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Urban Agricultural planning, Green and Open Spaces and its Impact on Sustainable development in Kurdistan Region of Iraq/ Duhok City: the case of Shindokha Area.

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ABSTRACT

The aim of the research is to demonstrate the importance of agricultural planning and open green spaces in the sustainable development of Duhok Governorate, through reviewing the relevant scientific literature and studies, lessons learned from international experiences in the field of agricultural planning, modern trends in the field of extension work on a global scale, and the characteristics of agricultural extension in directing the provision of services. Agricultural and urban planning have strong impacts on the environment, green spaces, the economy and the form of the city The concept of Urban green space is open space areas reserved for parks and other "green spaces", including plant life, and the environment. Most urban open spaces are green spaces, but occasionally include other kinds of open areas. Lack of sustainable agriculture has a negative impact on the city in regard to envrinment, economy and social aspects. This study tries to find out the obstacles of sustainable agriculture in Shindokha area to achieve sustainability and the factors that can improve the agricultural lands, to become more affective and to increase production through conducting a qualitative research approach. Qualitative data collection methods vary using unstructured or semistructured techniques. Individual interviews with stake holders, houses honors in Duhok city and participation/observations which are going to be used to collect data about Duhok city.in the result findings the agricultural sustainability, urban agriculture are one of the most effective interventions for improving our social, psychological and economic future for individuals, communities, states, and the country as a whole. Having a greener community is very crucial that enables a city to be more attractive and solves many social issues, especially for those who want to get use of their times and will not waste it.

***Keywords*:** Agricultural planning. Green space, open space, Duhok city, sustainable agriculture, environmental sustainability.

INTRODUCTION

Urban Agriculture is clearly defined as "the cultivation, processing and distribution of food and other products through intensive planting and animal husbandry in and around cities with the production of food in urbanizations, small intensive urban farms, public space food production, greenhouses, land division and other initiatives [1]. Urban agriculture makes it possible to bring a wide range of environmental, economic and social benefits to the surrounding communities. These agricultural activities help and improve urban populations and contribute to and improve the sustainability of the urban environment [2]. Recycling is the technique of changing waste substances into new substances and objects, accelerated recycling method agricultural manufacturing at decrease monetary and environmental costs, strengthening the resilience of individuals, groups and ecosystems is a key element for the sustainability of meals and agricultural systems [3].

Urban agriculture (UA) is “an activity that yields and diversifies plants and farm animals via way of means of producing, processing, and marketing meals and different items on city and peri-city land and water the use of in depth manufacturing methods (re)using natural resources, and (re)using urban waste” [4]. Sustainable development is an organizing principle to achieve human development goals by maintaining the capacity of natural systems to provide the natural resources and eco-system services on which the environment, the economy and society. Sustainable agriculture must nurture healthy ecosystems and support the sustainable management of land, water and natural resources, while ensuring world food security [5]. Sustainable agriculture professionals must incorporate three main goals into their work: a healthy environment, and social and economic. All producers, food processors, traders, retailers, consumers and waste managers involved in the food system can contribute to ensuring a sustainable agricultural system. There are many practices that are widely used by people working in sustainable food and agriculture systems. Farmers can use methods to improve soil health, minimize water use, and reduce pollution on the farm [6].

Problem statement

During our observation to the agricultural status of Duhok city, we found out that there are problems in sustainability

in all of its aspects, such as: (environment, social and economy)

Environmentally:

we will confront many problems as; census is a significant problem regards to agriculture. Day by day population increases, by this green space and agricultural urbanism, we will confront a big problem in future for food system. Population will raise and food system won't be enough for all of the people, so people will have to produce industrial food and this will affect negatively in many ways as it is fundamentally at odds with environmental health, it is an inefficient use of land, it contaminates water and soil and affects human health and many more.

Socially:

The rationality of the people, nowadays most of the people work or employee for trade companies, industrial companies, policies or for the government, they do not see and give any importance to agriculture, people think that agriculture cannot be a source of their economic income mainly within the city, and that is one of the reasons for poor agriculture in Duhok.

Economically:

In general, Duhok city has a poor economy, and that is another problem. For example, if farmers work for the government, the government has to pay workers' wages, and this is difficult for the Duhok governorate's budget, and the confrontation of farmers and the government with the financial cost of materials that are necessary for agriculture. Such as providing pesticides and crop protection, fertilizers, soil reinforcing materials, and agricultural tools such as shovel, etc. Duhok's residents, depend on outdoors products and they don't give any importance to local food, so farmers don't get any motivation to promote cultivation.

This study tries to answer the following questions:

What are the obstacles of sustainable agriculture in Shindokha area?

1. How can we achieve the sustainable development through urban agriculture?
2. What factors can improve the agricultural lands, to become more affective and to increase production?
3. To what extent Shindokha residents benefit from sustainable agriculture?

The objectives are:

- To create a source of income Farmers' income should be provided when they sell their products at prices imposed by government and relevant authorities to encourage them to promote agriculture. It has the prospects to be a long-term revenue source for the country's economy and development (issues and priorities for agriculture, 2012) [7].

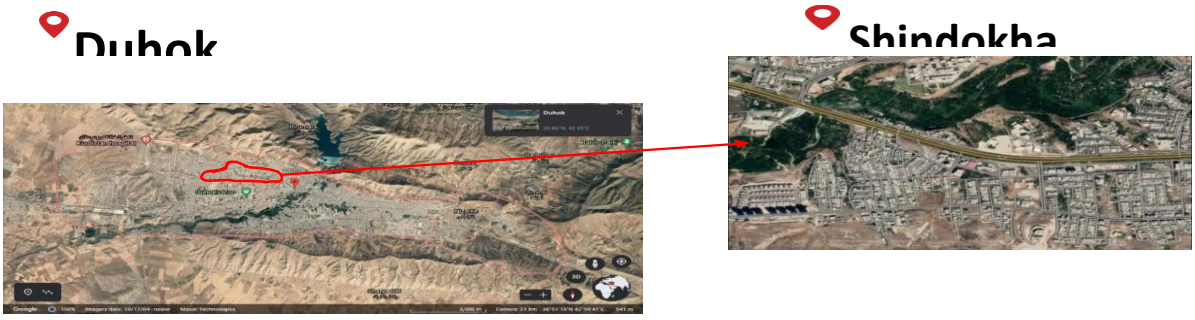


Figure **:** 1-2 map of Duhok, showing the location of Shindokha, by the researcher

- To give Open spaces and to give amplitude for comfort, and healthier lifestyle especially if they are spread out over the city. Offering citizens, a pleasant, cheerful, and healthy existence, and perhaps to give people a sensation of nature and beauty in their city, a counterbalance in both residential areas and the environment must be established [8].
- To promote good health, our health is greatly influenced by the environment. Global warming, which has become one of the world's most critical environmental issues, is mitigated by the high oxygen content and low carbon content. If people become more conscious, there will be a much more urban gardening, which will have a little but positive effect on all of these districts [9]
- To achieve self-sufficiency in food production. As a result, there will be no need to import foreign items that can be planted in Duhok, resulting in economic benefits as well as benefits to farmers and land usage [10].

Study Area: The city of Duhok is located between two mountain ranges, it has four seasons and is surrounded by agricultural lands. Significantly, Duhok is a multicultural and multi-religious city with a population of around 350,000 The city's main water supply comes from the Duhok Dam, the Mosul Dam, and various springs and rivers [11].

Shindokha is located in the south of the city of Dohuk near Zawa mountain. Shindokha area is considered as one of the mountains are in terms of terrain, and most of its lands are considered residential, and very few of them are considered agricultural. According to what we have studied, the people of the area have established like orchards on their roofs. We, in turn, aspire to study what these people benefit from their work. Shindokha district can be shown in Figure (1.2) the Dohok province and the location of Shindokha area.

1.7 Services provided by the KRI government to improve the status of Agriculture in Duhok city and its policies and regulations

- The Directorate of Agriculture in Dohuk Governorate sought to advance the agricultural reality and reduce the problems faced by this vital sector, which constitutes an important economic tributary for the people of the region because there is a large percentage of them working in the field of agriculture, animal husbandry and fish [12].
- During the year 2012 with the support of farmers through several sectors, most notably granting sums of money to farmers to transport their goods from orchards in remote villages and towns to the city center of Dohuk, where more than two billion and 640 million dinars were spent for farmers to transfer their crops to Dohuk [12].
- The Director of Dohuk Agriculture has taken a number of other steps, including distributing a large number of greenhouses to farmers in disputed areas, and they distributed 120 greenhouses to farmers in disputed areas at subsidized prices of 50%, as well as supporting farmers who are building farms [12].
- Assisting farmers who use their farm revenue to construct small earthen dams to store rainwater in the winter and use it in the summer [12].
- Providing extension services, agricultural production requirements, conducting research and applied agricultural studies, supervising the implementation of applicable laws, and following up on the implementation of activities related to agricultural land investment and supporting it with the territorial agricultural production objectives (law number (1), [13]

Planning system for improving the agricultural status in Duhok city:

Agricultural planning is a political process to help secure the future of agriculture where people and countries set goals and strategies to achieve in a particular time period, and plan to transform and benefit. Its natural resources according to the needs [14].

The Kurdistan Agricultural Vision in 2020 developed this vision to set indicators and generally describe goals to improve resident's standard of living by developing the total framework under which ministries operate, implement policies and plans [15]. The Kurdistan Agricultural Vision 2020 is "Food security for the people of the Kurdistan region, economic prosperity for farmers and prosperity through the export of our agricultural and food products." The vision is that KRI will be a major food and agriculture producer and exporter of wheat, vegetables, fruits, meat, dairy products in the wider region and beyond 15].

Methodology: In our methodology we are going to use qualitative research approach. Qualitative Research is used to uncover trends in thought and opinions and dive deeper into the problem. Qualitative data collection methods vary, using unstructured or semi-structured techniques. Individual interviews with stakeholders, house honours in Duhok city and participation/observations, which are going to be used to collect data about Duhok city.

2. Literature review: This section compares and contrasts the experiences of improving and developing countries in terms of urban agriculture and how they achieve and support it. We will talk about three different countries that are from Asia, Europe and the Middle East.

African traditions for agriculture: Urban agriculture is one of the traditional sharing strategies used by African households, as well as a vital element of their culture and heritage of urban gardening (Hubert de Bon, 2010). Overall, traditional and cultural features of African urban agriculture are up against structural challenges in the cities where they have been evolving for decades [16].

The common agricultural types of farming in Africa:

1. Backyard farming:

Cultivating crops and/or keeping animals in one’s own compound near the house. On-plot farming usually concerns middle-income households [17].

2. Plot farming:

Farming on land that belongs to some-body else. This is typically being done by Lowe households and can be found along roads, rivers and railway lines, under power lines, in parks and in the middle of roundabouts, among others [17].

3. Home gardening:

In terms of participation, this is the most popular sort of urban farming. It’s a little plot of land surrounded by a house. The tiny scale of the home gardens accounted for some of the low annual yield, which was mostly vegetables [18].

According to Authority in London, 2010 the agriculture planning in London particularly commercial food producing, is vital to London as a major land use. Perhaps not in terms of the value it brings to the London economy, but it is clearly one of the few productive and commercial enterprises allowed in the Green Belt.

However, the profitability of the project is jeopardized by a planning system that has not evolved to meet the needs of modern commercial agriculture [19].

The background of the Green Belt planning policy and government aims, as well as how they relate to the actual needs of contemporary agriculture, noting any potential conflicts. Furthermore, existing planning policies at the national level [19].

The present situation urban agriculture of London: Despite the fact that London contributes a negligible amount to the UK's overall agricultural output, the scope and character of its activities are diverse. Food is grown all across the capital, from commercial agriculture on the outskirts of town to allotment sites, property owned or managed by municipal governments, home gardens, windowsills, and balconies. Commercial operations, individual gardening activities, and community food-growing are all methods for growing food, and the range of foods produced includes fruits and

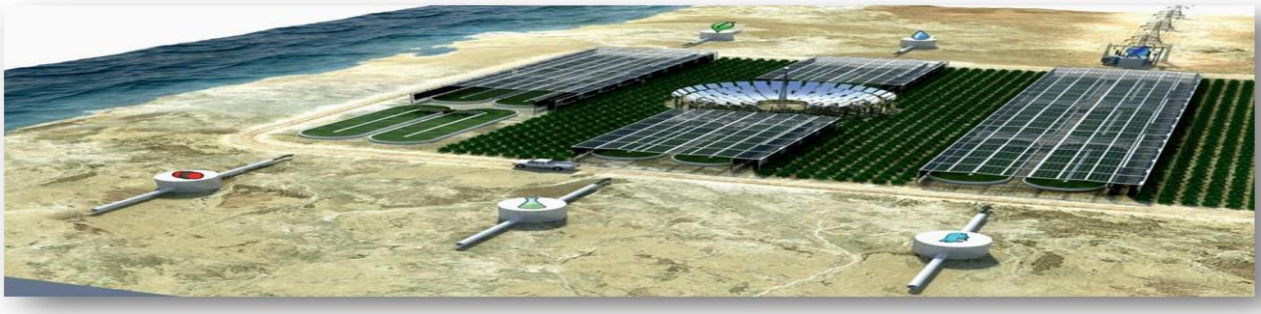
vegetables, meat, eggs, milk, and honey [20]. Residents benefit from community gardens for a variety of reasons,
Throughout the city, local gardens can be found in housing estates, near railways, on temporarily available property, and in community centers. Community gardeners typically raise flowers and aesthetic plants, though fruit trees, herbs, and tomatoes are also frequent [20]. Our investigation learned about the potential economic, environmental, health, and social benefits of local food production. It allows for outdoor exercise and enjoyment, local employment creation, education, regeneration, green space preservation, and a reduction in food packaging and food miles. Local food production can also make use of waste products from the capital, such as compost created from food waste, or captured rainwater and recovered grey water for irrigation [19].
Farms face a competitive market for food and other products. Consumers want to spend less for their food, and the clout of large merchants and wholesalers allows them to pass along most of this pricing pressure to farmers. Participation in this large-scale supply chain may be particularly difficult for small farmers. Low pricing encourages farmers to think short-term and discourages investment in future productivity and environmental sustainability. Price volatility is also a problem, particularly for small growers. [21].
The status of Agriculture in Qatar**:** For thousands of years, agriculture has been a critical component in the provision of food and in the general economic growth of cultures all over the world. Agriculture in hot and arid nations like Qatar has faced numerous obstacles in the past, the first of which was a lack of irrigation water. This has historically hampered Qatar's economic development, which has relied heavily on resource extraction, pearling, and, more recently, the extraction of its oil and gas reserves, which has resulted in the country's great wealth. The State of Qatar's development has brought new ideas for benefiting from agriculture and using new and inventive approaches to do so. [22]. In Qatar the total arable area that can be cultivated in Qatar is 65 thousand hectares, and this size has remained constant in recent years, and this area can provide in Qatar agricultural requirements and products relatively well if the land is used correctly and consciously and Qatar has acted in a considerate and careful manner On these areas, especially in the years of the siege, which led to a clear rise in their products, and this correct use of land affects not only the products, but the climate, nature and even tourism in Qatar [23]
One of Qatar's new projects is soil strengthening. Because of its desert nature, the majority of the land is unsuitable for agriculture. Qatar is attempting to develop various plants using chemicals and fertilizers in order to enhance its soil with ingredients that will make it ideal for agriculture and expand Qatar's agricultural acreage [24]. In the same way that Qatar has built numerous gardens, sports stadiums, and other projects to help develop the soil and make it more productive and beneficial for agriculture. True, Qatar's efforts may not be sufficient to bring about the necessary transformation, but these activities could occur in the future. that have a significant impact**.**
Water reduces in agriculture in Qatar: One of the other techniques used by Qatar is the use of water and sewage to feed plants, especially that Qatar is a desert country and the water in it is very scarce, so it is important to save water and reuse it, especially for agriculture. Therefore, Qatar uses sewage water to water some plants, and this constitutes a good change in the agricultural factor civilization [25].
Sahara forest project: In 2011, the Sahara Forest Project entered into a collaboration with Yara ASA, the world's largest fertilizer supplier and Qatar's Afcon, the world's largest producer of urea and ammonia. The agreement was signed in February 2012 with the Norwegian Prime Minister Jens Stoltenberg, and the Prime Minister of Qatar, Sheikh Hamad bin Jassim bin Jaber Al Thani, after an extensive construction period of the Sahara Forest Project facility that began operating in December 2012. The important points that the project accomplished are:

1) Concentrated Solar Power:

A strikingly simple facade replaces a traditional CSP plant's water-hungry cooling towers with a salt water cooling system that dissipates waste heat from the CSP process via greenhouse roofs. SFP presents a new global warming cooling technology at the pilot site, which allows for the low-cost use of brine to achieve wet cooling efficiencies without depleting limited freshwater supplies [26] .

2) Saltwater greenhouses:

The salt water cooled greenhouses provide suitable growing conditions that enable the cultivation of high value vegetable crops all year round in the harsh Qatari desert. The greenhouse structure consists of 3 bays to allow performance comparisons between ETFE and polyethylene roofing covers on horticultural yield [27]. The middle bay has a double-skin ETFE membrane roof that forms a void.



Source: Figure 3 Sahara forest project

above the greenhouse. This is connected to an evaporator pad and a fan that can use the waste heat from the CSP to evaporate seawater or replenish the dryer and produce hot moist air [26]. By using saline water to provide evaporative cooling and humidification, the water requirements of crops are minimized and yields increased with a minimal carbon footprint.

3) Outside vegetation and evaporative hedges:

Water is coming from the greenhouse at a concentration of 15% salinity. Desert areas are cultivated to benefit from beneficial growing conditions for food and forage crops and for a wide variety of desert species. Distinguishing the new species that are candidates for use as harvested fodder and grazing for livestock, and as raw materials for bio-energy [26].

4) Halophytes:

Besides traditional gardening and farming, halophytes - types of salt-loving plants - are grown in brackish water. These robust plants, often well adapted to desert conditions, are very promising sources of forage and raw materials for bioenergy that can thrive in highly saline environments [27].

5)Photovoltaic Solar Power: Providing the latest photovoltaic technologies to the pilot station. The effective generation of power is ensured by removing dust from neighbouring plants and using water to clean solar panels. **[27].**

6) Algae production:

A new 50-cubic-meter modern algae release is conducting commercial-scale research into the cultivation of marine algae species native to the Gulf and Red Sea for use as nutrients, fuel, and animal and fish feed. It is the only one of its kind in the largest area [26]. SFP personnel and their team of collaborators work on marine culture and soil procedures, while SFP employees and their team of collaborators work on planting and harvesting met

3.1 The planning process and regulations in Qatar as an example to this research:

SSB plan & strategy plan in Sahara project.

The goals of SSB towards sustainable development are Founded on four pillars namely:

- Beginning with fundamental research and development;
- PV and High Critical Temperature Coupling High-temperature superconducting cables (HTcSC) for renewable energy

Generation and delivery of energy-saving information;

- Using international cooperation to resolve global crises The SSERC programs' three basic strategies are: The following things serve as indicative targets:
- Solar silicon innovation processes with a focus on The following goals have been achieved using Sahara sands:

Personal travel between Algeria and Japan is possible.

Thermodynamics-based purification of silica sand.

3.2 Qatar policies in Urban Agriculture:

The Qatari Sovereign Fund, the Investment Authority [28] has made investments in agricultural land in other countries through the Hassad Food Company, this policy attempts to increase food security by exporting that cannot be grown locally. Harvest has purchased hundreds of hectares of farmland After the 2017 ban, the Qatari government intensified its efforts to encourage local food production, including low-interest loans to farmers, and help farmers. Seeds, fertilizers, pesticides and marketing. Before the blockage, local food production met only 10% of the region's vegetable demand. Only one third of the 1,400 active farms in Qatar are commercial farms [29]. On the other hand, the crisis encouraged Qatar to expand its domestic production capacities.

3.3 Urban Agriculture in Qatar:

Qatar is a small peninsula in the Arabian Gulf that is one of the richest countries in the world, [30]. Qatar is a highly urbanized country, where 99.1% of its population lives in cities and most of its desert lands, and it is not possible to farm directly there, but despite that there are many agricultural projects in Qatar.

Figure – 4 Farming in Qatar(Source)

3.4 Farmlands in Qatar

Farms are another facet of Qatari agriculture. These farms are available in a variety of sizes and shapes. They can be divided into three categories: tiny, large, and middle. Small farms (less than 20 hectares) are more likely to cater to domestic need, whereas medium farms (20-100 hectares) are more likely to export. Dates, grains, eggs, milk, and dairy products (>100 hectares) are exported to neighbouring countries and other markets such as
Europe brings major economic value to Qatar [21],

4. Sustainable agriculture

The goal of sustainable agriculture is to meet society's food and textile needs in the present without compromising the ability of future generations to meet their own needs [31]. It improves the social cohesion, environment and the economy.

4.1 Sustainable agriculture in Qatar

Qatar is a non-agricultural country that relies primarily on urbanization, with deserts covering the majority of its area. Despite this, the State of Qatar put special attention to agriculture. Despite this, the State of Qatar paid special attention to agriculture, especially during the years of the blockade from 2017 to 2021, when the problem of food security arose. . Increasing concerns during the period of food security., and more urban agriculture and agriculture were developed in the four years so that the State of Qatar would not be in a situation where food security would be at risk [32]. Or, at least, to mitigate the risks and provide the state with the highest possible level of food insurance [32].

5. Sustainable Activities in Qatar: (green buildings, Gardens and Eco-homes)

5.1 Houses Gardens in Qatar Houses in Qatar frequently include beautiful gardens and breathtaking views. Qataris, on the other hand, do not cultivate or harvest a variety of food crops in their gardens; instead, they use them for leisure and pleasure. To create appealing and stunning gardens, the greatest equipment is required. Qataris enjoy the gardens for their enjoyment and leisure, as well as for the wonderful view of the house [33]. "Qatar Gardens is progressing nicely, according to the Garden House Center in Qatar Garden, one of the major organizations in the garden business"[33]**.**

Figure 5 source*:*
http://qatarcanadian.com/client/test-test-test/

3.Methodology

In this research the researcher is using the qualitative research method. qualitative Used to uncover trends in thought and opinion and dive deeper into a subject. Qualitative data collection method vary using unstructured or semi structured techniques. Conducting individual interviews with stack holders of agricultural planning (general directorate of agricultural office in Duhok city, members of perlamant in the committee of agriculture, general directorate of urban planning in Duhok, general directorate of agriculture in Duhok, and participation , observation which are going to be used to collect data in duhok (shindokha area)

3.1 Data type

The researcher is going to use 2 types for collecting data (data collection methods) which are primary data and secondary data , primary data is for collecting data from Normal people, houses owners who are using the green spaces in their houses, farmers and to know the condition of agriculture in the area and weather they are statistified or not for

the agriculture system in their area. The houses owner to know their agriculture status in their area. Secondary data is to gather information from stack holders general directorate of agricultural office in Duhok city, members of perlamant in the committee of agriculture(natural resources), diroctors of NGOs who are dealing with agriculture issues, general directorate of urban planning in Duhok, general directorate of agriculture in Duhok., , the dean of the college of agriculture in Duhok city) to better undrtstanging the agricultural status in duhok city in general and shindokha area in specific .

3.2 Data Collection:

For this case study, we used primary data and secondary data for collecting data (Data collection methods), primary data is used to collect direct information from the cultivation Department to gain knowledge the benefits of agriculture on the economy and sustainability, and what are the benefits of agricultural land in cities. And we used secondary data to collect information from people, to know their opinion about green roofs and their experience that they know it from using UA in their houses.

3.3 participant and sampling this research will take the both kind of sampling probability and non-probability to get then source as good as we can , for the probability the random sampling will be used because in this research we will choose many houses and farms , green spaces in shindokha area duhok city , also will interview with many stack holders, persons and farmers in this case the research will have a better idea about the agriculture system in duhok city and also policies on agriculture issue by KRI and to know more about the agriculture sustainable development in duhok city.

For non-probability the snowball sampling will be used because like each evidence will show how are they connected to each other's. When we make an interview with stack holders of agriculture in duhok city he\she will show the interviewer another person to interview with or how a good info about agriculture planning we have. In this case by using the snowball sampling, the researcher had made their interview with important people working in agricultural sector.

3.4 Table (3-1) data collection method and frequency

Data source	Data collection method	Number	Age	Gender	occupants
Stack Holders	Interview	5	30-55	Male	
Farmer	Interview	7	20-50	Male - Female	
General Directorate of Urban Planning	Interview	1	38	Male	Planner Engineer
General Directorate of Agriculture	Interview	1	52	Male	
Directorate of Gardenning	Interview	1	36	Male	Agriculture Engineer
Deputy Governor	Interview	1	46	Male	
Members Of Parliaments	Interview	1	50	Male	

3.5 Table 3-2 Data Collection Plan

Research questions	Measures	needed(metrics) & operational definitions	Data source	Research collection methods in-depth interviews	Frequency	Dates & times
What are the obstacles of sustainable agriculture in Shindokha area?	Barrier of developing sustainability, land and water issues, old cultivation techniques Hardness of getting some seeds.	The non-availability of elements, new techniques, some areas suffer from a lack of the arrival of the sun.	General Urban Planning Directorate	Semi-structure Interview		

How can we achieve the sustainable developmen t through urban agriculture?	Building and maintaining healthy soil Managing water wisely Minimizing air, water, and climate pollution Promoting biodiversity	Managing the quality of air, water and soil. Optimize the use of natural resources. Develop efficient, selfsufficient and economical production systems that provide decent incomes	Agriculture Directorate	Semi-structure Interview
What factors can improve the agricultural lands, to become more affective and to increase production?	Elements of improving agriculture and production such as pesticides, fertilizers, GMO, Smart water management,	the contribution of the agricultural sector to the provision of positive externalities and public goods and the land use fnction.	Agriculture Directorate	Semi-structure Interview
To what extent Shindokha residents benefit from sustainable agriculture	labour forces, economy, environment, social cohesion, healthier life and fresher air.		House Owners	Semi-structure Interview
Is there any training programs in your directorate for supporting farmers to improve the status of agriculture in Duhok city?	Cultivation campaigns, awareness campaigns.	Teaching and training farmers		
What are the main resources of water used for irrigating in Duhok city	Acid collecting water, following the old techniques of saving the water.			

. **Result and Discussion**

General Urban Planning Directorate, General Gardening Directorate Member of Parliament, Governertore, Houses Owners and farmers have been visited to conduct interviews. During data collection methods. The research team observed and interviewed the above sides to better understanding and go deep into this phenomenon. Bellow the result of interview will be show.

4.1. Types of Green Areas:

1. **Park Garden**: the government builds the parks like Local Park or General
2. Park 2. **Green area:** the government must plan trees and take care of them.
3. **Green belt**: it's when government builds a green cycle around the governorate, for those reasons for clean governorate weather, and to extract carbon dioxide, and protect the governorate from dust billow, and also to control the water in a zone.

Figure 6nurser in duhok

Figure 7. Gardining
By:

4. **Green network**: its inside the governorate for example Duhok had one massive water channel, the source water of Duhok comes from the around mountains, and it collected in one place. that water mullet starts from Etit district and went through the Mosul dam and it continue inside the Duhok and another one comes from Duhok dam and inside the Duhok bazaar they related to each other, then ends up outside the governorate, this is all for this land, this land had its own map. These channel it is for that to collect the water for the land and for plants. And Open space the government should take care of it a protect it to make it open, they must be the private place of planting and it must plant in it and plant trees for example like Plant nursery. Directorate of urban planning (Mr. baravan.

4.2 Distribution of lands

1. The zone should have the parks and plants it depends on the number of people that live there. And the directorate of municipality and directorate of agriculture divide those areas to people. Master plan the main meaning of master plans a map of a Governorate in the past and now and in the future, a Governorate needs agricultural and factories, clearly, it's a dynamic long-term planning document that provides a conceptual layout to guide future growth and development. And according to that master plan the government make list of rules and they do follow those rules. Each part of that Governorate had its own map it called (detail plan) for example: ("shindokha area is a zone, this zone become a map with its detail which it had "schools, factories, gardens, hospitals and commercials). Urban green area: it's like a network which connects all part of governorate together. Urban green area of Duhok is good enough but we have to develop it more, 15% of Duhok city is used for the green spaces.**Directorate of urban planning (Mr. Baravan).**

2. In 2021, we activated the Environment Association, which is leaded by Abdul Rahman Siddik, and certainly this matter belongs to them, who divide the lands and of course based on the master plan of Duhok city. Member **of Parliament (Mr. Bahjat Ali).**

3. We do not distribute the land, and for the policies we follow the policies of the land divisions. There are the three divisions of agricultural land, rocky land and mountainous land, and we belong to rocky land. The **manager of gardening director (Mr. Sagvan Muhammad).**

4. In inside each city there are many municipalities, in Duhok city there are nearly 40 municipalities. When master plan for Duhok city and its municipalities at first, a master plan should be drawn and limits should be clarified for that place, inside the limits there must be a good average of green space such as (garden, trees, plants and green spaces in generally), and it should not be less than 30% because when population increase the level of oxygen decries. And also, there are many other recreational places such as park.

And there are some cities that have their own green space naturally and in generally they don't change. Deputy **Governor (Mr. Majd Ali).**

According to the stack holders, the master plan shows the distribution of land uses, and green space is one of the land uses. So, the master plan can have an important role in determining the shape of the city, and green spaces are distributed based on the master plan of Duhok city, if it is not well-conceived it can lead to problems in future. Also, there are also some policies and strategies that we depend on. For example, distributing green areas depending on the population, or the three divisions of which are agricultural land, rocky land and mountainous land. Generally, the total percentage of green space in Duhok city is 15%. See figure 8

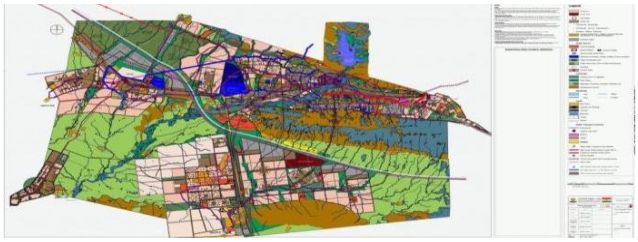


Figure 8. new master plan of Duhok city. Source: www.semanticscholar.org/

4.3 Policies and Regulation

4.3.1. General Policies

1. Agricultural projects are outside the city, and we cannot enter agricultural projects within the city. We try to form Policies as much as possible to support the local product by reducing taxes if possible and all other types of facilities. **Member of Parliament (Mr. Bahjat Ali).**
2. Agricultural productivity we try to support in every way. We have written a letter that supports the local agricultural product and we are trying to reduce the import rate in seasons when productivity is high. As for our conditions for building an agricultural project, the only basic condition is that there should not be an infringement on other lands or property, and we have no other specific conditions. We try as much as possible to help farmers. As for agriculture outside the city, especially the farms that have spread recently. It is illegal for the farms, and we have an illegal letter that is legislated regarding those farms.
3. **The manager of plane in Agriculture director (Mr. khizer dewali).** A house owner he should leave 5 meters in front the house for planting and farming.
4. **Directorate of urban planning (Mr. Baravan).**

Agricultural production has been deeply transformed by the forces of globalization. On the one hand, export driven agricultural production has significantly increased access to agricultural commodities in inhospitable environments government policy and agricultural supply requires analysis on multiple levels. The approaches taken by government to agricultural production are shaped by ideas of economic development, economic interests, the prescriptions and requirements of international agencies

policy and public health require attention to all of these factors and efforts to piece together this puzzle into a comprehensive understanding of how these factors intersect.

4.3.2. Compensation

Depending on the house owners' responses, when the government takes the land that is owned by the government, they won't give any compensation, because they care for the land and use it as an orchard only for a specific period until the government takes it.

4.3.3. Permission

1. Support agriculture in all its aspects. However, agriculture in the city is illegal except for the wooded lands that extend from Qasara to Wadi Duhok. It is limited to shrubs and not vegetables, and it is not considered illegal because it does not use the water that is used for homes, and it uses the water that comes from the Hashkro River. As for the agriculture in the city, people use clean water, and therefore, this farming is illegal. But although we warned the responsible authorities, they did not take any measures against this illegal act. **The manager of plane in Agriculture director (Mr. khizer dewali).**

2. It is depended of the situation for example if they want to change a residential area to a park, they had to give remuneration to the residents or they won't accept to demolish their houses. **Deputy Governor (Mr. Majd Ali).**

So, according to the house owners and stack holders that team interviewed with, the phenomenon of orchards in front of the house or on green rooftops doesn't obtain any license from any party and they do this work according to their selves and without any reference.

4.5 Sustainability

1. Certainly, agriculture affects all aspects of economic life when it provides productivity. Especially human health, because it provides the appropriate climate and also affects the human psyche, as it affects both the physical and psychological aspects of the human being. And that progress without agriculture or the environment means nothing. Agriculture reduces the risk of bad factors. Providing good health and having a positive impact on all aspects of human life. Member of Parliament (Mr. Bahjat ali).
2. Cultivation has a significant and positive impact on people's health and especially economic life, and so on. A corner pine tree produces 45% of the oxygen and covers 36 to 38% of the world's green area, according to the William Tree Gallery in London. And also, the economic life of people and all aspects of life can affect through agriculture, for example, if we take the Paulownia tree, which is used in many products such as the manufacture of home furniture, charcoal for hookah and many other products and some investors in Dohuk invest in these trees, so agriculture can directly affect. The manager of gardening director (Mr. Sagvan Muhammad).
3. When people plant their crops, they know that are healthier and cleaner than other corps and also other people will get their crops and so by this way it's better for economy while sailing it. Deputy Governor (Mr. Majd Ali).

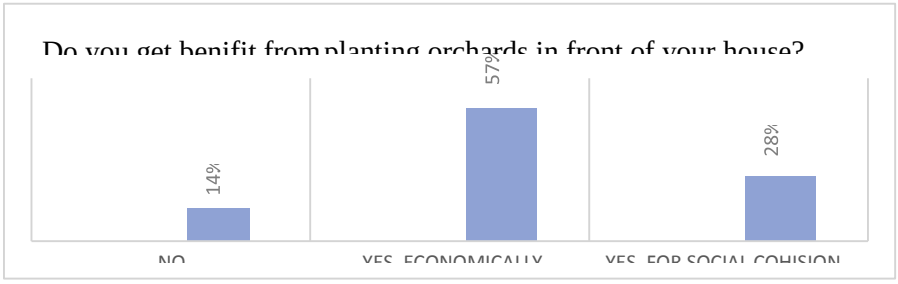


Figure 9 For the house owners

As is shown in figure 9, planting orchards inside the city, have many positive impacts it could be benefit for the economis social chohesion and also environment.

So, according to the house owners and stack holders, generally, agriculture has positive impacts on our lives. Agriculture could affect all aspects of economic life when it provides productivity, a positive impact on people's health, a positive impact on the environment and social life.

.6 Agriculture Project in Duhok

1. We had projects to give cash advances to farmers. Reducing the tax on local products. We also sometimes provide cars to transport agricultural supplies. But now, due to the circumstances the region is going through and the economic decline in which we are in, these operations were stopped a long time ago. We have a law

that provides and supports agricultural graduates. So that every agricultural project must gather agricultural graduates in it. We have a project covering 850 hectares between Kassara and Semel. The project is a large recreational park it includes pedestrian paths, as well as restaurants, cafes and many other things. It is a complete garden with specifications. But due to the lack of financial funding, the project

was temporarily suspended. **Member of Parliament (Mr. Bahjat ali).**

2. Many of our projects depend on pollination and patching. When a forest or bushes are burned, we re-plant them. We also have a project to manufacture new forests. We try to plant bushes. We have many afforestation projects. We also have projects to gilt the harmful grass. Our projects focus on making the green areas wide. We also have coal projects to produce coal. **The manager of gardening director (Mr. Sagvan Muhammad).**
3. We support agricultural projects, as we have supported a special project for Potato Finger in Rofia, and we are also trying to support another project in the Bamarna area for apples, and we also supported the Hefta Bazaar project, which we supported and guided. **The manager of plane in Agriculture director (Mr. khizer dewali).**
4. There is a support project for farmers the location is between Semel and Seje and it's nearly 200 acres the aim of this project is to open a place to store the food, so by this way farmers can always store their products, for example changing wheat to flour and many other things. **Deputy Governor (Mr. Majd Ali).**

Team reach the result that the government tries to make agricultural projects in Duhok, to increase the percentage of green spaces in the city. For example, recreational places, afforestation projects, agricultural projects, Hefta bazaar projects, and projects support local products such as potatoes and apples.

If the situation of the government finance budget is better, they will support more agricultural projects and finish the projects that are halfway.

4.7 Support

1. We had projects to give cash advances to farmers. Reducing the tax on local products. We also sometimes provide cars to transport agricultural supplies. But now, due to the circumstances the region is going through and the economic decline in which we are in, these operations were stopped a long time ago. We have a law that provides and supports agricultural graduates. So that every agricultural project must gather agricultural graduates in it. We try as much as possible to educate people through conferences and seminars. Spreading environmental and agricultural culture among the population, raising awareness and directing them. **Member of Parliament (Mr. Bahjat Ali).**
2. We support farmers by giving them shrubs like olive trees, pines, almonds, etc. But we do not have material support for farmers by providing them with tools. **The manager of gardening director (Mr. Sagvan Muhammad).**
3. We support farmers by making warehouses for them to cool their crops, and we have provided ten cold stores for crops. We support farmers in all forms in terms of providing tools and fertilizer at a discount of 25 to 75%. We

have courses for farmers and courses online. We give a grant to its employees, they go to developed countries and receive advanced skills, and after their return, they share these skills with farmers and other employees. **The manager of plane in Agriculture director (Mr. khizer Dewali).**

4. There are always some supporting projects that are set by the government to help farmers when they need and they bring it to them. **Deputy Governor (Mr. Majd Ali).**
5. Agri-business existing in master plan, to open factories and plant and get benefits from incoming by selling it. **Directorate of urban planning (Mr. Baravan).**

For the House-owners, 3 house-owner that team interview with, said that the government doesn't support us for the planting or even for the irrigating, and 4 house owners said that, the land that we plant on it is owned by the government and they let us to plant on it until they need that land, so this is a type of support for us from the government.

4.7.1 Support Export Local product

Based on our interviews, the follwoin were our findings:

1. The local product had beend supported by reducing taxes if possible and all other types of facilities. **Member of Parliament (Mr. Bahjat ali).**
2. Agricultural productivity we try to support in every way. We have written a letter that supports the local agricultural product and we are trying to reduce the import rate in seasons when productivity is high. As for our policy regarding import and export, we try as much as possible to help the farmer, reduce the tax on local products, and stop the import products as much as possible. We have export for Iraq only Dohuk Governorate 400,000 tons of wheat. But other countries depositing them with them is not that desirable. **The manager of plane in Agriculture director (Mr. khizer dewali).**
3. Government it's very helpful for farmers and always supports them to be contentious on their work and also bring sales for them inside and outside the city to sale their product for their communities and other nearby municipalities. **Deputy Governor (Mr. Majd Ali).**

4.7.2 Fertilize Support

1. We do not support farmers in compost because we do not have material support from the government. **The manager of gardening director (Mr. Sagvan Muhammad).**
2. We support farmers to use organic materials and organic fertilizers and to stay away from chemicals. **The manager of plane in Agriculture director (Mr. khizer dewali).**
3. Government will help and support farmers as much as they can in order to bring the new kind of product that will be beneficial for farming. **Deputy Governor (Mr. Majd Ali).**
4. Yes, the directorates of agricultural teach farmers and support them for free, and give them trees and the governorate have to look at farmers and teach them and support them more and open farming courses for them. **Directorate of urban planning (Mr. baravan).**

4.8. Agriculture and problems

The problems that are mentioned by stock holders and house owners are:

4.8.1. Drought, a lack of precipitation of rain, snow, or sleet, for a protracted period of time, resulting in a water shortage. While droughts occur naturally, human activity, such as water use and management, can exacerbate dry conditions. Depending on the stack holders, Drought has affected us in the past years and this year, but there are projects to exploit the rivers that we have, there are some solutions or plans for drought by government, if there is financial support. In other words, when the normal range of raining in some years decrease it affect our environment such as increasing cases of diseases and effect on the plants and also climate change effect on plants and trees. According to house owners, they didn't face difficulties because trees don't need to water every day only 15 days once, but like onions and celery, you should water it once on weak.

4.8.2. Water sources or irrigation, the only source of water in Duhok is Duhok dam, people use the water that is used for homes or people use clean water, and the water source is low, some days some homes are waterless so it is not fair to use clean water for irrigation. In other words, using the public water may affect the water supply in duhok city and made a shortage of water supply that provide houses water.

4.8.3. Economic situation, because of bad economic situation of the region, many important agricultural projects are postponed, and the government is unable to support local agricultural product, cash advances to farmers, Agribusiness and so on.

4.8.4. Difficulties with animals, the barriers in the path of the house onwers were few, but the most significant were the animals that some people maintain, which wreak havoc on crops and agricultural produce, and other obstacles were overlooked.

4.9 Treatment

1. In Duhok, we planned for a project for recycling the water and get rid of the chemical materials but unfortunately, the project was temporarily suspended due to lack of funds. **Directorate of urban planning (Mr. Baravan).**
2. We don't have any treatment system for water right now but may be will have in the future. **Deputy Governor**

(Mr. Majd Ali).

3. Yes, this river, which is called Ashkura, was in the general plan of the city, a plan to re-use this river. Or differentiate between good and invalid water. And re-clean the invalid water. and the use of sediments as attributes of plants. Unfortunately, due to the lack of funding for the project, it was temporarily suspended. **Member of Parliament (Mr. Bahjat Ali).**

The government tries to open a project for recycling the water and re-clean the invalid water, especially the water that goes through the Ashurka river and to get benefit from it but because and then use it for irrigating. But because of the bad economic situation the project is not opened yet.

4.10 Factors Can Increase (AG)

1. There are many factors that can affect agriculture. Including government support from all economic and financial aspects and the availability of equipment. It also supports agricultural specialists, the Department of Agriculture and their graduates, and provides job opportunities for agricultural graduates. Also, the most important thing is to have a clear plan. A well thought out plan. **Member of Parliament (Mr. Bahjat ali).**

2. Factors that affect agriculture Most of the factors are economic and market, as we do not have a strong market for agricultural products. We have many other factors such as irrigation, storage, and the economy. These factors greatly affect agriculture. **The manager of plane in Agriculture director (Mr. khizer dewali).**
3. Climate change is the international problem that effect the agriculture a lot, and in the sustainable development goals we have one goals that is about to plan more plants in the city, this is the most important goal. **Directorate of urban planning (Mr. baravan).**

There are many factors that increase Agriculture including implementation of land reforms, interplant, plant many crops, raised beds, smart water management, use nitrogen, plant protection, and technological developments and the most important factor that increase Agriculture is to plan your land and make this plan for farming. And factors that affect Agriculture are climate change, soil water, land-use, deforestation

4.11 Social interaction

According to house owners, there is a strong social interaction and from a family to a family then from neighborhood to neighborhood, this idea spread and now 80% of the people spread this habit or even imitated each other. Also, our background is related to agriculture, It is like a culture to us, our fathers and grandfathers have been cultivating it in the land since before them and we try to continue it.

5.Conclusion: In conclusion, urban agriculture is one of the most effective interventions for improving our social, psychological and economic future for individuals, communities, states, and the country as a whole. Having a greener community is very crucial that enables a city to be more attractive and solving many social issues, especially for those who want to get use of their times and will not waste it. As Fukuoka, who was the father of natural farming, said, "The ultimate goal of farming is not the growing of crops, but the cultivation and perfection of human beings". So, it means that the priority is to change our behavior towards farming.

This research marked the different social factors affecting urban agriculture. Qualitative data collection methods vary using unstructured or semi-structured techniques. Individual interviews with stake holders, houses honors in Duhok city to collect data

According to findings and analysis, the opinions of many local people in Shindokha neighborhood were taken regarding many issues and problems about urban agriculture as well as different viewpoints of many directorates; governmental and non-governmental were taken, and after that we have concluded (11) themes (pie charts) of their opinions**.** the most important points

1. Proper planning enhances sustainable development:
   - Through proper agricultural and green space planning, environmental quality can be improved, agricultural productivity can be enhanced, and healthier environments for communities can be created.
2. Environmental and social impact:
   - Green and open spaces are not only valuable for aesthetic purposes, but also contribute to improving air and water quality, reducing environmental pollution, and supporting the physical and mental well-being of residents.
3. Economic sustainability:
   - Good agricultural planning can contribute to the local economy by increasing agricultural production and preserving natural resources. Moreover, investing in green spaces can boost tourism and investment.

: 4. mpact on climate change:

Green spaces help mitigate the effects of climate change by absorbing carbon and reducing urban heat island effects.

Recommendations:

1. Enhance the integration of agriculture and urban planning:
   - There should be coordination between agricultural and urban policies to ensure the optimal use of land. This can include designating specific areas for green spaces within cities, as well as supporting sustainable agricultural practices.

2. Increase green spaces within cities:

- Green spaces are essential for improving the quality of life and can contribute to better public health by reducing pollution and providing areas for relaxation and recreation. Local authorities should allocate land for public parks and gardens.

3. Encourage urban agriculture:

- Supporting agriculture in urban areas can enhance food sustainability and reduce reliance on long-distance transportation. This initiative can include rooftop gardens and micro-farming within cities.

4. Protect agricultural land:

- Agricultural land should be protected from conversion to non-sustainable urban use. This can be achieved by enacting laws and regulations that preserve agricultural land and prevent its conversion for other uses that may negatively impact food production.

5. Plan open spaces as part of the ecosystem:

- Open spaces should be part of an integrated ecological network that supports biodiversity and helps combat climate change.

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التخطيط الزراعي الحضري والمساحات الخضراء والمفتوحة وتأثيرها على التنمية المستدامة في إقليم كوردستان العراق/ مدينة دهوك: حالة منطقة شندوخا

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الخلاصة

تهدف الدراسة الى ابراز اهمية التخطيط الزراعي والمساحات الخضراءالمفتوحة في التنمية المستدامة لمحافظة دهوك ،وذلك من خلال مراجعة الادبيات والدراسات العلمية ذات الصلة ،والدروس المستفادة من التجارب الحديثة على المستوى الدولي في مجال التخطيط الزراعي والعمل الارشادي وخصائصه في توجيه تقديم الخدمات. للتخطيط الزراعي والحضري تأثيرات قوية على البيئة والمساحات الخضراء والاقتصاد وشكل المدينة. مفهوم المساحات الخضراء الحضرية هي مساحات مفتوحة مخصصة للحدائق وغيرها من "المساحات الخضراء"، بما في ذلك الحياة النباتية والبيئة. معظم المساحات المفتوحة الحضرية هي مساحات خضراء، ولكنها تشمل أحيانًا أنواعًا أخرى من المساحات المفتوحة. إن الافتقار إلى الزراعة المستدامة له تأثير سلبي على المدينة فيما يتعلق بالبيئة والاقتصاد الجوانب الاجتماعية. تحاول هذه الدراسة معرفة معوقات الزراعة المستدامة في منطقة شندوخا في محافظة دهوك لتحقيق الاستدامة والعوامل التي يمكن أن تحسن الأراضي الزراعية، لتصبح أكثر فعالية في زيادة الإنتاج من خلال إجراء نهج البحث النوعي. تختلف طرق جمع البيانات النوعية باستخدام التقنيات غير المنظمة أو شبه المنظمة. المقابلات الفردية مع أصحاب المصلحة، وسكان المنازل في مدينة دهوك والمشاركات/ الملاحظات التي سيتم استخدامها لجمع البيانات حول مدينة دهوك. تبين في النتائج التي توصلت إليها الدراسة، بان الاستدامة الزراعية والزراعة الحضرية من أكثر التدخلات فعالية لتحسين المستقبل الاجتماعي والاقتصادي والنفسي للأفراد والمجتمعات والولايات والبلد ككل. إن وجود مجتمع أكثر اخضراراً أمر بالغ الأهمية، حيث يجعل المدينة أكثر جاذبية ويحل العديد من القضايا الاجتماعية، وخاصة لأولئك الذين يرغبون الاستفادة من أوقاتهم وعدم إضاعها..

الكلمات المفتاحية: المساحات الخضراء، المساحات المفتوحة، مدينة دهوك،الزراعة المستدامة ،الاستدامة البيئية