will be planted to control erosion, increase biodiversity an keep the ecosystem healthy. These three plants are emergent plants and strive along the edges of the pond (Nizam et al., 2020). Normally, it takes a few weeks for initial changes to the pond. Noticeable improvement takes 2 up to 3 months, whereas a full stabilisation typically takes 6 up to 12 months (Newete & Byrne, 2016).

Moreover, strategic planting was emphasised in the literature. That is why it is important to plant heat and drought resistant trees that are either native to the region, or well-adapted. A famous tree of the region is the Barhi palm tree – a date tree – which was also the tree

that was planted in the drip irrigation project. The Populus Euphratica is native to Iraq, and grows well near water sources, and could therefore be planted accordingly on the site. Another native Iraqi tree, is the Ziziphus Spina-Christi which provides dense summer shade. Tamarix Aphylla will be planted too, as is tolerates salty, sandy and loamy soil, which is essential due to the salinity mentioned earlier (Al-Mohammed et al., 2024). This brings forth soil remediation. As was concluded earlier by Lees and Falcon (1952), the soil of Az Zubayr is naturally fertile, and could therefore be restored to its original state. Using soil remediation techniques is crucial to the principles regenerative agriculture.

The issue with a saline soil is that the salt pulls fresh water from the plant roots when it is in close proximity to them. By using drip irrigation, a major reduction in water use is gained, but this is not enough. Plants that improve – remediate – the health of the soil will be planted. The Faidherbia Albida tree is proven to improve soil quality by adding nitrogen to it and accessing lower soil layers. It also strives in a hot climate, but is does not remove salt directly from the soil (Fridolin et al., 2023). Other plants that directly target salt removal (halophytes) are Atriplex, Distichlis Spicata and Salicornia. The latter is also an edible crop for humans and livestock. A moderate improvement – a reduction of soil salinity between 30-50% – are reported when using these salt-removing plants (Belkheiri & Mulas, 2011).

Because the remediation of the soil can take several years, it is important to use other techniques simultaneously. The reason for this is to not only improve the process, but also to be able to adapt to the reality of the saline soil. This can be done by raising crop beds, at least 20 centimetres high so the salts do not end up near the plant roots. Additionally, growing salt-tolerant crops for food production, especially in the first few years of this process, is important. These include sugar beets, barley and the earlier mentioned date palms and salicornia (Organic Egypt, 2021). Shortly, a combination of controlled irrigation, salt-tolerant plants and salt-removing plants will be used to remediate the soil while adapting to the situation.

However, it is important to not that this project acknowledges that this landscape deals with intermitted bodies, and will therefore inevitably experience drier seasons. For that reason, focusing on soil health – to the extent that is possible within a reasonable timeframe – and reducing water usage are the main priority of this project, rather than overstressing and tilling the soil each season, a shared principle with regenerative agriculture (Durkin & McCue, 2021).

Besides, this project aims to create an innovative new community, where there is room for experimentation with new technologies inside and outside. This could involve the development of new, sustainable building materials, which could be derived from the site. Another aspect is experimenting with new agricultural technologies. The community centre building will provide these educational facilities, such as working with hydroponics or aeroponics. These methods utilise nutrient-rich water rather than soil for plant nourishment and therefore require less water and space. In short, a hydroponic system delivers minerals

directly to roots and aeroponics uses the air, so suspended plants in air that are misted with nutrient solution (AlShrouf, 2017). Because these techniques do not depend on the condition of the soil, they can be worked on throughout the year, which is beneficial for the farmers of the new community during the drier seasons. The centre will provide other recreational and social services as well to maximise community-driven job opportunities and spaces for leisure, as well as to help the new community feel welcome.

In terms of the positioning of buildings, the principle of permaculture is taken as a guideline since it aligns with the architectural vision for the site as well. Building the accommodation for the new community on the drier zones (on the east side) alongside already existing housing, creates a harmonious transition. It also increases their accessibility through the main infrastructure and creates less disturbance to the green heart of the site. By building the community centre close to the main road at the south side of the site, a landmark is created that provides a good view and easy access to the gardens that will emergence behind it. This is also a way to give the site legs from several sides in order to protect the created ecological landscape, see figure 37.

Finally, it is important to address the spatial connectivity within the site as well as with the surrounding area. This is inspired by the philosophy of CPUL, where a productive

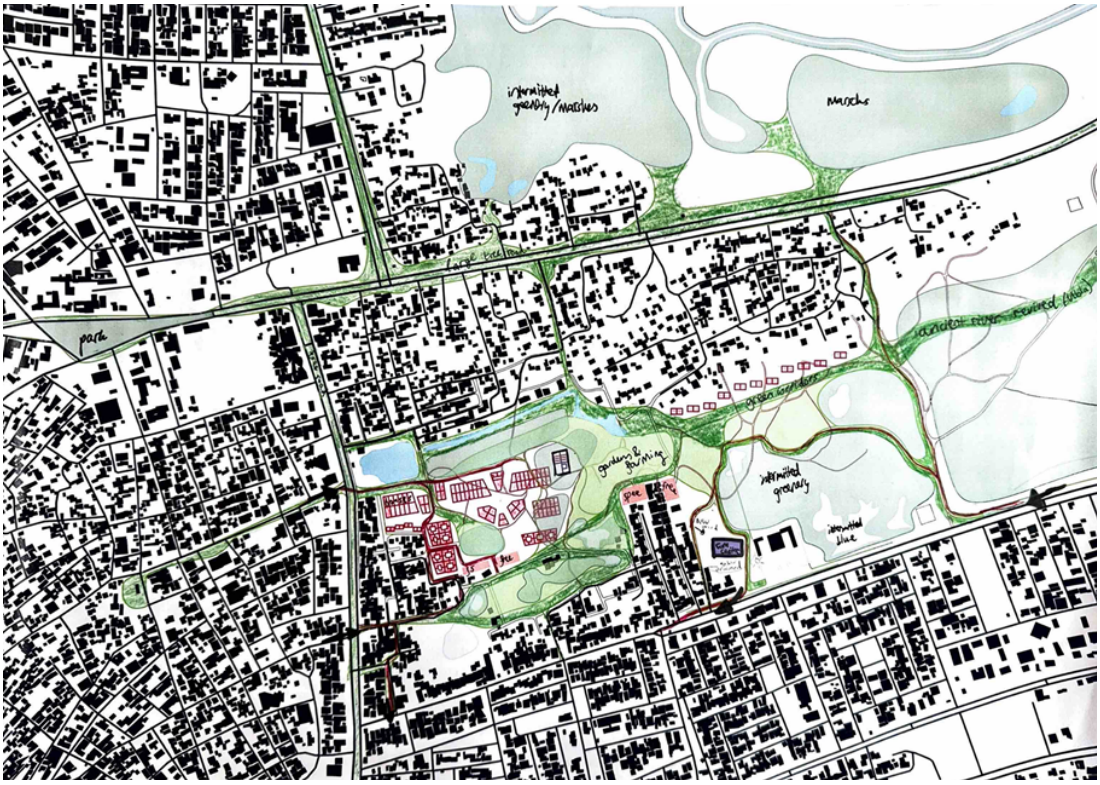
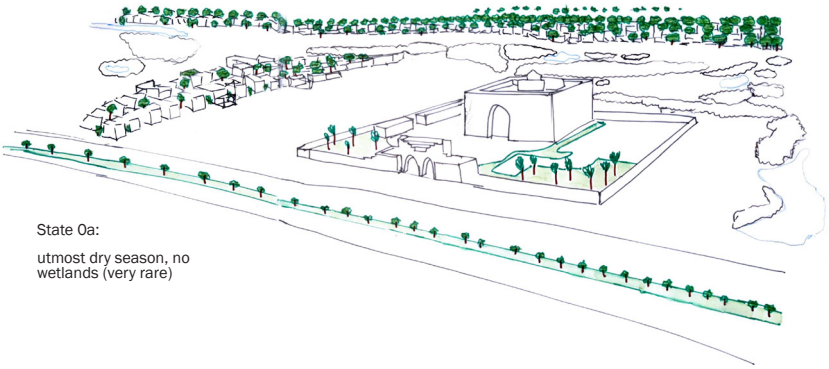


Figure 37: Combining the spatial interventions into the site plan

landscape can be created by connecting existing greenery (Viljoen & Bohn, 2009).

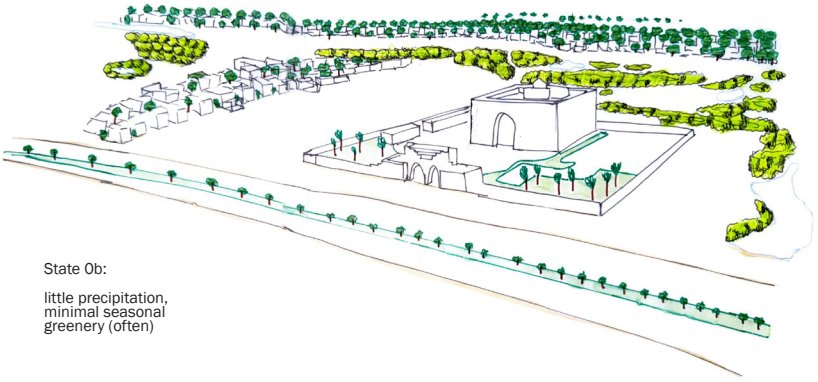
As the project site intends to become a sustainable urban garden, it will be connected with other green spaces in the surrounding area through plants. The site falls between three main roads with large trees on the north side and newly planted trees at south and west. By planting plants between them, ecological corridors can be created that create recreational value as well. The trees on the northern main road are almost next to other intermitted wetlands, and another green road. Planting in between them enhances the ecological connectivity. This will be done in a later stage, since the program on the site itself needs to function to a certain extent, before it can extends it borders. However when considering the development of the project in time, it is an essential element that is *backcasted* based on the *envisioned* future scenario.

The project begins by analysing water flow, soil quality, and elevation to guide permaculture-based design. Initial interventions include gravity-fed and drip irrigation, soil remediation with halophytes, and ecological pond restoration. Buildings are strategically placed on higher ground, while community spaces and gardens emerge around water bodies. Renewable systems, hydroponics, and ecological corridors support long-term expansion and urban ecological resilience. Figure 38 will follow which showcases the phasing of the project in the direct surrounding of the community centre, built for the new community.



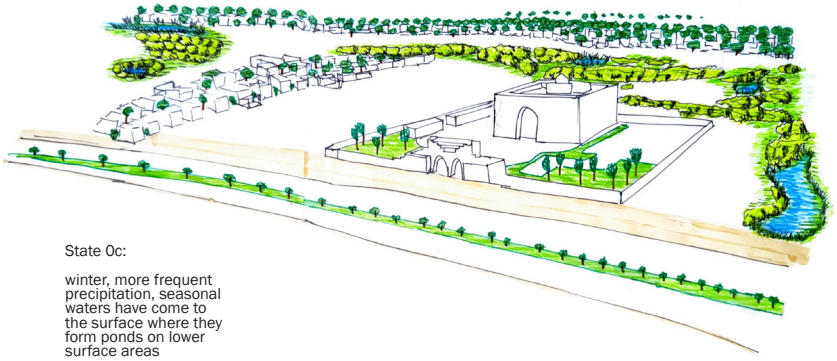
State 0a:

utmost dry season, no wetlands (very rare)



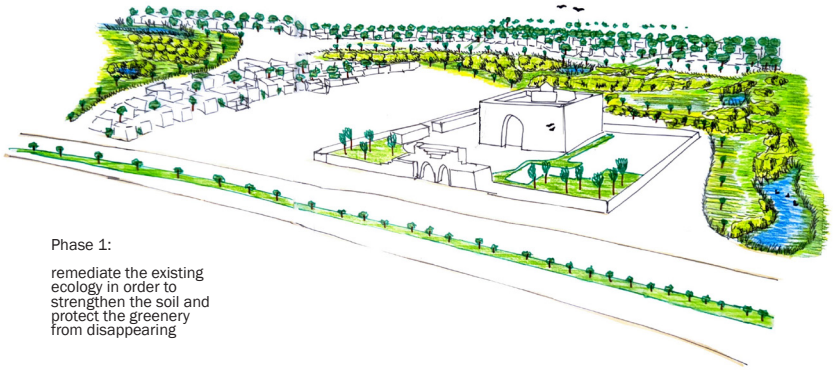
State 0b:

little precipitation, minimal seasonal greenery (often)



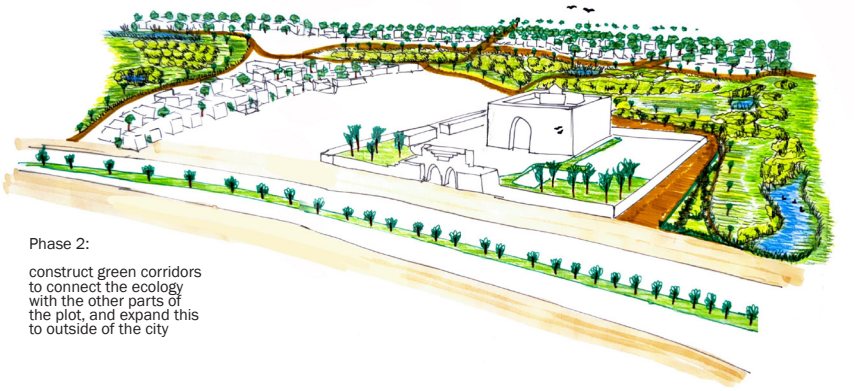
State 0c:

winter, more frequent precipitation, seasonal waters have come to the surface where they form ponds on lower surface areas



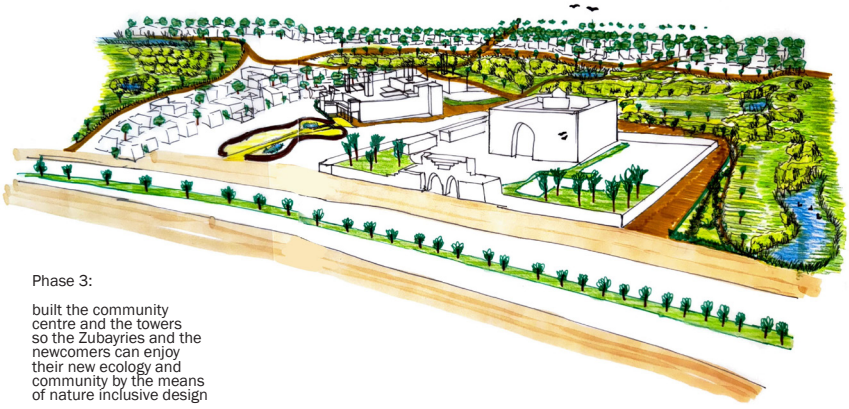
Phase 1:

remediate the existing ecology in order to strengthen the soil and protect the greenery from disappearing



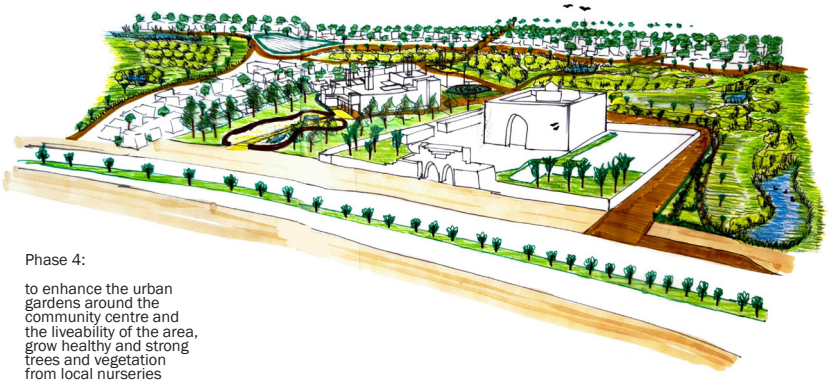
Phase 2:

construct green corridors
to connect the ecology
with the other parts of
the plot, and expand this
to outside of the city



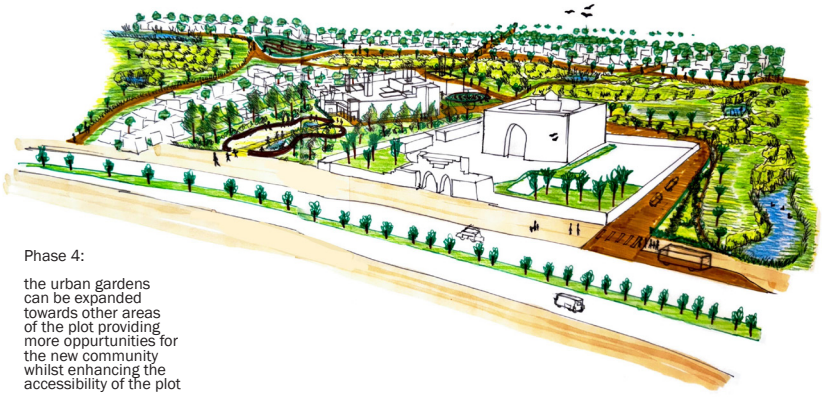
Phase 3:

built the community
centre and the towers
so the Zubayries and the
newcomers can enjoy
their new ecology and
community by the means
of nature inclusive design



Phase 4:

to enhance the urban
gardens around the
community centre and
the liveability of the area,
grow healthy and strong
trees and vegetation
from local nurseries



Phase 4:

the urban gardens
can be expanded
towards other areas
of the plot providing
more oppurtunities for
the new community
whilst enhancing the
accessibility of the plot

7 Conclusion

The research answers the following main question: *In which way could we imagine the urban gardening community of the future in Az Zubayr, from an equitable perspective?*

To answer the research question, an understanding of the opposed challenges by the research was necessary. To enable that, a theoretical framework was presented that viewed the challenges through the lens of infrastructure in order to provide insight in the root-problem opposed by the research. This resulted in the understanding and problematization of the matter via the concept of infrastructural violence. The theoretical framework resulted in an understanding of the deep-rooted inequalities that are embedded in urban developments and affect marginalised communities. This exclusionary planning creates gentrification and disproportionately impacts vulnerable communities. It also further exacerbates the challenges that the local population already faces, which involves water scarcity, pollution and inadequate infrastructure.

So, the major infrastructure projects are reshaping the Basra region. A mixed anticipatory scenario approach is used to think in possible future scenarios that are likely to happen, as well as to anticipate on them by envisioning and backcasting the desired future scenario. Therefore, an interconnectedness between the cities of Umm Qasr, Al-Faw, and Az Zubayr in the Basra gouvernante was observed, through environmental, economic, and migration challenges. A historical and urban background of the wider region (the Basra gouvernante) and the three interconnected sites within the region were analysed. It was found that Umm Qasr is facing severe pollution and political tension causing displacement. Al-Faw's new port is expected to change and potentially even cause the decline of the port of Umm Qasr, further changing regional trade patterns. Additionally, the citizens of Al-Faw have been facing displacement due to environmental degradation, such as extreme drought and high salinity levels. Az Zubayr is already growing rapidly due to migration while also dealing which reinforces the existing urban challenges the city faces. The migration is expected to increase due to the reasons mentioned earlier. within is an emerging hub for both displaced populations and innovative agricultural practices.
This research recognised that the major infrastructure projects like the Grand Faw Port and other development projects that are induced by it, cannot be stopped by this project, but adopts a critical design approach to these challenges.

Afterwards, a theoretical framework was presented that proposed the concept of ecofeminism as a lens that helped to understand which approaches are feasible for the solution, and why.
Ecofeminism highlights the interconnectedness of environmental degradation and systemic oppression, particularly in marginalized communities. This framework critiques patriarchal and capitalist systems that exploit nature and marginalized groups, advocating for a society where no one group dominates. The urban gardening community in Az Zubayr could benefit from this perspective by promoting a collective, inclusive approach

to gardening, one that integrates social equity and environmental sustainability. Ecofeminism's principles of empowerment, inclusivity, and collective action can help guide the development of urban gardens that provide equal access to resources and decision-making processes for all community members, especially vulnerable groups.

Finally, spatial interventions were identified that would enhance social bonds within the addressed community through urban gardening through envisioning. Imagining the future of urban gardening in Az Zubayr, the design would need to focus on – based on the concepts of ecofeminism and commoning – creating community-driven, sustainable solutions that integrate social equity with environmental restoration. The literature on permaculture, CPUL and regenerative agriculture further helped shape the vision. That is why water as a design foundation would be central to this process, since the region faces significant challenges in terms of fluctuating water levels and water scarcity. Integrating practices such as gravity-fed irrigation, drip irrigation, rainwater harvesting, and desalination into urban gardens could ensure long-term water access for all members of the community. By focusing on the sustainable use of water and soil, urban gardens could contribute to food security while fostering environmental resilience.

A key element in this vision is the integration of plants, animals, and microorganisms within the urban landscape. By backcasting what that would mean for Az Zubayr, using native, drought-resistant plants like the Barhi palm, Populus Euphratica, and halophytes to restore soil fertility and adapt to the local climate, is necessary. These plants would not only contribute to ecological restoration but also support agricultural productivity in an area where soil salinity and water scarcity are prevalent. By cultivating these plants in urban gardens, the community would not only produce food but also restore ecological balance in a way that supports the long-term health of the local environment.

In terms of spatial planning, it is important to design spaces that prioritize ecological preservation and social well-being. Green corridors, tree-lined roads, and the protection of existing green infrastructure like wetlands would create spaces for urban gardening while supporting biodiversity and improving air quality. These green spaces would foster community engagement and well-being, providing opportunities for local residents to connect, share knowledge, and work collectively toward a more sustainable future.

A community centre would serve as a hub for educational, recreational, and social activities, fostering social cohesion and promoting collaboration among displaced and host communities. By offering spaces for people to learn about sustainable gardening practices, share resources, and collaborate on solutions, the community centre could empower individuals and foster a sense of ownership over local development. The centre would be designed and managed democratically, ensuring that every voice is heard, and every group, particularly marginalized ones, has a stake in the decision-making process.

In conclusion, imagining the urban gardening community of the future in Az Zubayr from an equitable perspective means addressing both ecological and social challenges through inclusive, sustainable practices. By integrating ecofeminism principles, focusing on water management while considering the background and needs of both the host community as well as the displaced population, we can create a new urban gardening community that not only meets the needs of the population, but also restores ecological balance. The emphasis on community-driven decision-making, shared spaces, and equitable access to resources ensures that the future of urban gardening in Az Zubayr is rooted in social and environmental sustainability. Through these practices, Az Zubayr could offer a model for creating resilient and inclusive urban spaces where both human communities and ecosystems thrive together.

8 Discussion

The research offers valuable insights into sustainable urban development, particularly in environmentally fragile and post-conflict regions. By integrating ecofeminism, equitable water management, and community-driven decision-making, the study presents an adaptable framework for mitigating the negative impacts of major infrastructure projects while fostering social and ecological resilience. The spatial planning strategies – such as green corridors, urban gardening spaces, and a democratically managed community centre – prioritize both environmental preservation and social well-being. These design principles can be applied to other regions facing similar challenges, serving as a model for equitable urban transformation. The emphasis on shared spaces, local engagement, and sustainable resource management ensures that interventions remain relevant across diverse cultural and geographical contexts.

The research aligns with global urban planning trends, emphasizing participatory design and sustainability. It provides policymakers and designers with a transferable methodology to address infrastructural violence and promote inclusive development. By considering the historical, social, and ecological dynamics of affected regions, the study contributes to broader discussions on resilient urban futures. This pilot project in Az Zubayr can serve as a blueprint for cities worldwide, demonstrating how green infrastructure in an urban setting, and environmental building technology can support both displaced and host communities in creating more inclusive and sustainable urban environments.

Final Reflection

I. What is the relation between your graduation project topic, your master track (A, U, BT, LA, MBE), and your master programme (MSc AUBS)?

My graduation project responds to current challenges, including environmental degradation, population displacement and infrastructural violence. It explores the integration of landscape, urban and architectural interventions that address these issues. This is done by setting up a smaller-scale program (pilot project), that aims to mitigate the impact of these challenges on the region by imagining a future otherwise.

My research aims to find ways to balance the challenges of urban development within a vulnerable environment and community, through equitable and sustainable design. This topic aligns with the interdisciplinary approach of my studio, master track and MSc program since it touches upon various design strategies in order to support displaced communities and long-term residents, whilst protecting and nourishing the fragile ecosystem. Furthermore, the importance of management strategies is also represented due to the planning and phasing of the pilot project.

My architecture track provides and enables the theoretical and technical basis for realizing the program, since I will be designing with a focus on passive climatization techniques, material sustainability and architectural adaptability in contemporary building design where past meets present. This is crucial due to the need for climate-adaptive architecture in response to the environmental degradation of the site, increasing energy consumption and the necessity of reducing reliance on mechanical cooling systems. That is why an approach to effective and local vernacular strategies will be used in a contemporary way, using the forces and building materials of nature itself.

II. How did your research influence your design/recommendations and how did the design/recommendations influence your research?

The research evolved from the following main question: In which way could we imagine the urban gardening community of the future in Az Zubayr, from an equitable perspective? My research, which was primarily based on literature research, mapping and scenario planning, provided the narrative that led to certain design choices, like the project site. It led to the insight of choosing the city of Az Zubayr as a design site due to the discovered trends. It provided the knowledge needed to determine for whom I am designing, but also the reasoning and the history behind it. Then I started to analyse the city and its surroundings in order to get an understanding of which potential site locations could provide the environment needed to realise the pilot project. This space was found on the northwest of Az Zubayr, on a walking distance from the city centre, which includes intermitted as well as constant greenery and water bodies, with large empty spaces. The design recommendations led to many changes and variations of the configuration of the design components within the project plot. Initially, the program was distributed in a rather functional way, which later developed

into a different configuration and set up. As the design process continued, the integration of the program and the buildings within the urban and landscape context started to form. This was led by analysing and researching the area, to get a better understanding of the site characteristics in terms of both architecture and environmental technology.

III. How do you assess the value of your way of working (your approach, your used methods, used methodology)?

This research adopts a mixed anticipatory scenario approach, integrating scenario planning, backcasting, and visioning to address infrastructural violence and propose equitable urban futures. Scenario planning helps analyse critical uncertainties, backcasting structures the transition toward a preferred outcome, and visioning ensures long-term, inclusive development. This flexible approach allows the research to not only critique existing urban challenges but also actively shape alternative futures.

A key component of this methodology is the integration of mapping and the study of both historical and contemporary local sources. By analysing local books from the last hundred years, alongside contemporary academic literature and media (of the wider region/ countries), the research gains a nuanced understanding of the socio-environmental transformations in the region. This historical depth, combined with contemporary site-specific insights, strengthens the relevance of proposed interventions.

Furthermore, this approach emphasizes the role of community narratives, particularly those of displaced populations, to inform equitable and sustainable spatial strategies. By envisioning an urban gardening future that responds to environmental degradation and migration trends, the study offers practical design-based solutions tailored to both newcomers and long-term residents. The mixed scenario methodology ensures that these interventions remain adaptable and responsive.

IV. How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

I believe my graduation work is highly relevant on a societal, professional and academic level. It addresses issues in a country that has been through many wars and conflicts, which creates many challenges. On a social and ethical level, it pays close attention to the impact of major infrastructure projects. This is relevant because it touches upon displaced communities and environmental catastrophes, whilst also trying to tackle social inequality by adopting an equitable, feminist perspective throughout the whole graduation project. By taking this ethical position, I aim to highlight the needs of vulnerable stakeholders, without neglecting long-term residents.

On a professional level, the research addresses global urban planning trends, paying attention to sustainable urban development with a focus on community well-being. The project could provide insights for policymakers and designers that are willing to consider ways to mitigate the impact of major infrastructural projects. Particularly in the cases of historical, social, and ecological

dynamics of affected regions, especially in post-conflict and environmentally fragile contexts.

On an academic level, the topic touches upon the fields of architecture, urbanism, geography and environmental sciences by delving into specific ecosystems and intermittent wetlands, along with exploring the relational port identities and the interconnected urban dynamics. I believe that I bridge theory and practice by proposing equitable design interventions for a sustainable urban development model in the city of Zubayr, and possibly beyond, to mitigate infrastructural violence. I propose a new way of living for displaced communities and an integration model within an urban environment, whilst protecting their professions and the local ecosystems.

V. How do you assess the value of the transferability of your project results?

The research offers valuable insights into the field of sustainable urban development, in the context of an environmentally fragile, post-conflict region. The research proposes a way in which ecofeminism, equitable water management, and community-driven decision-making are integrated into an adaptable framework. The aim of this framework is to mitigate the negative effects of major infrastructure projects whilst adopting social and ecological resilience. The strategies enabling this include green corridors, urban gardening spaces and a community centre, that is managed democratically, emphasizing environmental preservation and social well-being. The design principles put forward by this pilot project can be applied in other regions facing similar challenges, and therefore serve as a model for equitable urban development. The emphasis lies on shared spaces, local engagement, sustainable resource management, which is why these design interventions are relevant across diverse cultural and geographical contexts. This aligns with global urban planning trends that involve participatory design and sustainability. The study provides policymakers and designers with an interdisciplinary approach a methodology to address infrastructural violence whilst promoting inclusive development. Furthermore, due to the fact that the research considers the historical, social, and ecological dynamics of the affected region, it contributes to broader discussions on resilient urban futures.

Shortly, this pilot project in Az Zubayr can serve as a guideline for cities worldwide, demonstrating how green infrastructure in an urban setting, and environmental building technology can support both displaced and host communities in creating more inclusive and sustainable urban environments.

First reflection question: What is the impact of introducing a feminist (equitable) design approach in the context of program of the project (in this way)?

Introducing a feminist (equitable) design approach in this project enables inclusivity and long-term social cohesion. This is done by addressing the specific needs of vulnerable groups while promoting shared experiences.
Through the integration of permaculture

practices, the design ensures sustainable land use that benefits both long-term residents and newcomers. In this way, a shared space is created where agricultural traditions can thrive while supporting ecological resilience. This approach both promotes environmental sustainability as well as providing a platform for community engagement and knowledge exchange.

A key aspect of this approach is bridging the gap between displaced communities and host populations. The spaces are designed with the active consideration of the needs of vulnerable groups, which foster interaction and collaboration that on their turn strengthen social bonds. The community centre and housing incorporate dedicated spaces for women and children, acknowledging their specific needs rather than reinforcing separation. This is based on survey findings that highlight their requirements for safety, accessibility, and empowerment.

It is important to note that these exclusive spaces do not contribute to segregation, but instead facilitate integration by balancing exclusive and shared areas. While women and children have spaces that support their well-being, the project also provides joint spaces where diverse groups can interact, creating a sense of community and mutual support. This equitable approach challenges traditional exclusionary urban practices, and promotes a socially just and resilient future.

Second reflection question: Is the introduction of this specific program enough to accommodate all the displaced people in Az Zubayr?

This project is not designed to accommodate all displaced people in Az Zubayr, but rather to serve as a pilot intervention. This projects provides housing for approximately 15-20% of the displaced population and an equal proportion of long-term residents are included in the housing strategy. Furthermore, the urgent shelter in the accommodation building can house up to eight extended families. Each family (household) unit can accommodate eight people, which is based on the average amount of members in the household of the displaced community. Even though this is far from sufficient for the entire displaced population, that is not the project's goal.

The project rather focuses on a smaller-scale, site-specific intervention that can test new urban strategies and potentially be replicated elsewhere. Other additional locations in the area are identified where similar approaches could be applied. However, to maintain coherency in this research and design, I have chosen to develop and detail only this specific site.

The project derives from an understanding of interconnectedness, linking three sites that show why this intervention is necessary. The current emptiness of the site presents a unique opportunity to create a new kind of community, one that integrates housing, learning, and working through gardening—bringing together displaced people, long-term residents, natural ecosystems, and local species.

This is an experiment in urban inclusion, not a colonization of the site for displaced people. Instead, it seeks to facilitate integration by softening interactions between host communities and newcomers, fostering shared spaces and mutual support rather than segregation.

Bibliography

Abdulaziz Alqatrani, F. S. (2018). Residential Regions in the City of Al Zubair and their building methods. *Al-Qadisiyah Journal For Humanities Sciences*, *21*, 35–64.

Abdul-Hameed, S., & Hatem, A. J. (2021). Effect of Shatt Al-Arab Salinity on the Groundwater of Al-Fao and Al-Siba in Southern Iraq. *Iraqi Geological Journal*, *54*(1E), 114–122. https://doi.org/10.46717/igj.54.1e.10ms-2021-05-31

Acted. (2022, 12 september). *Providing sustainable work opportunities to refugees and vulnerable Jordanians in the agricultural sector*. https://www.acted.org/en/providing-sustainable-work-opportunities-to-refugees-and-vulnerable-jordanians-in-the-agricultural-sector/

AFP News Agency. (2022, 21 september). *The death of the Tigris: Iraq's mighty river is drying up | AFP* [Video]. YouTube. https://www.youtube.com/watch?v=rdmhLMdnuL0

Al Jazeera English. (2018, 27 maart). *ɪq Iraq's Faw Peninsula faces environmental catastrophe | Al Jazeera English* [Video]. YouTube. https://www.youtube.com/watch?v=aVnCDkPsMgQ

Al Jazeera English. (2023, 21 september). *Why is Iraq running out of water? | People & Power Documentary* [Video]. YouTube. https://www.youtube.com/watch?v=IU_5YH70lAE

Al Kaabi, A. S. A., & Al Darwish, A. H. H. A. (2023). Spatial analysis for the spread of communicable diseases in the city of Zubair. *Basra Studies Journal*, *47*, 519–564.

Alaaldin, R. (2024, 31 oktober). *Iraq's Development Road Project: A Path to Prosperity or Instability? - Middle East Council on Global Affairs*. Middle East Council On Global Affairs. https://mecouncil.org/publication/iraqs-development-road-project-a-path-to-prosperity-or-instability/?utm_source=chatgpt.com

Alaca, M. (2022, 22 december). Orta Doğu'nun en büyük limanlarından Irak'taki Büyük FAW'ın inşası hız kesmeden sürüyor. *Anadolu Ajansi*. https://www.aa.com.tr/tr/dunya/orta-dogunun-en-buyuk-limanlarindan-iraktaki-buyuk-fawin-insasi-hiz-kesmeden-suruyor/2759271

Al-Dulaimi, H. D. (2021, 10 mei). *سني عراقي في الذكرى الثالثة والثلاثين لمعركة تحرير الفاو مدينة الفداء وبوابة النصر العظيم*. https://sunni-iraqi.net/2021/04/%D9%81%D9%8A-%D8%A7%D9%84%D8%B0%D9%83%D8%B1%D9%89-%D8%A7%D9%84%D8%AB%D8%A7%D9%84%D8%AB%D8%A9-%D9%88%D8%A7%D9%84%D8%AB%D9%84%D8%A7%D8%AB%D9%8A%D9%86-%D9%84%D9%85%D8%B9%D8%B1%D9%83%D8%A9-%D8%AA%D8%AD/

Alfayyadh, S. A. J. (2017). *Development of the framework for a lean, energy efficient, and environmentally friendly port: Umm Qasr Port as a case study* [Doctor of Philosophy in Maritime Affairs]. World Maritime University.

Alkhudary, T. (2023, 12 juni). Southern Iraq's toxic skies are a colonial legacy. *Al Jazeera*. https://www.aljazeera.com/opinions/2023/6/12/southern-iraqs-toxic-skies-are-a-colonial-legacy

Al-Mahmood, H. K. H. (2015). Hydrological changes in the lower part of Mesopotamian Basin. *IRAQI JOURNAL OF AQUACULTURE*, *12*(1), 47–70. https://doi.org/10.21276/ijaq.2015.12.1.4

Al-Maliki, Z. J. (2018, 14 januari). *Editing & Research Department*. Al-Bayan Center For Studies And Planning. https://www.bayancenter.org/en/2018/01/1414/

AlMirbad Media. (2022, 26 september). *سكان ام قصر يشكون من خطورة غازات منبعثة من داخل الحدود الكويتية #المربد* [Video]. YouTube. https://www.youtube.com/watch?v=S5ZniARivZU

Al-Mohammed, R., Alghamaz, F., Abbara, M. I., Alahmer, K., Abd Alaziz, L., & Al-Shebli, W. (2024). The most important natural plant species in the Middle Euphrates Basin and their importance in agroforestry

systems. *Alnakhla Journal Of Science (AJOS)*, *13*(1). https://alnakhlajos.com/index.php/AJOS/article/view/10

Alqatrani, F. S. A. (2018). Residential regions in the city of Al-Zubair. *Journal Of Al-Qadisiya University*, *21*(4).

Al-Sanea, A. R. A. M., & Al-Ali, A. O. (1985). *امارة الزبير بن هجرتين - عبد الرزاق الصانع عبد العزيز عمر العلي - الجزء الاول* (1ste editie). Sarmed Hatem Shukr Al-Samarrai.

AlShrouf, A. (2017). Hydroponics, Aeroponic and Aquaponic as Compared with Conventional Farming. *American Scientific Research Journal For Engineering, Technology, And Sciences*, *27*(1), 247–255. https://www.asrjetsjournal.org/index.php/American_Scientific_Journal/article/download/2543/1028

Al-Zahidee, A. R. H., & Al-Edam, H. S. M. (2021). The economic importance of the construction of the great port of FAW and the link to the Silk Road. *Review Of International Geographical Education Online*, *11*(5), 3134–3144. https://rigeo.org/submit-a-menuscript/index.php/submission/article/view/1449

Andrew Millison. (2021, 4 augustus). *WATER is the foundation of PERMACULTURE DESIGN!* [Video]. YouTube. https://www.youtube.com/watch?v=RDCFbfcRcUE

Aqrawi, A. M. (1993). Implications of sea-level fluctuations, sedimentation and neotectonics for the evolution of the Marshlands (Ahwar) of Southern Mesopotamia. *Quaternary Proceedings*, *3*, 17–25.

Arab Sea Ports Federation. (2022, 23 november). *Port of Umm Qasr*. https://arabseaports.com/iraq-ports/umm-qasr#:~:text=The%20depth%20of%20sea%20waters,total%20length%20is%207837%20meters.

Belkheiri, O., & Mulas, M. (2011). The effects of salt stress on growth, water relations and ion accumulation in two halophyte Atriplex species. *Environmental And Experimental Botany*, *86*, 17–28. https://doi.org/10.1016/j.envexpbot.2011.07.001

Biggs, S. (2023, 7 november). Storming of the Ottoman Fort Fao - Al Faw Peninsula. *RoyalMarinesHistory*. https://www.royalmarineshistory.com/post/storming-of-the-ottoman-fort-fao-al-faw-peninsula

Bilgin, M. S. (2004). The construction of the Baghdad railway and its impact on Anglo-Turkish relations, 1902-1913. *OTAM Ankara Üniversitesi Osmanlı Tarihi Araştırma Ve Uygulama Merkezi Dergisi*, 109–129. https://doi.org/10.1501/otam_0000000524

Cafiero, G. (2025, 5 maart). *Geopolitical dynamics surrounding Iraq's ambitious development road project*. Arab Center Washington DC. https://arabcenterdc.org/resource/geopolitical-dynamics-surrounding-iraqs-ambitious-development-road-project/

Carruthers, D., & Rodriguez, P. (2009). Mapuche Protest, Environmental Conflict and Social Movement Linkage in Chile. *Third World Quarterly*, *30*(4), 743–760. https://doi.org/10.1080/01436590902867193

Cartographic collection. (2022). *NLI quarta Asie tabula*. https://picryl.com/media/nli-quarta-asie-tabula-482713.

Centre for Urban Studies Amsterdam. (2021, 6 april). *CUS Urban Dialogue #5 - Multispecies Urbanism by Debra Solomon* [Video]. YouTube. https://www.youtube.com/watch?v=TWUp_UZ9Gpo

CNN-News18. (2023, 27 mei). *LIVE: Iraq launches $17Bn project to link its new Grand Faw port on its southern coast to Turkey* [Video]. YouTube. https://www.youtube.com/watch?v=gqJxyBRMXKQ

Defence, T. (2021, 8 augustus). *Al Faw and the Operation to Open the Iraqi Port of Umm Qasr - Think Defence*. Think Defence. https://www.thinkdefence.co.uk/al-faw-operation-open-iraqi-port-umm-qasr/

DesignZip. (2025, 11 januari). *What Is Iraq's Development Road and Why Does It Matter?* [Video]. YouTube. https://www.youtube.com/watch?v=ExK38T1bWmA

Durkin, L., & McCue, A. (2021, 22 juni). *Regenerative agriculture: Farming in nature's form*. Metabolic. https://www.metabolic.nl/news/regenerative-agriculture-farming-in-natures-form/

Fares, M. (2023, 1 oktober). *Iraq-Kuwait tensions on the rise once more: Navigating troubled waters*. Raseef22. https://raseef22.net/english/article/1095143-iraqkuwait-tensions-on-the-rise-once-more-navigating-troubled-waters

Fethi, I. (2005). Iraq: State of Ecology and Built Heritage after Four Decades of Adversity / Iraq's Cultural Heritage: Loss and Destruction - The Case for Restoration and Reconstruction. *Heritage At Risk*, 111–124. https://doi.org/10.11588/hr.2005.0.21023

Fethi, I. A. W. (1978). *Urban conservation in Iraq : the case for protecting the cultural heritage of Iraq with special reference to Baghdad, including a comprehensive inventory of its areas and buildings of historic or architectural interest.* https://etheses.whiterose.ac.uk/10302/

Franzke, J. (2003). *Bagdad- und Hedjazbahn: Deutsche Eisenbahngeschichte im Vorderen Orient*.

Fridolin, C., Liliane, M. K., & Oscar, W. T. (2023). Effect of salinity on physiological, and biochemical traits of two forage species: Albizia lebbeck and Faidherbia albida. *African Journal Of Agricultural Research*, *19*(5), 537–546. https://doi.org/10.5897/AJAR2023.16314

Ghaidan, U., Al-Dabbagh, N., & Fethi, I. (2015). Iraq: State of Ecology and Built Heritage after Four Decades of Adversity / Iraq's Cultural Heritage: Loss and Destruction - The Case for Restoration and Reconstruction. *Heritage At Risk*, 111–124. https://doi.org/10.11588/hr.2005.0.21023

Gruen, L. (1992). Janet Biehl. Rethinking ecofeminist politics. Boston, South End Press, 1991. *Hypatia*, *7*(3), 216–220. https://doi.org/10.1017/s0887536700005146

Hasan, H. (2024, 11 maart). *Iraq's Development Road: Geopolitics, Rentierism, and Border Connectivity*. Malcom H. Kerr Carnegie Middle East Center.

Hein, C. (2020). Port Cities: Dynamic Interactions. Amsterdam University Press.

Hein, C., Luning, S., & Van de Laar, P. (2021). Port City Cultures, Values, and Maritime Mindsets : Defining What Makes Port Cities Special. *European Journal Of Creative Practices in Cities And Landscapes (CPCL)*, *4*(1), 7–20. https://doi.org/10.6092/issn.2612-0496/13378

Hoekstra, M., Lousberg, L., Rooij, R., Floet, W. W., & Zijlstra, S. (2022). Inzicht: academische vaardigheden voor bouwkundigen. In *TU Delft Open eBooks*. https://doi.org/10.5074/t.2022.002

IVHQ. (2023). *Maasai Immersion Volunteer Project in Tanzania | IVHQ*. International Volunteer HQ. https://www.volunteerhq.org/destinations/tanzania/maasai-immersion-in-tanzania/

Jaafar, B. (2021, 12 september). *The water shortage crisis in Iraq*. Begin-Sadat Center For Strategic Studies. https://besacenter.org/the-water-shortage-crisis-in-iraq/

Jaoude, G. A., Mumm, O., & Carlow, V. M. (2022). An Overview of Scenario Approaches: A Guide for Urban Design and Planning. *Journal Of Planning Literature*, *37*(3), 467–487. https://doi.org/10.1177/08854122221083546

Joe. (2021, 21 september). Iraq's Al Faw port to become largest in Middle East. *Global Construction Review*. https://www.globalconstructionreview.com/iraqs-al-faw-port-to-become-largest-in-middle-east/

Lees, G. M., & Falcon, N. L. (1952). The Geographical History of the Mesopotamian Plains. *Geographical Journal*, *118*(1), 24. https://doi.org/10.2307/1791234

Lesaffer, R. (2022). *The Iran-Iraq Border: A Story of Too Many Treaties*. Oxford Public International Law. https://opil.ouplaw.com/page/502#:~:text=In%20order%20to%20avoid%20war,whole%20course%20at%20the%20thalweg.

Li, Y., Peng, L., Wu, C., & Zhang, J. (2022). Street View Imagery (SVI) in the Built Environment: A Theoretical and Systematic Review. *Buildings*, *12*(8), 1167. https://doi.org/10.3390/buildings12081167

Loncón, E. (2023, 20 april). *The Mapuche Struggle for the Recognition of its Nation From a Feminine and Decolonizing Point of View*. ReVista. https://revista.drclas.harvard.edu/the-mapuche-struggle-for-the-recognition-of-its-nation-from-a-feminine-and-decolonizing-point-of-view/

Lugo, I., & Martínez-Mekler, G. (2022). Theoretical study of the effect of ports in the formation of city systems. *Journal Of Shipping And Trade*, *7*(1). https://doi.org/10.1186/s41072-022-00117-6

Masboob, H. (2023, 8 maart). al Hawizeh Marsh, Iraq: Story of Destruction & Restoration. *ArcGIS StoryMaps*. https://storymaps.arcgis.com/stories/f8eac119c2db48aaa24ee1980054a1e3?utm_

MBC1. (2023, 1 april). *مدينة الزبير العراقية.. قصة أكبر مدينة بناها النجديون خارج نجد / الحلقة 10 / مالك بالطويلة 5*[Video]. YouTube. https://www.youtube.com/watch?v=PiM7nBiiH-Q

MediTelegraph. (2019, 3 november). Umm Qasr capacity upgrade completed. *The MediTelegraph*. https://www.themeditelegraph.com/en/transport/ports/2019/11/03/news/umm-qasr-capacity-upgrade-completed-1.38052924

Menzel, U. (2014). *Bagdad-Bahn*. Die Ordnung Der Welt. https://www.ulrich-menzel.de/odw/1884_u8.html

Ministry of Foreign Affairs. (2023). *وزارة الخارجية العراقية يؤتمر طريق التنمية*. https://mofa.gov.iq/%D9%85%D8%A4%D8%AA%D9%85%D8%B1-%D8%B7%D8%B1%D9%8A%D9%82-%D8%A7%D9%84%D8%AA%D9%86%D9%85%D9%8A%D8%A9/

Mohammed, A. I., Naimi, S., & Dawood, A. S. (2023). Evaluation of the Drinking and Irrigation Quality of Groundwater in Basra, Iraq. *Journal Of Ecological Engineering*, *24*(9), 260–271. https://doi.org/10.12911/22998993/169177

Morel, K., Léger, F., & Ferguson, R. S. (2018). Permaculture. In *Elsevier eBooks* (pp. 559–567). https://doi.org/10.1016/b978-0-12-409548-9.10598-6

Mustafa, H. A., Al-Qaisi, M., Ahmad, A., Bachar, A., Davis, P., Al-Saray, M., Massify, W., Wali, Z. Z., Chalak, C., Naqishbandy, S., Qadir, B., Al-Salhy, S., Travers, A., Al-Araji, A., Shareef, B., Beuze, A. H. S. &. J., Housni, A. A., Al-Rawi, O., Al-Qaher, S., . . . Al-Qaisi, A. (2023, 10 oktober). The new region. *The New Region*. https://thenewregion.com/posts/500/iraqi-mps-collect-signatures-against-kuwaiti-encroachment-on-iraqi-sovereignty

Newete, S. W., & Byrne, M. J. (2016). The capacity of aquatic macrophytes for phytoremediation and their disposal with specific reference to water hyacinth. *Environmental Science And Pollution Research*, *23*(11), 10630–10643. https://doi.org/10.1007/s11356-016-6329-6

Nimmergut, J. (1991). *Historische Wertpapiere: Sinnvoll sammeln - garantiert gewinnen*.

Nizam, N. U. M., Hanafiah, M. M., Noor, I. M., & Karim, H. I. A. (2020). Efficiency of Five Selected Aquatic Plants in Phytoremediation of Aquaculture Wastewater. *Applied Sciences*, *10*(8), 2712. https://doi.org/10.3390/app10082712

Normand, R., Zaidi, S., Park, J., Liu, J., & Fuller, P. (2003, 8 april). *Water under siege in Iraq: US/UK military forces risk committing war crimes by depriving civilians of safe water*. ReliefWeb.

Nowysz, A., Mazur, Ł., Vaverková, M. D., Koda, E., & Winkler, J. (2022). Urban Agriculture as an Alternative Source of Food and Water Security in Today's Sustainable Cities. *International Journal Of Environmental Research And Public Health*, *19*(23), 15597. https://doi.org/10.3390/ijerph192315597

Obeid, A. D. (2022, 18 mei). *سيرة مدينة / مدينة الزبير*[Video]. YouTube. https://www.youtube.com/watch?v=j7eWnMG1N2Y

O'Donnell, J. L. (2023). 'Hitting at the heart of a massive problem': articulating a democratic education through feminist practices of freedom and urban farm movements in Buenos Aires, Argentina. *Ethnography & Education*, *19*(1), 34–54. https://doi.org/10.1080/17457823.2023.2291312

Old Iraq. (2015). *ميناء الفاو 1951 البصرة*. Facebook. https://www.facebook.com/photo.php?fbid=361161694078602&id=115069352021172&set=a.135939339934173&locale=cy_GB

Organic Egypt. (2021, 29 december). *Overcoming soil salinity* [Video]. YouTube. https://www.youtube.com/watch?v=H_UViPfxFUs

Pike, J. (1997, mei). *Umm Qasr Port Facility - 3 March 1991. Coalition air strikes inflicted serious damage to the Umm Qasr Port Facility.* FAS. https://irp.fas.org/imint/cpgw_155b.htm

PIlumbi, D. (2018). Affective Common-Place: The Case of NDSM Ship Wharf, Amsterdam. *Uni-nl*. https://www.academia.edu/43144271/Affective_Common_Place_The_Case_of_NDSM_Ship_Wharf_Amsterdam?utm_source=chatgpt.com

PIlumbi, D. (2020). Transitional Tirana: Commoning as material engagement. *Uni-nl*. https://www.academia.edu/43144240/Transitional_Tirana_Commoning_as_material_engagement

Programa ProHuerta. (2024, 10 juli). Argentina.gob.ar. https://www.argentina.gob.ar/capital-humano/familia/seguridad-y-soberania-alimentaria/programa-prohuerta

Qanat Altaghyir. (2023, 1 augustus). *هذا ما دفعته الكويت للعراق لحسم الخلاف على ترسيم حدود ام قصر*[Video]. YouTube. https://www.youtube.com/watch?v=C6QdB067JNc

Rahi, K. A. (2018a). Salinity Management in the Shatt Al-Arab River. *International Journal Of Engineering & Technology*, *7*(4.20), 128. https://doi.org/10.14419/ijet.v7i4.20.25913

Rahi, K. A. (2018b). Salinity Management in the Shatt Al-Arab River. *International Journal Of Engineering & Technology*, *7*(4.20), 128. https://doi.org/10.14419/ijet.v7i4.20.25913

RC Climate Centre. (2024). Iraq Climate Fact Sheet 2024. In *International Committee Of The Red Cross*. https://www.icrc.org/en/where-we-work/iraq#latest-documents941792

Rodgers, D., & O'Neill, B. (2012). Introduction: Infrastructural Violence: Introduction to the special issue. *Ethnography*, *13*(4), 401–412. http://www.jstor.org/stable/43497506

Rossiter, M. (2009). *Target Basra*. Random House.

Russell, R. L. (2005). *Weapons Proliferation and War in the Greater Middle East: Strategic Contest*. https://ci.nii.ac.jp/ncid/BA75936842

Sabri, A. (2021). *بساتين النخيل في مدينة الفاو عام ١٩٥٥*. Facebook. https://www.facebook.com/ISMAIL.KHALID.M.M/posts/%D8%A8%D8%B3%D8%A7%D8%AA%D9%8A%D9%86-%D8%A7%D9%84%D9%86%D8%AE%D9%8A%D9%84-%D9%81%D9%8A-%D9%85%D8%AF%D9%8A%D9%86%D8%A9-%D8%A7%D9%84%D9%81%D8%A7%D9%88-%D8%B9%D8%A7%D9%85-%D9%A1%D9%A9%D9%A5%D9%A5/4335243783165058/

Shaw-Smith, P. (2023, 6 april). *Is Al Faw Grand Port inching to completion in Iraq?* Seatrade Maritime News. https://www.seatrade-maritime.com/ports-logistics/is-al-faw-grand-port-inching-to-completion-in-iraq-

Shiva, V. (1989). *Staying Alive: Women, Ecology and Development*. http://patterns.architexturez.net/doc/az-cf-172850

Shuker, Z. (2022, 24 augustus). *The Black Gold Curse: Socio-Political Impact of Basra's Oil Economy*. EPC. https://epc.ae/en/details/featured/the-black-gold-curse-socio-political-impact-of-basra-s-oil-economy

Sol. (2020, 20 maart). *What is Regenerative Agriculture?* [Video]. YouTube. https://www.youtube.com/watch?v=fSEtiixgRJI

Tallarico, G. (2024, 21 januari). *Permaculture and Water Conservation Initiatives*. World Permaculture Association. https://worldpermacultureassociation.com/water-conservation-with-permaculture/

Technital. (2024, 13 januari). *Al Faw Peninsula Industrial and Urban Planning (Iraq)*. TECHNITAL S.p.A. https://www.technital.net/projects/urban-planning-buildings-and-architecture/urban-and-industrial-planning/urbanismo-construccion-y-arquitectura-al-faw-peninsula-industrial-and-urban-planning-iraq

The Editors of Encyclopaedia Britannica. (1998). BASRA | History, Economy & Culture. In *Encyclopedia Britannica*. https://www.britannica.com/place/Basra

Tollast, R., & Aldroubi, M. (2021, 10 augustus). An overland route to rival Suez: the wild ambition of Iraq's Al Faw port. *The National*. https://www.thenationalnews.com/mena/iraq/2021/08/08/an-overland-route-to-rival-suez-the-wild-ambition-of-iraqs-al-faw-port

UNDP. (2023a). *Khor Al Zubair Water Treatment Plant Inauguration – UNDP-UNICEF Project Funded by the Netherlands*. https://www.undp.org/iraq/press-releases/khor-al-zubair-water-treatment-plant-inauguration?utm_source=chatgpt.com

UNDP. (2023b, oktober 2). 5 Ways UNDP Is Supporting Iraq's Stabilisation. https://www.undp.org/iraq/stories/5-ways-undp-supporting-iraqs-stabilisation

UNIOM. (2023). Iraq - National Displacement Profile 2023. In *IOM UN Migration*. https://dtm.iom.int/reports/iraq-women-navigating-durable-solutions-displacement-experiences-ninewa-governorate-march?close=true

UNIOM. (2024a). Iraq – Women Navigating Durable Solutions to Displacement Experiences from Ninewa Governorate. In *IOM UN Migration*. https://dtm.iom.int/reports/iraq-women-navigating-durable-solutions-displacement-experiences-ninewa-governorate-march?close=true

UNIOM. (2024b). Navigating the Effects of Displacement: Iraq. In *UNIOM UN Migration*. https://dtm.iom.int/reports/navigating-effects-displacement-iraq?close=true

Van Der Kooij, S., Zwarteveen, M., Boesveld, H., & Kuper, M. (2013). The efficiency of drip irrigation unpacked. *Agricultural Water Management*, *123*, 103–110. https://doi.org/10.1016/j.agwat.2013.03.014

Viljoen, A., & Bohn, K. (2009). Continuous Productive Urban Landscape (CPUL): Essential Infrastructure and Edible Ornament. *Open House International*, *34*(2), 50–60. https://doi.org/10.1108/ohi-02-2009-b0006

Vox. (2019, 2 juli). *Why Iraq's great rivers are dying* [Video]. YouTube. https://www.youtube.com/watch?v=_c7AuSQdvow

Walters, S. D. (1985). Caught in the Web: A Critique of Spiritual Feminism. *Berkeley Journal Of Sociology*, *30*, 15–40. https://dialnet.unirioja.es/servlet/articulo?codigo=3916996

Wang, T., Xu, J., He, Q., Chan, A. P. C., & Kingsford Owusu, E. (2023). Studies on the success criteria and critical success factors for mega infrastructure construction projects: a literature review. *Engineering, Construction And Architectural Management*, *30*(5).

Warren, K. J. (1990). The Power and the Promise of Ecological Feminism. *Environmental Ethics*, *12*(2), 125–146. https://doi.org/10.5840/enviroethics199012221

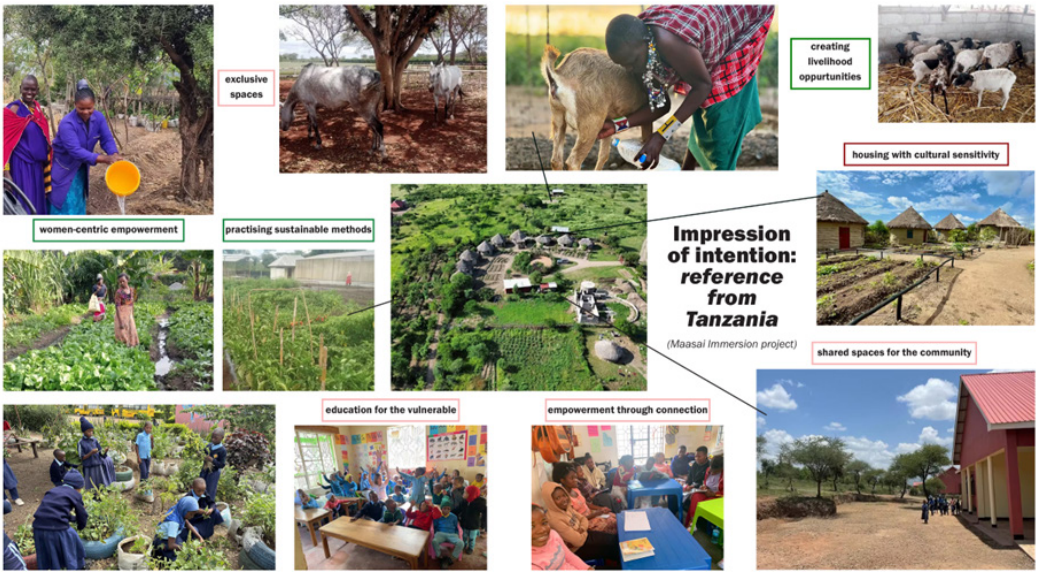
Was Here. (2023, 18 februari). *زراعة 370,000 نخلة في محافظة البصرة قضاء الزبير* [Video]. YouTube. https://www.youtube.com/watch?v=fqoL0IrSvUk

WEF. (2021). Global Gender Gap Report 2021. In *World Economic Forum*. https://www.weforum.org/reports/global-gendergap-report-2021

Appendix A


OPINIONS & CONCERNS
qualitative analysis of six focus group discussions conducted in 2023 in Kirkuk and Erbil with 43 participants by the UN
IDPS
internally displaced people, ISIS war in this cas
HOST COMMUNITY
the long-term residents in Kirkuk and Erbil
High costs force IDPs into overcrowded housing. Some women gained new job opportunities.
Housing & Livelihoods
Overcrowding raises rent and lowers wages. Schools are overcrowded, impacting local children. Hosting IDPs adds financial strain.
Many feel welcomed but some women experience stigma. Family presence and job opportunities influence decisions to stay.
Community & Integration
Some welcome IDP women in new job roles. Others feel privacy and household dynamics have shifted. Mixed views on intermarriage.
They aim for education, jobs, and eventual return. Many aspire to careers that support their families.
Long-term impact
Men mention friendships, but they require time, effort, and resources. Most say IDPs don't harm financial stability. Some see economic benefits from IDPs as business partners or customers.

Appendix B



Appendix C

Impression of intention: *reference from Jordan*

(ACTED's Initiatives project)

Appendix D