The Role of the Urban Agriculture on Food Security Crisis in Gaza Strip During 2014 Assault, Case Study: Beit Lahia City

دور الزراعة الحضرية في أزمة الأمن الغذائي في قطاع غزة خلال عدوان 2014, دراسة حالة - مدينة بيت لاهيا

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The Role of the Urban Agriculture on Food Security Crisis in Gaza Strip During 2014 Assault, Case Study: Beit Lahia City

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نتيجة الحكم على أطروحة ماجستير

بناءً على موافقة عمادة البحث العلمي والدراسات العليا بالجامعة الإسلامية بغزة على تشكيل لجنة الحكم على أطروحة الباحث/ هادي فتحي عبد الرزاق خليل لدرجة الماجستير في برنامج إدارة الأزمات والكوارث وموضوعها:

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The Role of the Urban Agriculture on Food Security Crisis in Gaza Strip during 2014 Assault - Case Study Beit Lahia City

وبعد المناقشة التي تمت اليوم الأربعاء 11 رجب 1439 هـ الموافق 28/03/2018، الساعة الثانية مساءً، اجتمعت لجنة الحكم على الأطروحة والمكونة من:

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مناقشة خارجية

وبعد المداولات أوصت اللجنة بمنح الباحث درجة الماجستير في برنامج إدارة الأزمات والكوارث، واللجنة إذ تمنح هذه الدرجة فإنها توصي بتقوى الله تعالى ولزوم طاعته وأن يسخر علمه في خدمة دينه ووطنه.

والله ولي التوفيق...
Abstract

In August 2014, Gaza marked the end of the third Israeli assault since 2008; which has made Gaza a conflict-vulnerable zone. As a result of the 2014 assault, thousands of Palestinians were killed and injured, and tens of thousands were displaced, in addition to severe damage in the different sectors all over Gaza Strip. Meanwhile, the productive capacity was dramatically affected, and therefore the food security status has been worsening ever since.

Urban agriculture is among those socio economic sectors that are interrelated with food security and therefore it plays a significant role in national development by contributing towards food security, job creation and income generation.

This study aims to assess the role of urban agriculture on the recovery of the agricultural sector and the input to food security. It also aims to assess the potential of urban agriculture to secure daily needs during Israeli offensives against Gaza.

A combination of both quantitative and qualitative research methods was employed in this study. In the quantitative design, 129 randomly selected urban farmers from the area of the survey, Beit Lahia city, completed the self-administered close-ended questionnaires, whereas the statistical analysis presents the socio-demographic, economic and other aspects of the households. The qualitative data collection included interviews with six governmental and non-governmental officials.

The results show that 89.2 percent of the UA practitioners are feeling food secure, to some or a large extent, due to their engagement in UA. However, a small percentage of the households who practice UA are still experiencing difficulties with food security. In the meantime, the war forced most of the urban farmers to evacuate their homes or lands, thus only 34.9 percent of urban farmers managed to gain food during the 2014 war due to their engagement in UA; this percentage shows the severe deterioration of food security status during the war even for UA practitioners.

The study also found that, despite their engagement in UA, more than 46 percent of the urban farmers in the study area are still spending more than 40% of their income on food requirements for their families, as they focus on cash crops and export rather than food crops.

In addition to the above and based on the study result, it is found that UA is also contributing to create more jobs opportunities and improving household income. The UA production can also foster the local market availability of agriculture products and this will help poor community members to access the UA products.

From a strategic perspective, urban agriculture holdings need be extended to make a larger contribution to the food security levels in Gaza strip, if organized well. Government support is much needed to adopt sustainable UA plans to alleviate the level of poverty within the strip and therefore to improve the food security status. The stakeholders involved in urban farming also should coordinate with each other and integrate their support towards improving the productivity of urban agriculture at household and community levels.
ملخص الرسالة
في شهر أغسطس من العام 2014، شهد قطاع غزة نهاية للعدوان الإسرائيلي الثالث منذ عام 2008؛ مما جعل القطاع منطقة معرضة للنزاع. ونتيجة للاعتداء الذي وقع في عام 2014، تقلصت الأراضي الفلسطينية، ورغم عشرات الآلاف، بالإضافة إلى وقوع أضرار جسيمة في القطاع الزراعي بشكل كبير، وبالتالي فإن حالة الأمن الغذائي تدهورت وأزدادت سوءاً.

تعتبر الزراعة الحضرية إحدى القطاعات الاجتماعية والأقتصادية المرتبطة بالأمن الغذائي، وبالتالي فإنها تلعب دوراً هاماً في التنمية الوطنية بالمساهمة من خلال تحقيق الأمن الغذائي وخلق فرص العمل وزيادة الدخل.

تهدف هذه الدراسة إلى تقييم دور إمكانية الزراعة الحضرية في تأمين الاحتياجات اليومية خلال العدوان الإسرائيلي ضد قطاع غزة.

وقد تم الجمع بين طريقي البحث العلمي الكمية والنوعية في هذه الدراسة. حيث تم اختيار 129 مزارعاً حضرياً عشوائياً من مدينة بيت لاهيا استكمال الاستبانات التي أجريت على أسلوب حياة محدد، بينما أظهر التحليل الإحصائي الأوضاع الاجتماعية - الديمقراطية والاقتصادية وغيرها لمختلف الأسر التي تميز الزراعة الحضرية في منطقة الدراسة. كما تم إجراء مقابلات مع ستة أشخاص من ذوي العلاقة وأصحاب الشأن من جهات حكومية وغير حكومية، للحصول على المزيد من المعلومات المتعلقة بموضوع الدراسة.

وتبين نتائج الدراسة أن 89.2% من ممارسي الزراعة الحضرية يشعرون بالأمن الغذائي، إلى حد ما أو إلى حد كبير، بسبب اعتمادهم في هذا النوع من الزراعة. غير أن نسبة صغيرة من الأسر لا تزال تواجه صعوبات في الأمن الغذائي بالرغم من اكتشافها في الزراعة الحضرية. وفقاً لذلك، نعم أن نسبة مزارعين الحضريين الذين يعبر عن إخلاص مزارعهم أو أراضيهم، وبالتالي لا يمكن سوى 34.9% منهم من الحصول على الغذاء خلال حرب عام 2014 بسبب ممارساتهم الزراعية الحضرية؛ حيث تظهر نتيجة هذه الرسالة التدهور الشديد لحاله الأمن الغذائي خلال الحرب حتى بالنسبة لمارستي الزراعة الحضرية.

وعلى الرغم من ممارساتهم للزراعة الحضرية، فإن أكثر من 46% من المزارعين الحضريين في منطقة الدراسة ما زالوا يعتمدون أكثر من 40% من دخلهم على الاحتياطيات الغذائية الخاصة بهم، وهذا بسبب تكرارهم على المحاصيل التقليدية والتصدير بدلاً من المحاصيل الحديثة، بالإضافة إلى ما سبق وبناء على نتائج الدراسة، فقد تبين أن ممارسات الزراعة الحضرية تسهم أيضاً في خلق العديد من فرص العمل وتحسين الدخل الاسمي. كما أن منتجات الزراعة الحضرية تؤدي إلى تعزيز توافر المنتجات الزراعية في الأسواق المحلية، وهذا من شأنه مساعدة قراء المجتمع.

والبحث استراتيجي حيث يجب العمل على زيادة مساحة الحدائق الزراعية في المناطق الحضرية بحيث يمكنها أن تسهم بشكل أكبر في تحقيق مستويات الأمن الغذائي في قطاع غزة. إذا، بما يمكنها تطويرها بشكل جيد. كما أن هناك حاجة ماسة إلى دعم الحكومة لاعادة خطط مستدامة في مجال الزراعة من أجل التخفيف من حدة الفقر داخل القطاع وبالتالي تعزيز حالة الأمن الغذائي. ويمكن أيضاً لמשקزار الشبان المعنيين بالزراعة الحضرية أن يتعاونوا فيما بينهم بشكل أكبر وأن يدمجوا دعمهم لتحسين إنتاجية الزراعة الحضرية على مستوى الأسر والمجتمع المحلي.
قبيلة الرحمان الرحيم

قال تعالى:
{ لَقَدْ كَانَ لَكُمْ فِي رَسُولِ اللَّهِ أُسْوَةٌ حَسَنَةٌ لِّمَن
كَانَ يَرْجُو اللَّهَ وَالْيَوْمَ الآَخِرَ وَذَكَرَ اللَّهَ كَثِيرًا

صدق الله العظيم

[الأحزاب: 21]
Dedication

I dedicate this thesis manuscript for those people who are experiencing food insecurity around the globe, especially the Gazan ones.

Hadi Fathi Khalil
Acknowledgement

First of all, I wish to thank my parent, Fathi and Hamda, for their sufficient grace throughout my journey to complete my studies; who bestows me with continuous much needed strength.

This study would not have been achievable without the help and contributions of a number of personalities and organization. I feel greatly owe and grateful to my supervisor Dr. Husam Al Najar for his great supervision, guidance, scholarly advice and the sustained interest he showed in my work. All the Islamic University course lecturers are also acknowledged for their professional input, commitment and guidance.

Special thanks for all urban farmers in Beit Lahia city for their voluntary participation in filling the questionnaire. And also many thanks for Mr. Abdallah Aqel for his great and continuous efforts during the thesis period.

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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACAD</td>
<td>Arabic centre for Agriculture Development</td>
</tr>
<tr>
<td>ASML</td>
<td>Above Sea Mean Level</td>
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<tr>
<td>ARA</td>
<td>Access Restricted Area</td>
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<tr>
<td>ARIJ</td>
<td>Applied Research Institute-Jerusalem</td>
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<tr>
<td>CMWU</td>
<td>Coastal Municipalities Water Utility</td>
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<tr>
<td>Duunnm</td>
<td>1000 square meter</td>
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<tr>
<td>FOA</td>
<td>Food and Agriculture Organization of the UN</td>
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<tr>
<td>FSS</td>
<td>Food Security Sector in Palestine</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GUPAP</td>
<td>Gaza Urban and Peri-urban Agriculture Platform</td>
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<tr>
<td>HH</td>
<td>Household</td>
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<tr>
<td>LH</td>
<td>Livelihood</td>
</tr>
<tr>
<td>MoA</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>NGOs</td>
<td>None-governmental Organizations</td>
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<tr>
<td>NIS</td>
<td>New Israeli Shekel</td>
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<tr>
<td>OCHA</td>
<td>UN Office for the Coordination of Humanitarian Affairs</td>
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<tr>
<td>PCBS</td>
<td>Palestinian Central Bureau of Statistics</td>
</tr>
<tr>
<td>PUA</td>
<td>Peri-Urban Agriculture</td>
</tr>
<tr>
<td>PWA</td>
<td>Palestinian Water Authority</td>
</tr>
<tr>
<td>RUAF</td>
<td>Resource Centre of Urban Agriculture and Food security</td>
</tr>
<tr>
<td>UA</td>
<td>Urban Agriculture</td>
</tr>
<tr>
<td>UAWC</td>
<td>Agricultural work committees</td>
</tr>
<tr>
<td>UN</td>
<td>United Nation</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
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<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
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<tr>
<td>UNFPA</td>
<td>United Nations Fund for Population</td>
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<tr>
<td>UNICEF</td>
<td>United Nations International Children's Emergency Fund</td>
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<tr>
<td>UNITAR</td>
<td>United Nations Institute for Training and Research</td>
</tr>
<tr>
<td>UNSCO</td>
<td>United Nation Special Coordination Office</td>
</tr>
<tr>
<td>USD</td>
<td>United State Dollar</td>
</tr>
<tr>
<td>WFP</td>
<td>World Food Program of UN</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Chapter 1
Introduction

1.1 The need for Urban Agriculture

The worldwide populace is on the rise, and is expected to increment from around 7 billion at present to 9 billion individuals by 2050 (UN, 2011). In the meantime, the average purchasing power, and with it the food consumption, per capita is expanding (Godfray et al., 2010). These patterns are expected to lead to increase the food demands of about 70 to 100 per cent by the year of 2050 (World Bank, 2009).

The rate of population is not only increasing, it is becoming progressively urban. Around 3 billion individuals, which form more than half worldwide population, currently lives in urban areas, (World Bank, 2009) and by 2050 this number is expected to reach to more than 9 billion (UN, 2011). Therefore, the distance between production and consumption is widening, resulting in the increasing of complex logistics and a greater transportation demand. This impact is magnified by globalization, in light of the fact that increased global commerce means that rural hinterlands are increasingly often in other countries, where labour and land are less expensive. In the United States, as an example, between the years 1997 and 2004, the distance travelled by food from production to household consumption increased by 25% (Weber & Matthews 2008).

Traditional agriculture does not guarantee constant food security for the growing population and also it has negative effects on the ecosystem. Therefore, food production should be further explored using alternative method. As one of the solutions, urban space should be reconsidered to exploit more space for plant cultivation and food production in order to improve the level of food security (Viljoen & Bohn, 2005).

FAO (2009) warns that the local governments in many countries are not regulating policies to consider the issues related to food insecurity, however, it motivates that urban policies should consider “food dimension of poverty in urban areas”.

The first modern studies of urban farming was done during the 1960s (Mougeot, 2000) and after that, many case studies of urban farming have been
investigated and published in numerous journals and books. Development aid agencies have played main roles by sponsoring many of these studies, focusing on cities in developing countries and on the urban agriculture place in a development context. These studies, enriched with literature about the concept of urban farming in developed countries, form the theoretical basis for the current research.

The definition of Urban Agriculture, based on several researchers, is the growing of crops and animal’s raising for food and other uses in and around cities and towns. The related activities such as the production and delivery of inputs, and the processing and marketing of products are also part of urban agriculture. It is generally practices near the markets and also described by closeness to the local markets, limited space, high competition for land, use of urban resources like organic solid wastes and wastewater. The efficiency of national food systems can be increased by integrating urban agriculture with rural agriculture (Veenhuizen, 2014).

The Summit of the World Food held in (1996) defines food security as a general state “When all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life”. It is important to mention that urban farming produces a range of products well matched to the food requirements and demands of various urban populations, thus providing them with a more balanced diet and food and then they will be more secured (Urban Agriculture Committee of the Community Food Security Coalition, 2002).

In this research, the role of the Urban Agriculture in helping Gazan to deal with food insecurity will be examined.

1.2 Problem Statement:

The Gaza Strip is a small stretch of land bordering the Mediterranean Sea, 46 kilometres long by 6-10 kilometres wide. The population on this area of approximately 365 km² has increased dramatically over the last 60 years: from about 50,000 in 1948 to an estimated 2 million today which makes Gaza to be one of the most highly populated areas in the world.

The available land for horticulture is very limited in the Gaza Strip and, with the current blockade imposed on Gaza and with access restrictions to the lands in place, fresh fruits and vegetables are very expensive. In the meantime, the continuous population growth putting extra pressure on the resources of the Gaza Strip, which is
one of the most densely populated areas of the globe. And as reported by FAO (2012), in Gaza Strip 97% of the population are urban or camp dwellers, and thus do not have access to land. Therefore, there is a critical need to find out alternative and creative approaches to achieve as ideal as possible investment for urban farming modalities and to mobilize for such production patterns in the Gaza Community. By utilizing the available vacant spaces within universities, hospitals, schools and backyards and top roofs of the buildings for crops raising and/or livestock keeping, the aim of the urban gardening phenomenon is to support productive activities that can make essential contributions to dignity, resilience and improve food security status and food consumption through nutritious and well-quality food for the marginalized families.

Furthermore, the Israeli forces impose systematic destruction of Palestinian agricultural sector, including uprooting of trees, destruction of crops, denying of access to agricultural land and equipment. Gaza Strip has examined many of the Israeli aggressive measures against land and agriculture; especially after the year 2008, while only in 2014, the direct damage for the agricultural sector in Gaza strip counted to more than 250 million USD due to the war conducted by Israel against the strip (MOA, 2014a). Moreover 30% of the agricultural land located in the buffer zone, which is considered as “Access Restricted Area (ARA)” and runs from Beit Hanoun in the north of the Gaza Strip to Rafah in the south, making access to agricultural land in this area, unsafe and a risky to the farmers as it consider as the front line and the most affected area during the escalations periods. It is worth mentioning that lads locating in the buffer zone are generally using for the cultivation of potatoes, watermelons, tomatoes and onions amongst others. The large-scale destruction of agricultural land have terrible impacts on environment, and also have contributed to further deterioration of the Palestinian economy as hundreds of Palestinian farmers have lost their sources of income. Therefore, the Food security levels in Gaza have decreased due to reduction in the agricultural area and the rabid urban expansion. However, it was found by the Gaza Food Security Cluster report in (2015) that most households defined as food insecure, approximately 47%, in Gaza experience chronic food insecurity. This is a sign of a long-term food crises and a
depletion of coping mechanisms and resilience if we keep away from a proper solutions and interventions.

Generally, despite the fact that urban farming is widely practiced in the Gaza Strip, planning for urban agriculture does almost not exist, and seemingly have been neglected by water providing institutions and the ministry of agriculture. Therefore this study aim to find out the role of the urban agriculture, as one of the possible solutions within Gazan community, in coping on food security crisis considering the no harm strategy to the natural resources.

1.3 Research Aim

The main aim of this research is to adopt the survival strategy of the besieged Gazans by assessing the role of urban agriculture on the recovery of the agricultural sector and the input to food security. In addition to assess the potential urban agriculture in securing the daily life needs during Israeli offensives against Gaza.

1.4 Research objectives

1. To explore the importance of the urban agricultural and its effect on Gaza food security’s crisis.
2. To assess the role of urban agriculture for its practitioners, including those famers whose farms locate within the buffer zone, during the war of 2014.
3. To examine the availability of nutritious fresh food for household consumption and sale for the urban agriculture practitioners.
4. Investigate the socio-cultural conditions and job opportunities could be saved by implementing appropriate urban agriculture concepts.

1.5 Ethical Considerations

Although there are no risks for participating in this study, all of the participants were treated in accordance with the ethical guidelines of a science research. Participants of the study have been freely took part while personal identities have been kept confidential and protected; moral standards have been applied to decisions made in planning, conducting and reporting of the results. There was no deliberate misrepresentation of the purpose of the study and overstatement or understatement of the findings. And most importantly, plagiarisms have been avoided through this study.
1.6 Research structure

Chapter one "Introduction"

The first chapter has dealt with an introduction which including the background on urban agriculture and its need for Gaza strip, statement of the problem, thesis aim, objectives, scope, ethical considerations, and thesis structure.

Chapter Two "Study Area"

This chapter describes the study area with briefing about its disastrous situation, agricultural situation, food security situation, topography, climate and water resources in Gaza strip.

Chapter Three "Literature Review"

The third chapter has dealt with a review of theoretical and related literatures including the practice of urban agriculture, definitions and features, stakeholders of urban agriculture, benefits and challenges of urban agriculture, the food security definition and its relation with the urban agriculture, and also the relation between the conflict and food security.

Chapter Four "Thesis Methodology"

The fourth chapter has explained the methodology used to achieve the objectives of the study and has presented the research method, research design, method of data collection, and methods of data analysis.

Chapter Five "Results and Discussions"

The fifth chapter dealt with data analysis and discussions up on the findings of the study.

Chapter Six "Conclusion and Recommendations"

The sixth chapter dealt with the concluding remarks and recommendations of the study.
Chapter 2
Study Area

2.1 Introduction

The Gaza strip is part of the occupied Palestinian territories which is a narrow strip of land on the Mediterranean coast with an area of 365 km$^2$. The estimated population of Gaza strip is 2 Million. Thus, Gaza holds the highest population density in the world.

The Gaza Strip is bounded by the Mediterranean Sea in the west, Egypt in the south and “Israel” from the north and east which is about 41 kilometers long, and between 6 and 12 kilometers wide as shown in figure (2.1).

![Gaza Strip Map](image)

**Figure (2.1): Regional setting of Gaza Strip and the neighboring countries.**

The Gaza Strip has a moderate climate, with mild winters and dry, hot summers subject to drought. Rainfall in Gaza strip is unevenly distributed it varies considerably by governorates from the North to the South with long-term annual average rainfall of 372 mm (PWA, 2012).
Gaza is partitioned into five administrative Governorates, roughly equal area; Gaza governorate is the administrative and commercial centre for the strip. During the first Arab–Israeli conflict in 1948, Gaza’s population almost tripled with the sudden flow of displaced refugees (Badil, 2004; UNCTAD, 1994). In the few past years, natural growth, sustained by high fertility rates in a context of stringent restrictions on the movement of people out of the Gaza Strip, has been the key driver of the increasing of the population as shown in figure (2.2). The population of Gaza is subjected to further increase to 2.2 million by 2020 and to 3.1 million by 2030.

![Gaza Strip Map](image)

**Figure (2.2): The population of the five Governorates of Gaza Strip**

**Source:** (UNSCO, 2017)

Overcrowding in Gaza is considered as a serious problem due to the current heavily urbanised and a current shortage of 71,000 housing units, (OCHA, 2012). Family expansion and continuing growth in population resulted to the housing shortage; however the destruction of thousands of Palestinian houses resulted from the three Israeli wars against Gaza in 2008/2009, 2012 and 2014 have increased the shortage, while displacements is one of the main factors contributing to the housing shortage and overcrowding.
The majority of Palestinians in Gaza are UNRWA-registered refugees live in urban areas. There are approximately 1.35 million registered refugees, accounting for almost 67% of the population. The great majority of the population – around 63.6% – live in urban areas, 31.1% in camps and only 5.3% in rural areas (PCBS, 2016b). Immediately aftermath of the 1948 conflict, eight refugee camps were established in Gaza, but later on many refugee families bought property in other locations and left the camps, or currently reside on state land. The camps have been gradually upgraded by UNRWA or by refugees themselves, who have erected more permanent buildings and service infrastructure. More refugees reside outside than inside these camps by nowadays.

Generally, disasters are now can be assumed as one of the main drawbacks for sustainable development and social security of nations. Meanwhile, the disaster is a serious interruption of the functioning of society, causing widespread human, property, material or environmental losses which surpass the ability of the affected society to cope if it depends only on its own resources (UNISDR, 2009). Based on many studies, it was found that disasters can be categorized into two main types: natural and man-made Figure (2.3).

![Figure (2.3): Type of disaster](image)

**Sources:** (Ginige et al., 2009)
Natural disasters are tragic events, normally resulting from natural causes such as tornadoes, earthquakes, volcanic eruptions, etc. The natural disasters are often termed “Acts of God” as man has no control over (Shaluf, 2007, Ginige et al., 2009).

Those catastrophic events that result from human activities are the Man-made disasters. As it was reported by International Federation of Red Cross and Red Crescent Societies (2003) and Shaluf (2007), the man-made disaster refers to those non-natural disastrous incidents that can be happened suddenly or more long-term. Sudden man-made disasters include the collapse of structures, buildings and mines when this occurs spontaneously without any external force. Also there is a third type of disaster which results from both human intervention and natural forces; an example of a mixed disaster is the soil erosion which results from the extensive clearing of jungles, and subsequently heavy rain causing landslides.

2.2 The Disastrous Situation of Gaza Strip

Gaza is a venerable-conflict zone, and it is one of the hottest areas in the Middle East; it is one of the world’s most prolonged conflicts. The Gaza Strip is very vulnerable to disasters, and has a poor experience in disaster recovery in particular; building and infrastructure, contractors and local governorate, disaster management system were accused of being incapable to cope the disaster (human development report, 2009/10)

During the last decade, three wars took place between Israel and Gaza Strip, with almost two years period between the war and the other, 2008-2009, 2012 and 2014 war. Tons of explosive materials have been dropped over the Gaza strip, left critical impacts on all basics of life and on infrastructure as well, water networks, water stations, electricity, sewage networks and communication networks (CMWU, 2014).

In particular, the agricultural sector has the largest losses during the three wars as approximately 36000 ton of artillery heavy shells or rockets have been landed on farmlands. The losses in the agricultural sector estimated about 76% of the total damage in the agricultural sector, and approximately 500 acres of agricultural land areas in the north of Gaza Strip only were razed (MOA, 2014a).
2.2.1 Israeli Assault against Gaza in 2008/2009

The Gaza Strip passed through difficult situations due to the “Operation Cast Lead”, as the Israeli army called while it was called by “Al Forqan Battle” by Palestinian, which can be considered as one of the most violent and disaster event in the recent history of the occupied Palestinian territory. Palestinian centre for human rights (2009) reported that 1417 Palestinians were killed, more than 61,000 households were directly affected by damage sustained to their houses during the “Cast Lead” operation; 20,000 people were displaced due to total or severe destruction of their homes when 3,425 housing units were totally destroyed, 2,843 sustained major damages while 54,800 housing units sustained minor damage as summarized in table (2.1) (UNDP 2010; OCHA 2014).

The civilian population suffered from the damage of electricity, the breakdown of water and sewage systems. Military operations also caused substantial damage to the educational, health, agricultural and industrial institutes such as public governance facilities, universities, schools, hospitals, health centres, factories and farmland.

Damage after this war was mainly located in the governorates of North Gaza (37%), Gaza city (27%) and Rafah (17%) and the rest 19% was distributed to the middle area and Khan Younis governorates (Auffret, et al., 2009).

2.2.2 Israeli Assault against Gaza in 2012

The 2012 assault was the second major escalation of hostilities during the past decade. It was named as “The Stones of Shale Battles” by the Palestinian while the Israeli forces called it as “Pillar of Defence Operation”. It began on 14 November 2012 and lasted for one week, in which 174 Palestinians were killed and hundreds were injured. Moreover, 184 housing units were totally destroyed while 198 housing units were severely damaged and some 10,000 units were partially damaged. Only in one week, the Israeli forces destroyed many public and private structures, including 52 worshiping places, 15 health buildings, 25 non-governmental organizations (NGOs), 97 governmental and UNRWA schools, 8 police stations, 16 government buildings, 14 journalist premises and 11 political bases. In the meantime, fifteen factories and 192
commercial shops were partially or totally damaged. Twelve water wells as well as large areas of agricultural fields were destroyed. (OCHA, 2014)

2.2.3 Israeli Assault against Gaza in 2014

2014 war lasted for 51 days starting from July 8th until the 26th of August 2014; during which the Gaza Strip subjected to a brutal Israeli aggression which called by Israeli authority as “Operation Protective Edge” and called as “The Battle of Eaten Stalks” by Palestinian. The damages resulted from this war are severe at all levels and for all sectors including agricultural, economic, health, housing, access to water, solid waste management, and wastewater treatment. More than 2,100 Palestinian fatalities including 495 children were left as a result of this war, in addition to more than 11,000 injuries. Moreover, approximately 108,000 people evacuated their homes and became internally displaced in safer. In this horrible war, 15,264 buildings were damaged including 6,761 that were totally damaged. 101 health facilities sustained damages during the war including four facilities that were totally damaged. In the education sector, 467 educational institutes were affected including 31 which were totally damaged. Finally, 12,410 housing units were totally destroyed, 13,171 housing units were severely damaged and 130,975 housing unit were partially damaged (UNITAR 2014; OCHA 2014; Sarsour 2014; Health Cluster 2014).

Table (2.1): Damage to Homes from Israeli three wars

<table>
<thead>
<tr>
<th>Year</th>
<th>Operation Israeli name</th>
<th>Completely destroyed (Housing Units)</th>
<th>Severely Damaged (Housing Units)</th>
<th>Partially Damaged (Housing Units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>“Protective Edge”</td>
<td>12,410</td>
<td>13,171</td>
<td>130,975</td>
</tr>
<tr>
<td>2012</td>
<td>“Pillar of Defense”</td>
<td>184</td>
<td>198</td>
<td>10,000</td>
</tr>
<tr>
<td>2008/09</td>
<td>“Cast Lead”</td>
<td>3,425</td>
<td>2,843</td>
<td>54,800</td>
</tr>
</tbody>
</table>

Source: (OHCA, 2014)

2.3 Agriculture Situation in Gaza Strip

The agricultural activities are primary component of the Palestinian national, cultural, economic and social fabric. The cultivated area in Palestine is approximately 1.854 million dunums, 91% out of which in the West Bank and only 9% in the Gaza Strip (MOA, 2011).
Agriculture can generate incomes and create more jobs, can improve food security status, and contribute to poverty alleviation. Agriculture is almost entirely irrigated, where the average water use of 400-500 m³/dunum/year. The main problem is the water quality which is rapidly deteriorating, and this can have a negative impact on agricultural products (World Bank, 2009).

Agriculture is the dominant sector of Gaza's economy as it contributes to 32% of its economic production. In addition, all of the agricultural inputs such as, seeds, fertilizers and pesticides are imported from Israel and that make this sector is a politically sensitive sector which, therefore, can be affected by any political crisis. Meanwhile, the agricultural works are considered to be an integral part of Palestinian life. However, Al Najar in (2007) pointed that the agriculture contribution to the national Gross Domestic Production (GDP) has reduced from 9.1% in 2000 to about 7.0% in 2005.

In Gaza Strip, agriculture has gone through phases of expansion and land reduction. The cultivated area increased from 170 to 198 km² from 1966 –1968. The cultivated area was reduced to 179 km² in 1978; also the forest areas and sand dunes were reduced from 32% to 22% mainly due to the increase in urban areas, or in other words, due to the urbanization expanding.

The approximate amount of the lands cultivated in the five Governorates of Gaza strip witnessed a significant increase in 2007 (reportedly it was 146 km² in 2004 and 167 km² in 2005) comparing with the previous years recorded, which witnessed an observed reduction since the mid 1990’s, including extreme decrease in the cultivation of citrus fruits, which are considered to be the main water consumer. This mainly happened due to the expansion of urbanization, particularly in Gaza City, the blockade imposed on Gaza since almost a decade, the deterioration of irrigation water situation particularly in the middle and the southern parts of Gaza Strip and the socio-economic situation and as well as the restrictions that farmers experienced by the Israeli forces. The increase in the agricultural lands is referred to the willingness of Gaza Strip farmers to the reclamation of their farms by cultivating new types of citrus to replace the old ones and the
orientation to the intensive agriculture which clearly noticed with the increase of greenhouses all over Gaza Strip. (Al Najar 2007).

There are about 4000 Agricultural legal wells and more than 7765 illegal Agricultural wells distributed all-over Gaza Strip (PWA, 2016). By the end of 2016, Gaza’s population has reached to 2 million people, that will definitely cause a huge increase in demand for the production of agricultural activities which been done in a small area and therefore the use of land and water in urban areas will also extremely increase.

The productive sectors in Gaza have been severely hit by the events that took place during the last decade and their contribution of the Strip’s GDP has been minimized steadily. The contribution of agriculture, fishing and forestry in GDP decreased from 6.1% to 4.1% between 2006 and 2016, and the contribution proportion of manufacturing, mining, electricity and water reduced from 11.9 to 8.4 percent. According to BCPS, the rate of the GDP growth during this decade was driven, to a great extent, by construction, wholesale and retail trade, services as well as public administration and defence. Public administration and defence represented about 33% of the economy of Gaza in 2016. (UNSCO, 2017)

For the agricultural sector, as UNSCO reported in 2017, the annual average rate in the trade of the agricultural sector between the years 2000 and 2006 reached USD 18 million. However, in 2014 the trade of agricultural sector had declined to a paltry USD 2.2 million. It was noticeably progressed in 2016 as the value of exports reached USD 13.3 million, but still below the levels 10 years before. As the predictability of trade flows has improved over the previous decade, farmers in Gaza have focused on export-oriented crops in their cultivation which produce a much higher outcome than selling in the local markets. Continuing to keep up this behaviour depends on facilitating constraints that negatively impact overall agricultural yields as well as particularly those which govern trade, on the crops that can be used for exporting to Israel.

It is observed in the last few years, Agriculture is becoming the second water-use sector, accounting for less than 50 % of all water withdrawn from the coastal aquifers for agricultural, industrial and local purposes in Gaza Strip. Continuous population
growth increases the demand for water in Gaza Strip which characterized as arid and semi-arid regions conditions and limited water resource. The irrigation water in the Palestinian Governorates faces the challenge not only to supply the other sectors with their water demand, but also has to provide water to meet the increasing needs for people in the future. It is becoming clear that developing new water sources will not be enough to meet these challenges; it must be coupled with wiser use of existing sources of water through water demand management measures, water reuse and maintenance of water quality. In the agricultural sector, the management of adequate water demand needs to be motivated, regulated and restricted in order to help, guide, and coordinate the conduct of the farmers for a proper use of water in irrigation process which will encourage the saving of water. The capacity to save water and makes as high as possible effectiveness water use are playing essential role to the existence of agriculture. (PWA, 2013a)

The agricultural sector growth has been impacted as the import of raw material for the cultivation works was minimized due to the Israeli restrictions. Some kinds of fertilizers pesticides were listed on the Israeli ‘dual-use’ items. Limited access to these has affected the agricultural yields in Gaza, as the fertilizer amounts currently being utilized are much lower than those utilized by other farmers in the neighbouring countries, preventing farmers from widening their yields. Also some chemicals substances which increase the shelf life of agricultural produce were listed on the Israeli ‘dual-use’ items. Similarly, the necessary inputs for even basic manufacturing like machinery for milling and spare parts for lathes, screwing or iron rolling also were prevented to import as featured on the ‘dual-use’ list. Moreover, the agricultural sector was affected not only due to the access restrictions which impacted the movement Gaza imports and exports, but also it is affected due to the establishment of the buffer zone along Gaza border and the no-go fishing zone off Gaza cost by the Israeli forces as 35% of Gaza’s agricultural land and approximately 85% of its fishing industry have been affected (OCHA, 2013).
On the beginning of the second week of July 2014, the Israeli forces launched a wide military operation against the Gaza Strip and lasted till the 26th of August, which negatively impacted all sectors in Gaza strip, mainly the agricultural one. Table 2-2 shows the Summary of Agricultural direct damage due to the last war 2014. The most affected areas by the destruction in the agricultural sector were in Khan Yunis, followed by Rafah, Gaza, North Gaza, and Middle Area respectively. In the meantime, the indirect losses for agriculture sector reached 150 million USD (MOA, 2014a). This war dealt a serious blow to the already constrained agricultural sector in Gaza, affected by the blockade and the destruction of the commercial smuggling tunnels that were the only other supply line for Gaza (contributed with USD700 million to the annual trade). According to the MOA, “30% of agricultural land was damaged during the war and as well as large number of the irrigation wells, greenhouses, irrigation systems productive plants, post-harvest facilities and agricultural equipment were destroyed or severely damaged, causing shortages and increases in the fresh produce prices in Gaza markets for almost a two-month period following the ceasefire.

Table (2.2): Agricultural sector direct damage due to the last war 2014

<table>
<thead>
<tr>
<th>Governorate</th>
<th>Plant Production</th>
<th>Livestock</th>
<th>Fishery</th>
<th>Soil and Water</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USD</td>
<td>USD</td>
<td>USD</td>
<td>USD</td>
<td>USD</td>
</tr>
<tr>
<td>North</td>
<td>21,875,483</td>
<td>8,165,000</td>
<td>630,000</td>
<td>8,151,100</td>
<td>38,821,583</td>
</tr>
<tr>
<td>Gaza</td>
<td>24,566,950</td>
<td>9,423,150</td>
<td>4,310,000</td>
<td>6,140,250</td>
<td>44,440,350</td>
</tr>
<tr>
<td>Middle</td>
<td>17,280,350</td>
<td>8,112,700</td>
<td>785,000</td>
<td>5,673,950</td>
<td>31,852,000</td>
</tr>
<tr>
<td>Khan Younis</td>
<td>38,622,383</td>
<td>14,405,725</td>
<td>1,750,000</td>
<td>20,468,500</td>
<td>75,246,608</td>
</tr>
<tr>
<td>Rafah</td>
<td>29,316,150</td>
<td>14,585,675</td>
<td>525,000</td>
<td>16,399,100</td>
<td>60,825,925</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>131,661,317</strong></td>
<td><strong>54,691,250</strong></td>
<td><strong>8,000,000</strong></td>
<td><strong>56,832,900</strong></td>
<td><strong>251,185,467</strong></td>
</tr>
<tr>
<td>(% Damage)</td>
<td>52.42%</td>
<td>21.77%</td>
<td>3.18%</td>
<td>22.63%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Source:** (MOA, 2014a)

The amount of freshwater allotted for agriculture will be reduced significantly to meet the accelerating demand for the municipal purposes. The Irrigation practices are only based on farmer’s own experience. As shown in figure (2.4), the irrigation water abstraction for each governorates from 1993 to 2012 was illustrated and it’s clearly that the average irrigation water abstraction for North governorate is 13.83 MCM, 15.14
MCM for Gaza governorate, 15.41 MCM for middle governorate, 22.77 MCM for Khan Younes governorate and 15.94 MCM for Rafah governorate (PWA, 2013a).

2.3.1 Current crops distribution in Gaza Strip

The agricultural sector in Gaza Strip has a wide range of cultivated crops. There are over 100 main crop types, and fruit trees are the most dominant group. Olive production represents 81.1 percentage of the area, and produces between 50,000 and 180,000 tons annually in a two-year production cycle. Citrus were the most important crop by economic value, although they occupy around 13.1% of the tree area in the Gaza Strip. Also, citrus are amongst the very water intensive crops and spread-cultivated in Gaza Strip (PCBS & MOA, 2011).

In average, the agricultural sector in Gaza Strip consumes about 80 million cubic meters per annum from the groundwater wells. There is no absolute measurement of water extraction for agriculture irrigation because most of irrigation water obtain from the scattered agricultural wells all over Gaza Strip are unaccounted for, not functioning properly or not installed correctly. Table (2.3) shows the seasonal crops while figure (2.5) shows crop distribution all over the Gaza Strip. Noticeably, the irrigated areas represent more than two-thirds of the total cultivated areas (PWA, 2012).

Table (2.3): Seasonal crop in the Gaza Strip

<table>
<thead>
<tr>
<th>Crop</th>
<th>Cultivated Area dunum</th>
<th>% of total area</th>
<th>Irrigated Area dunum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>59,601</td>
<td>36.8 %</td>
<td>45,712</td>
</tr>
<tr>
<td>Horticulture</td>
<td>62,871</td>
<td>38.8 %</td>
<td>57,339</td>
</tr>
<tr>
<td>Field Crops</td>
<td>39,066</td>
<td>24.1 %</td>
<td>15,430</td>
</tr>
<tr>
<td>Herbs</td>
<td>50</td>
<td>0.3 %</td>
<td>140</td>
</tr>
<tr>
<td>Total</td>
<td>161,909</td>
<td>100 %</td>
<td>118,621 (73%)</td>
</tr>
</tbody>
</table>

Source: (PWA, 2012)
The total crop area was 189 thousand dunums in 2012; however it was increased to 201,000 dunums in 2013/2014, while the approximate water quantities for agriculture purpose, including the water consumed by the livestock, are about 95.3 MCM/y (92.7 for cultivation and 2.64 for livestock consumption). It is obvious that there is an annual increase in the consumption of agricultural water of about 9.5% in comparison with 2012 (PWA, 2014).

**Figure (2.4): Irrigation water abstraction for each governorate from 1993 to 2012**

*Source:* (PWA, 2013a)
2.3.2 Urban Agriculture in Gaza Strip

In a workshop held in Gaza in 1998 and organized by the Gaza Urban Agriculture Committee, it was concluded that agriculture in Gaza is already more urban than rural, based on the high degree of urbanization of the area. Meanwhile, according to Al Najar (2007), most of agricultural activities in Gaza Strip could be classified as urban agriculture due its location within and surrounding the denser residential areas.

In fact, agriculture in Gaza experiences critical problems. Increasing pressure on land and water limit the capacity today, and even more the potentials of the sector tomorrow. Furthermore, the community is confronted with a lack of significant alternative employment and export potentials in the other economic sectors. This awareness and the recognition of the gravity of the situation led to looking for alternatives to gain minor improvements. So that urban agriculture has come to be seen
as incorporating important potentials for the future of Gazan agriculture (Laereman & Sourani, 2005).

According to Gaza Urban and Peri-urban Agriculture Platform (GUPAP), the development of more sustainable and resilient urban agriculture in the Gaza Strip experiencing several constrains. Current urban development policies, land use classification systems and planning have neglected to recognize urban agriculture as a land use category and urban development strategy. At the same time, there is still a lack of authority’s’ regulations and researches on the contribution of urban agricultural in the development, urban policies, improved techniques for production and planning related to agricultural land use. Regulation and institutional reform initiatives will be played a significant role to enhance the benefits of urban agriculture for alleviating the poverty, improving food security status and sustainable urbanization.

There is an increasing national and international recognition for urban agriculture to be developed as a complementary strategy for improving urban food security status and nutrition, income and, empowerment and social inclusion, urban greening and enhanced recycling of urban wastes and wastewater, given that 90% of all agriculture in Gaza Strip can be classified as urban or peri-urban (Zeeuw & Drec, 2015).

Al Najar in (2007) reported that most of the agricultural fields are located within the denser residential areas or surrounding them. Therefore, this type of farming could be categorized as urban farming because of its location; moreover number of farmers using the municipal water networks to irrigate their greenhouses which located within the residential areas.

The price of fresh fruits and vegetables are very expensive in Gaza Strip, given that the lands available for horticulture is very limited and with the on-going blocked and restrictions on land accessibility in place. At the same time, the population continues to grow at over 3% annually; putting additional pressure on the resources in one of the most densely inhabited areas of the world. Meanwhile, the very high level of urbanization in Gaza made the lands available for cultivations in Gaza very limited (FAO, 2012). Therefore, there is a need to find out alternative creative strategy to
accomplish optimal investment for urban farming modalities and to mobilize for such production types in the Gaza Strip. By exploiting the available vacant spaces around the different facilities such as universities, schools, hospitals and backyards and top roofs of the buildings for planting and livestock keeping, the urban farming phenomenon aims at improving productive activities that can make very important contributions to the community resilience, dignity, improve food security status and food consumption through nutritious and fresh food for marginalized families.

Several key stakeholders from different organizations in Gaza strip, the coordinator of Gaza Urban & Peri-urban Agriculture Platform (GUPAP), FAO project coordinator, the general manager of Union of Agricultural work committees (UAWC), Director general of extension and rural development in MOA and UNDP program coordinator; all of them agree that the Gaza agriculture can be classified as Urban or Peri urban agriculture due to the urban expansion. However, the director of Arabic centre for Agriculture Development (ACAD) in Gaza said that “the practice of Urban agriculture in Gaza strip has widen in the recent year, but there are still large areas in the strip are depending on the traditional agriculture, so that the agriculture in Gaza can’t be classified as Urban agriculture” (Personal Interviews conducted by researcher in 2018).

2.4 Food Security Status in Gaza Strip

The percentage of households food insecurity in Gaza Strip is more than 2.5 times larger than in the West Bank, and stands at 47 per-cents as in figure (2.6) or approximately 1 million people as can be seen in table (2.4), with an increase of 86,000 individuals between 2013 and 2014.

All Palestinian refugees and non-refugees households faced a deteriorating of food security status. This reflects a generalized decline in food access in the Gaza Strip as a result of the failure of labour entitlement. The rate of the unemployment reached to a record height of 44 percent in 2014, with 11 percentages more than in 2013. Also, there was a significant increment in the level of food price (12 percent between May and August 2014), because of the 2014 war which led to the collapse of the Gaza economy (FSS, 2014).
Figure (2.6): The level of household food security in Gaza, 2013-2014 (FSS, 2014)

Table (2.4): Population food security status in the Gaza Strip, 2013-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Severely Food Insecure</th>
<th>Moderately Food Insecure</th>
<th>Marginally Food Secure</th>
<th>Food Secure</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>600,438</td>
<td>311,283</td>
<td>272,471</td>
<td>578,925</td>
<td>1,763,118</td>
</tr>
<tr>
<td>2014</td>
<td>664,416</td>
<td>333,613</td>
<td>292,889</td>
<td>531,101</td>
<td>1,822,020</td>
</tr>
</tbody>
</table>

Source: (FSS, 2014)

From the aspect of the occupational status, food security status in the Gaza Strip is better for the households whose heads are legislators, technicians, associates, senior officials and managers or professionals and clerks. On the other hand, food insecure exists with the household where there is a higher percentage of unskilled and low income heads of household. In conclusion, the household head with lowest income and constrains on movement freedom are two of the most important roles affected on food security situation in Palestine. (FSS, 2014)

For the fishing sector, Since January 2009, Israeli forces have established a no-go fishing zone and imposed a three nautical mile limit on Palestinian fishermen off the coast of Gaza, see figure (2.2). However, according to the Oslo Accords, Palestinian fishermen are legally permitted to navigate up to 20 nautical miles out, thus by the establishment the no-go fishing zone, the sea access for Palestinians reduced by 85%. Fishermen experience violent by the Israeli navy force when they attempt to navigate
beyond this three nautical mile zone, as they are subjected for shooting, arresting, and/or confiscate the boats and equipment of these fishermen. Only in 2011, 72 incidents of fire against fishermen were reported, resulting in one fisherman lost at sea, and four injuries. As a result of access prevention and the Israeli navy’s aggressions against Gazan fishermen in the sea, the amount of caught fish has reduced from 3,600 tonnes in 1999 to lower than 1810 tonnes in 2010 (Ma’an Development Centre, 2012).

The existence of food insecurity leads to reduced nutrition for mothers that lead to an increased opportunity of infant mortality or diseases. It is reported that 28 die, for every 1,000 babies born in Gaza, from anemia, malnutrition or other food insecurity related causes. (Ma’an Development Centre, 2012)

2.5 Topography and Climate of Gaza Strip

2.5.1 Topography

Palestine is characterized by a great variation in topography and altitude despite its small geographical area. The Gaza Strip is considered a foreshore plain gradually sloping westwards. In the northern area of the Gaza Strip, there are four ridges with different elevations, ranging from 20 to 90 meters above sea level. The four ridges are: Coastal ridge, Gaza ridge, El-Muntar ridge, and Beit Hanoun ridge. Active dunes can be found near the coastal segment especially in the southern part of the strip between Deir el Balah and Rafah. Areas with large accumulation of loess can be found 15 km southwest of Gaza and east of Khan Yunis (ARIJ, 2015).

The topography of Gaza Strip is portrayed by extended ridges and depressions, dry streambeds and shifting sand dunes. Land surface elevations range from mean sea level (msl) to about 110 AMSL. There are three surface water features in Gaza Strip: Wadi Gaza, Wadi Silka, and Wadi Halib (Qahman, 2004).

In the south, these features tend to be covered by sand dunes. The ridges and depressions show considerable vertical relief, in some places up to 60 m. Surface elevations of individual ridges range between 20 m and 90 m AMSL (Shaheen, 2007). Figure (2.7) shows the topography of the Gaza Strip.
2.5.2 Climate

Palestine locates within the Mediterranean climatic zone, while Gaza Strip, in particular, is part of the Mediterranean Basin countries. The climate of the state of Palestine is characterized by long, hot, dry summers and short, cool, wet winters (ARIJ, 2015).

The Gaza Strip is situated in the transitional zone between the arid desert climate of the Sinai Peninsula and the semi humid Mediterranean climate along the coast. The following is climatological summary in the project area for the period.

- **Temperature**: In Gaza Strip, the average daily mean temperature ranges between 25.8\(^0\) C in summer to 13.4\(^0\) C in winter. August is the hottest month with an average temperature of 25 to 28\(^0\) C while January is the coldest one with average temperature of 12 to 14\(^0\) C.
- **Sunshine Duration**: Palestine has a sunny climate with approximately 300 sunny days per year. The Palestinian people use this renewable source of solar energy for water heating. Solar radiation reaching Palestine varies from one place to another. June and July months witness the longest hours of sunlight and the shortest from December to February. Solar radiation is increased by almost completely clear skies during the summer season. While in the winter season, solar radiation reduced due to cloud cover. The lowest value of the solar radiation occurred in December, when the sun is over the Tropic of Capricorn (Southern Tropic) and the days are short (ARIJ, 2015).

- **Humidity**: The relative humidity varies from 60% to 85% (ARIJ, 2015)

- **Wind**: In summer, sea breeze blow all day and land breeze blows at night. The speed of wind reaches its peak value at noon period and decrease during night. In the winter season, most of the wind comes from the southwest direction and the average wind speed is 4.2m/s. In summer season, strong winds blow regularly at particular hours, while the daily average wind speed reach to 3.9m/s and blow from the northwest direction. Storms can be seen in winter with maximum hourly wind speed of 18m/s.

- **Rainfall**: The rainy season in Palestine is the winter, which extends from October until March. The main source to groundwater recharge is rainfall. The rainfall level is varying in the Gaza Strip and ranges between 400mm/year in the north to about 160mm/year in the south, while the long term average rainfall rate in all Gaza Strip governorates is about 317mm/year (CMWU, 2011). Between the years 2001 and 2011, the average Gaza strip annual rainfall ranged between 220 mm/year to 520 mm/year (MOA, 2011).

- **Evaporation**: In the Gaza Strip, evaporation is the lowest anywhere in Palestine (1580 mm per year), given that the relatively high humidity and lack of surface water in the strip (ARIJ, 2015).

### 2.6 Water Resources in Gaza Strip

#### 2.6.1 Ground Water

The Coastal Aquifer is the only source of water in the Gaza Strip where the main source of water in the Gaza Strip is the groundwater, with the thickness of the water
bearing strata ranging between several meters in the east and south-east to about 120-150 m in the western regions and along the coast. The aquifer composes mainly from gravel, sand and sandstone mixed clay and silt. A hard and non-productive layer of clay and marl with low permeability has a thickness of about 800-1000 m situated below the coastal aquifer. The annual recharge volume for this limited aquifer is ranging from 55-60 MCM/yr. The total abstracted volume is about 180 MCM, which means that the total recharge is only one third of total abstractions. These unsustainably high rates of extraction have led to lowering the groundwater level, the gradual intrusion of seawater and upwelling of saline groundwater (PWA, 2012). Figure (2.8) shows the groundwater level in Gaza Strip for the year of 2015.

The system of the ground water in Palestine was controlled by different parties during the last decades, Egyptians, Israelis, joint management between the Palestinians and Israelis and lastly the Palestinians themselves. Thousands of legal and illegal water wells are penetrating the aquifer of the Gaza Strip and pump more than its safe yield, which negatively impacted aquifer, and at the same time the quantity and quality of public water supply will be affected (Hamdan, 2012).

Figure (2.8): Gaza Strip Ground water Level. (PWA, 2015)
2.6.2 Non-conventional water resources

1- Desalination Plants

Reportedly, more than 95% of the water in Gaza Strip obtained from the aquifer lying underground is unsuitable for human consumption. This stems mainly from long-standing over-extraction, compounded by leakage of raw sewage and seawater. Aware of the dangers of consuming tap water, nine out of ten people in Gaza rely on desalinated trucked water, at least for drinking and cooking purposes. Over 80 per cent of desalinated water currently available in Gaza is produced by the private sector based on groundwater (AFD, 2016). Depending on this source for domestic water utilization increases the burden of the financial issues on already disappointed families and can be 30 times costly than water supplied from the municipal network. Moreover, this source also poses a health hazard: studies show that nearly 70 per cent of privately produced desalinated water has some level of contamination, despite recent efforts led by the Palestinian Water Authority (PWA) to monitor its quality (OCHA, 2017).

To mitigate this situation, UNICEF, with financial support from the European Union, led a project for the construction of Gaza’s largest seawater desalination plant. The plant, located in Deir al Balah, was officially inaugurated on 19 January 2017, but at the end of February it was running only on a partial/ad hoc basis powered by emergency fuel funded by the Humanitarian Fund. It will initially produce 6,000 cubic meters of desalinated water a day, with a projected target by 2020 of more than three times this volume (approximately 20,000 cubic meters a day), serving 275,000 people in Rafah and Khan Younis with 90 litres of safe drinking water per capita per day (OCHA, 2017).

2- Treated Wastewater Reuse

The reuse of the wastewater seems to be promising in the future in the Gaza Strip. As expected on the coming twenty years, the amount of wastewater to be used for irrigation will gradually increase and therefore more than half of groundwater required for irrigation will be saved (Tubail et. al., 2004).

The farmers in Gaza are willing to utilize treated wastewaters for irrigation, if flows of the relevant volume are made available. Approximately half of the current fresh water use in Gaza is allocated to the agricultural sector, so the reuse of treated
wastewater is a very important and strongly needed. However, in the absence of high-quality wastewater treatment, the reuse cannot be introduced at any significant scale (PWA, 2011).

2.7 Location of the Study

Beit Lahia is located at the northern part of Gaza Strip. According to a report published on PCBS web-page, the estimated population of Beit Lahia city might be reached to 89,949 inhabitants in 2016. It is reported that the annual population growth rate in Palestine is 2.8% as per the PCBS report issued in 2016.

Beit Lahia municipality consists of the following zones: Salatin area in the southwest, Atatra area in the West directly, Aslan in the middle, West region, Sheikh Zayed City, East Region, Fardous Region, Masroa Region, Om AL-Faham, AL-Fardous. Herbia Village bordered Beit Lahya in north, the Mediterranean Sea on the west and Beit Hanoun on the east. The sand dunes surrounding the city, the agriculture land area within Beit Lahia city is about 25.53%, where most of the agricultural lands are concentrated in Beit Lahia town (Al-Najar et al., 2013).
Chapter 3

Literature review

The term ‘Urban Agriculture’ is consisted of two words ‘urban’ and ‘agriculture’. Thus, it is important to illustrate how the words ‘urban’ and ‘agriculture’ are used for this study and to determine what is included within the urban agriculture field and what falls outside its field.

Urban agriculture includes poultry, rabbits, bees, animals, snakes, guinea pigs and other indigenous animals. It is not only refers to food crops and fruit trees grown in cities. Urban fish farms are also amongst the food systems in many tropical cities (Drescher et. al. 2000). The urban agriculture system is a combination of many various activities like gardening, staple food production, hunting, gathering and also urban forestry combined with food production, as per the figure (3.1).

Figure (3.1): The range of urban farming within an interaction system

Source: (Drescher et. al. 2000)

Urban is used in a wide sense, to include the entire area in which a city's sphere of influence (ecological, economic and social) comes to bear daily and directly on its
population (Smit et. al. 2001). The same for agriculture, it is used in its largest sense too, embracing aquaculture, horticulture, arboriculture, and poultry and animal keeping and breeding. The term agriculture also combines pre-production and post-production processes, in addition to the process of waste recycling. Agriculture, farming, cultivation and crops raising and animals keeping are used interchangeably. Farmers refer not only to the rural people whose main jobs are crops cultivation and livestock breeding, but also to the part-time or the people who practice the different types of farming activities for recreational purpose (Smit et. al. 2001).

There is no agreement between the researchers about the accurate definition of urban agriculture. Despite, urban agriculture can be defined as simply an agriculture that takes place in or at the verge of a residential area, possibly adding its relationship to urban populations. Also, Smit et. al. (2001) mentioned that the definition of urban farming can be characterized as an industry that produces processes, and markets food, fuel, and other outputs, widely in response to the day by day consumers’ demands within a town, city, or metropolis, on many types of privately and publicly held land and water sources found throughout intra-urban and semi-urban areas. Ordinarily urban farming applies many production approaches, as often as possible using and reusing natural resources and urban wastes, to yield a various array of land, water, and air based fauna and flora, contributing in improvement the food security situation, environment and health of the single individual, household, and community level.

However, a wider definition would stress those components that have come to portray urban agribusiness as it is performed today, while recognizing the great variety within it. Though there are a number of definitions on urban agriculture, five elements are more commonly found in these definitions. These include: 1) the location of the occurrence of urban agriculture; 2) the different activities types included within urban agriculture; 3) the lawfulness and type of land tenure under which the urban farming activities happen; 4) the different phases of production included in urban agriculture; and 5) the size of the activities of urban farming. Two other elements which are important for the groups with lower incomes might be added to the list; namely the
activity’s purpose and the groups’ types engaged in agricultural production within the urban areas (Quon, 1999).

Generally, urban agriculture is an entrepreneurial action for people with different levels of income. It provides proper access to food for the poorest of the poor. However, it can be a source of income and a better-quality food at low cost for the stable poor. And it offers the possibility of savings and a return on their investment in urban property for middle-income families. While for the businessmen, it is additional profitable business.

Urban agriculture is a large field that includes numerous small-scale farmers and as well as some large agricultural businesses. Urban farming can be taken place on smaller areas of land than rural fields and on open spaces that are empty, idle, or inappropriate for urban development. Urban agriculture can be found throughout the metropolitan area while the most common site is the household plot.

Some other examples of urban farming include: fish and other aquatic products, community and allotment gardens and horticulture.

3.1 The Practice of Urban Agriculture

Cities are existed since more 5,000 years. However, by the year of 1800, only 2 per cent of the world’s population was Urban. As we already entered the "urban millennium", more than half of the world’s populations are living in towns and cities, with approximately 180,000 people added to the urban population on daily basis (UNHABITAT, 2002).

Urban Agriculture is a phenomenon that produces, processes and markets food and fuel grew largely in response to daily demand of consumers within towns, cities or metropolitan areas. Practiced on land and water scattered throughout the urban and semi-urban areas, it utilizes intensive production methods, using and reusing the natural resources and the wastes o urban area, to cultivate a diversity of crops and rising livestock. Although UA it is practiced differently in different countries, it revolves around four generally defined farming systems: aquaculture, animal husbandry, horticulture and agro-forestry (UNDP, 1996).
During the last few decades, UA has increased greatly and rapidly worldwide. There are currently about 800 million urban citizens around the world engaged in UA (Smit et. al. 1996). Parts of Africa, Asia and Latin America have experienced a surge in urban agricultural production in recent years. For example, it was estimated that the overall proportion of the African urban population involved in urban cultivation was 10–25% in the early 1980s, whereas this proportion rose substantially during 1990s, reaching 70% in the city of Dar Es-Salaam (Rakodi, 1997). In 1996, the UNDP estimated that 800 million people around the world were engaged in UA and that approximately 33% of urban families were producing about a third of all food consumed in cities during the early 1990s (Smit et al., 1996). Though agriculture has traditionally been considered a rural activity, it is now being carried out by approximately 200 million urban farmers who contribute 15-20% percentage of the world’s food (Armar, Klemesu, 2000).

Subsistence farming within city limits has recently come to the forefront as a strategy to reduce malnutrition and food insecurity among poor urban households in the low-income states in the face of rapid urbanization and population growth. There are approximately 1 billion poor people in the world, 75% of whom are living in temporary urban settlements without adequate shelter or life basic services (UNHABITAT, 2002). Furthermore, based on current rates of growth, the world slum population is expected to reach to 9 billion by 2050 (UN, 2011).

World Health Organization (WHO) and World Bank data show that in most of low-income countries, the absolute number of poor is rising and therefore the rate of all poor people who reside in urban areas is rising (World Bank, 2006). A consequence of increasing food insecurity level and poverty in urban zones is an increase in the absolute number of malnourished young children who reside there, and an increase in the urban proportion of all children who suffering malnourished (Haddad et. al., 1999).

Women seem to play a central role in UA in most countries where it is practiced. According to Mireri (2002), in Kenya most urban farmers are women (roughly 56 per cent), with higher percentage of women in the larger towns (for example, 62 percent in Nairobi). Among household heads of those involved in urban agriculture, women form
the higher proportion (64 percent), where the majority of hired farm laborers were men (82 per cent).

Urban farming is performed by two groups in most developing countries, the conventional farmers, who have been engulfed by urban expansion, and the newcomers’ migrants. For example, during the last couple of decades, Kenyan urban centers have witnessed accidental changes of boundaries. The boundary changes have annexed areas that are mostly rural in character with agriculture as the dominant land use. Urban migrants and their families are the second major group of urban farmers. Most of urban farmers are poor although they come from all income categories, low, middle and high. In Kenya, most of urban households are unable to feed themselves properly and adequately from their incomes, and those who are able cultivate land in backyard spaces near their residents, on roadside verges, or on other publicly owned open land. Therefore, survival farming is an economic imperative for urban household. Subsequently, satisfaction of basic needs is the main objective and the essential persuading factor administering their behavior, rather than profit earning and capital accumulation. The groups with the very low-income tend to use public land, unlike the better-off households who tend to farm on private land mostly their backyards (Mireri, 2002).

3.2 The Benefits and Challenges of Urban Farming

Since urban farming is normally taken place within or around the cities, beside its unique features it also has constraints. The urban agriculture benefits of cities imply its contributions to sustainability of cities (Nugent, 1999). Nugent added that it is helpful and important to study urban agriculture from its three axes, economic, social and ecological, to realize its sharp benefit; hence, its sustainable contribution to the particular city.

3.2.1 Benefits of Urban Agriculture

Urban agriculture benefits the economy, environment. While, for those people who are active in the industry field as well as the residents who consume UA products, UA keeps them healthy. It plays a significant role in programs and projects that target, the environment, health and nutrition, income generation, enterprise development, youth
and women, water and sanitation, and also food production and supply (Smit et al., 2001).

Urban agriculture is mainly taken place in the vacant fields of the city, along riversides and even on the residential buildings roofs. Also it can be practiced at the fringes of the urban cities where land is not proper for the construction of new buildings. Bryld (2003) reported that urban arming brings with it large potentials for enhancing the urban citizens situation, especially the lowest incomes ones who almost are depending on the access to the food grown locally.

Most of urban cultivation is being done by the urban poor who consume most of the production and they provide the local market with the supply food (Bryld, 2003). Most of urban poor spend the major expense for food purchasing; therefore, nothing will be left for health, education and other household necessities. They also hardly consume varieties of food. Thus, it is not surprising that practicing urban agriculture contributes in improving the status of food security for the urban poor. Not only food intake quantity can be improved, but also the value of the nutrition if the poor grow vegetables, chickens and fruits by themselves (Bryld, 2003; UNDP, 1996). According to a report issued by RUAF in (2014), the role of urban farming as per figure (3.2):

**Figure (3.2): Benefits of Urban Agriculture.**

(Prepared by researcher)

- **Food security (nutrition):** The most important role of urban agriculture its contribution to food security and healthy nutrition. In many cases, food production within the city is a reaction of the urban poor to inadequate, unreliable and irregular access to food, and the lack of purchasing power.
- **Economic potential:** Urban agriculture play important role in the improving of the economic situation as it can be a suitable source of income for the urban poor, if it is well-practiced as a formal sector. However, (Bryld, 2003) is not sure if it has a large contribution to macro- economies of cities although he suggested that urban agriculture has an economic benefit as it is helping the poor urban farmers, to use their income obtained from the non-farming activities for other purposes, such as health and education, instead of purchasing food, for example it improves the welfare of urban farmer households. According to the Global Monitoring Report (2012), in developing countries the poor households normally spend 50-70 % of their earnings for food purchasing; therefore, it appreciated the benefits of self-growing crops or taking part in other types of urban farming by the urban poor.

- **Environmental advantages:** Urban agriculture is practiced, in most cases, in marginal open spaces within or adjacent to the cities where lands non-suited for other uses. Therefore, it creates more beautiful scenes and landscapes, and improved microclimate, and nutrient recycling (Bryld, 2003)

- **Social advantage:** Urban farming practitioners are those who are coming from different groups of urban community. They can be the rich or the poor, women or men and also they can be natives or migrated from rural areas and so on. The immersing of women and other marginalized families in this sector draws attention, and implies the important role of the sector in alleviate the poverty and integrating urban societies (RUAF, 2014; UNDP, 1996). UNDP added in its 1996 reports that urban farming has a critical role to improve social equity by improving the health and productive capacity of poorer people and by providing them with opportunities to make more income.

  According to UNDP (1996), approximately 800 million people from all over the world are engaged in the different activities of urban agriculture, 200 million of them are full-time. Table (3.1) shows data gathered on employment status created due to practicing urban farming in a several cities according to World Bank (2013).
Table (3.1): Urban agriculture contribution in employment

<table>
<thead>
<tr>
<th>City</th>
<th>Urban Producers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dakar, Senegal (Mbaye and Moustier 2000)</td>
<td>3,000 family vegetable farms (14,000 jobs) of which 1,250 are fully commercial (9,000 jobs); 250 poultry units.</td>
</tr>
<tr>
<td>Dar es Salaam, Tanzania (Sawio, 1998)</td>
<td>15 to 20 percent of all families in 2 city areas have a home garden. UA forms at least 60 percent of the informal sector and is second largest source of urban employment (20 percent) in 1997.</td>
</tr>
<tr>
<td>Havana, Cuba (Gonzalez &amp; Murphy, 2000)</td>
<td>117,000 direct and 26,000 indirect jobs in urban agriculture.</td>
</tr>
<tr>
<td>Shanghai, China (Yi-Zhang and Zhangen, 2000)</td>
<td>2.7 million Farmers, representing 31.8 percent of all workers, contribute 2 percent of the city’s GDP through urban agriculture.</td>
</tr>
<tr>
<td>Manila, Philippines (IPC, 2007)</td>
<td>120,000 low-income households depend on local jasmine production—including jasmine farmers, garland makers, garlands sellers—for their livelihoods.</td>
</tr>
</tbody>
</table>

Source: (World Bank, 2013)

3.2.2 Challenges of Urban Agriculture

In spite of the benefits of urban agriculture as mentioned above, it also has some challenges worth mentioning.

- **Space for cultivation:** Agriculture requires lands for cultivation. However, there is lack of space for growing crops in cities due to the high rate of urbanization. As Bryld (2003) reported, the homeless are in urgent needs to be provided with safe shelters besides feeding the poor people in the cities. Since growing the food in cities needs land, it may not be prioritized in urban land uses because the demand for urban spaces to build housing units is in somehow more important than using spaces for agricultural activities. Argenti (2000) further asserted that the lands use for agricultural productions are probably to be lost in this contest.

- **Health problems:** If it is not organized well, urban farming can be a health hazard. The resources of cities such as water and urban wastes can be used for production. The crops and livestock can be contaminated and then become health hazards to human beings due to the using of polluted rivers or wastewater and untreated
compost. There are several worldwide cases when urban farming brought health problems for its practitioners and for the neighboring people as well (UNDP, 1996).

- **Authorities perception:** The majority of urban planners and environmental managers, either with the government or even with NGOs, have more concentration on the economic benefits of UA while doesn’t pay enough attentions towards the other benefits of UA, and this can be considered as the greater challenges in the implementation of UA. As Quon (1999) revealed that the ignorance of the economic, social and environmental benefits of UA make the government response improperly in the land use planning process, and therefore less resources, financial and technical support are provided.

3.3 Urban Agriculture as a Response to Crisis

Economic crisis and structural adjustment policies that the developing countries experienced, have disproportionately affected the urban poor, particularly the women, and have resulted in rising food prices, decreasing the income, redundancy in the formal labor market, cuts in food aids for urban consumers, and also reduced public expenditure on basic services and infrastructure. It is often ignored, that economic crisis in a given country has various impacts on women and men (Foeken & Mwangi, 1999; Hasna, 1998).

In the developing countries, the short and medium-term results of conditionally programs have put an additional economic pressure on poor populations, narrowing of the income gap between rural and urban inhabitants, and also moving from rural to urban areas has been accelerated (Nugent, 1999). These urban poor regularly resort to the non-market activities, such as urban food production, for survival (Drescher et al., 2000).

The production of urban farming can be defined as a “crisis induced strategy” under such economic circumstances, ensuring survival of the poorer segment of the population. Jakarta, the Capital of Indonesia, can be considered as an example in the recent history that its people managed to create a survival strategy during periods of economic decline and civil unrest in densely populated cities. In 1997, millions of people were vulnerable to food insecurity in Indonesia due to the economic disturbance,
as they were left without enough money to buy sufficient food. Alarming food related problems were reported when first urban areas were dramatically affected (FAO, 1999). In response to this, people engaged in urban agriculture and started producing food on small and vacant fields all over the city, even the former public parks were transformed into gardens, while government officials encouraged the people of Jakarta to grow their own food. Problems started in urban areas and then expanded to rural areas later caused by migration. The population has increased up to 30% in some rural communities adding severe pressure on those areas (FAO, 1999). It is the responsibility of the local authorities to improve and to support food security in cities and also have to alleviate urban poverty.

In many developing countries and in-progress countries, induced economic crisis, rapid population growth and moving from rural to urban, deteriorating national economies or persisting economic difficulties are pre-conditions for urban food production. Nevertheless the production of urban food might have, to large extent, less value if there is no lack in adequate and accessible income opportunities and an unsatisfied demand for suitable quantity and quality of agricultural products in cities.

3.4 Stakeholders in Urban Agriculture

All those affected, or affecting it, by urban agriculture in some way or another can be considered as stakeholders. Urban farmers themselves, people engaged in the post-production stages, landowners, the local government, inputs and services suppliers to urban farmers, NGOs (Mougeot, 2001; Smit et al., 2001) and UN are stakeholders. The city planners who seek to order and regulate land use are also amongst the stakeholders.

Also the people that indirectly affecting by urban agriculture activities such as smell, noise or other forms of pollution can be considered as stakeholders in UA.

According to the role they play, these stakeholders can be classified into four categories: regulating, facilitating, providing and partnering stakeholders (Smit et al., 2001). Multiple roles can be performed simultaneously by one organization. Moreover, stakeholders not only affect urban agricultural activities, but are also affected by them, either negatively, as when poor agriculture practices cause health problems that require
government intervention, or positively as when farmers use the sludge from a wastewater treatment plant properly (Smit et al., 2001).

The rules and restrictions on urban farming can be imposed by regulating stakeholders. On the other hand, facilitating stakeholders are the ones who create opportunities, for example through education, training and extension. Providing stakeholders are the ones who have direct roles to supply the urban farmers with resources, logistics and inputs to be used in cultivation. Partnering stakeholders are those who working together with urban farmers to produce the food. An example for the last category is a university that allows farmers to use some of its vacant lands for cultivation, while the crops can be shared between them (Smit et al., 2001).

3.5 Food Security and its relation with Urban Agriculture

The Food and Agriculture Organization (FAO) of the United Nations definition of the food security is the most influential and widely accepted definition which is “access by all people at all times to enough food for an active and healthy life” (Baumgartner & Belevi, 2001). This definition includes many issues, but above all the following are its key components, as illustrate in figure (3.3):

- **Availability**: is achieved when enough quantities of food are consistently available to all people within a country.
- **Accessibility**: which is ensured when all household members have adequate resources to obtain suitable foods for a nutritious diet at all times.
- **Utilization**: in terms of quality, quantity, safety, cultural acceptability, and food preferences.
- **Stability**: stability of access to food over the year (takes into account shocks and vulnerability).
The discussion of how urban agriculture can contribute to the food security and nutrition of cities as a whole was a major matter of the literature.

Based on studies made by (Maxwell, 2003; Ellis & Sumberg, 1998), a distinction that is often made in the literature refers to the extent to which urban households that involve in agriculture have some degree of market orientation or are purely producing agricultural products for own-utilization. There seems to be an agreement that the direct food security purpose prevails, but there is a substantial number of urban farmers also use their produce to the market selling, as in Latin America and a bit less so Africa.

In most lower-income countries, urban agriculture is a complementary part of the urban food supply. It aims to provide products that rural farming cannot supply as well perishables that can be easily rotten during transportation process, high-value crops that need close monitoring of the market, and certain export crops which need prompt delivery when ready. It is thus complementary rather than competitive with rural farming, increases the efficiency of the food supply and further contribution to the national economy (Smit et al., 2001).

It was mentioned that the contribution of urban farming to the food security and nutrition is the most important advantage of urban agriculture (Veenhuizen, 2014).
Renewed interest in looking at alternative strategies to improve the urban livelihoods, for income increasing and for urban food security and nutrition among others has arisen with the wide increase in urban poverty, food insecurity and malnutrition now seen as migrating from rural to urban areas. Many urban dwellers have involved within UA as a livelihood strategy and main or secondary source of income and, as in most countries, complement rural agriculture and increases the quality of national food system (FAO, 2007).

When urban and peri-urban agriculture is legalized and is better regulated, based on assessment for many cities around the world, the beneficial effect of farming in cities can be widening towards the provision of better nutrition, poverty alleviation and more job creation (Mougeot, 2000).

According to local ecological conditions and habitat, urban conditions are contributing to dense production of perishable foods (vegetables, fruits, fish, meat and dairy products). These foods, which are rich in fundamental nutrients, are consumed by urban dwellers. Some are consumed by the families engaged in production, processing and distribution and therefore contribute directly to improve the level of their food security. However, it is important that this food is to be safe and properly prepared, selected, and disseminated within the family in order to improve the level of the household food security and nutrition, (Ayaga et al., 2004).

Urban farming can have a role on urban food security through several ways. It can be a source of income for the involved household; can provide immediate access to a wider number of nutritionally rich foods (fruit, vegetables, meat) and a more diversified diet and the mothers can spend more time for their children caring. Also by practicing urban agriculture, the stability of household food consumption against seasonality or other temporary shortages can be increased, unlike to the non-urban agricultural activities that are located far away from home (Maxwell, 2003; Maxwell et al., 1998; Armar-Klemesu, 2000). Although the poorest suffer from lack access to land, there are some evidences that the poor households, not the poorest, are mostly engaged in UA, (Haddad et al., 1999).
Urban food security is often interrelated with urban agriculture, especially for millions of urban poor who strongly depend on cash to obtain their food. Self-production is an important strategy for the food security improving with insufficient income. The majority of urban farmers are amongst the low-income people, producing first for consumption of the household. Improving the level of the household food security is the main objective for the poor to cultivate in cities, as is revealed by many evidences from countries in Africa, Asia and Latin America (Smit et. al., 2001).

When every single person, from infant to elder, does not have sustainable access to nutritious, culturally enough food, then food insecurity or food poverty exists. On the other hand, food security exists when all people, individual, family, society, city and country have proper income to maintain the stability of their food system and ensures both individual and group sustainable daily and throughout the year access to a nutritious and culturally acceptable diet.

When the level of urban poverty increases and evidence indicates that food security and nutrition are worse among the urban poor than the rural poor, food security is becoming an increasingly critical issue. A study carried out by International Food Policy Research Institute (IFPRI) in eight big countries (representing two-thirds of the world population) found that in urban areas the poverty increasing more than in rural, and the existence of poverty moves to urban areas. Intra-urban deference between the rich and poor are very high although the average nutritional status of children in urban area is better than in rural areas. In cities, morbidity from diarrheal diseases, malnutrition and parasitic infections, and infant mortality are higher, up to three times, in lower income communities than in larger income ones.

it was found that the status of the poor food security is more difficult in urban areas than rural because: lower self-production and cash dependency to buy food is higher, urban areas have less social safety nets, and complex formal supply channels that are subject to failure. As they buy small amount and have to travel far away to reach places where food costs less, poor urban households always pay more on food than richer urban dwellers (Smit et. al., 2001).
The food costs of the non-farmer represent a substantial contribution of total household expenditures in most low-income communities. Approximately 40-70% of the family budget in urban areas of low-income countries is spent on food purchase. However, the poorest people in these cities spend 60-90% of their total income to purchase food, and thus often experiencing hunger when such price levels cannot be affordable. Urban agriculture can therefore make a crucial contribution to the poor urban households’ economy (Smit et. al., 2001).

Since urban farming is one of the essential food security components of community, it should be put into consideration for any strategy that seeks to achieve its objectives. Urban agriculture has a unique ability to strengthen access to food by low-income individual and even other vulnerable groups (Ander, 2015)

### 3.6 Indicators of household food security

Several indicators, that reflect the various dimensions of the problem, are used by different researchers to measure and analyze food security conditions in the developing countries. Of the most frequently used types of indicators to assess food security situation are food productions which include diversification, intensification and yield. Household income, total expenses, food consumption, share of total expenditure on food, calorie consumption, and the status of nutritional are also important measures to the food security status of a household (Riely et. al., 1999).

According to Hoddinott & Yohannes in (2002), household food security is measured by dietary diversity of household. This is the total number of various foods consumed by a person over a given time period. It may be a simple mathematical sum of the number of consumed various food groups. One person or more from a specific household can be asked about various food items that they have consumed in a given period of time, to collect data to measure food security status. These questions might be asked to different members of the household where the differences consumption in food amongst household members should be taken into consideration. The advantage of this method is that, the enumerators can easily train to ask such kind of questions while individuals generally can easily answer these questions. The weakness of this method is that this simple measure doesn't record quantities.
Hoddinott in (1999) also reported that the household food security can be measured using four ways. These are individual intakes, dietary diversity, household calorie acquisition and indicators of household coping strategies. The individual food intake method measures the amount of calorie or nutrient consumed by an individual within 24 hours. In this Thesis, dietary diversity was used due to assumptions constructed on the improvements in food availability, utilization, access and stability over the 12 months of the year at household level; most specifically due to engagement of the household in farming activity. It measures also how households adapt or cope to food shortages.

3.7 How Food Insecurity Drive to Conflict

The fact that conflict reduces food security directly is intuitive. Conflict diminishes food availability by affecting the production of the agriculture through the damaging of agricultural property in addition to destroying physical infrastructure and thus increases the risks associated with access to food markets which push local food prices up.

Food insecurity is not only a result of conflict; however it can also lead to conflict eruption. Key drivers of conflict have generally been appeared to include: poverty (Blattman & Miguel 2010); underemployment of young men (Taeb, 2004); income inequalities, land and natural resources (Macours, 2010); often combined with the pressure of population (Ostby et al., 2011); geographic characteristics; the existence of high-valued natural resources (Dube & Vargas, 2013) and poor governance (Fearon, 2010).

More recently, based on the study of Brinkman and Hendrix (2011), food insecurity has also been deemed as a source of conflict especially in the presence of fragile political regimes, a “youth bulge” (a disproportionally high share of young people in the population), the slow recovery of falling economic growth, weak economic development and high inequality among groups. Particularly, it has been found that the food prices increments strongly expand the risk of civil unrest and conflicts (Bellemare, 2015). For example, during 1970s, food riots took place in response to the increased food prices in Egypt, while the same happened in Jordan in 1980s and in Morocco

According to IFPRI, Food Policy Report (2015), in Egypt, deteriorating food security was a main reason for the revolution in January 2011. In order to protect household-level food security, the authority increased food subsidies as part of a social safety net program, which played a major role in protecting the poor. Yet, food insecurity and poverty continued rising and increasing dependence on cheaper, calorie dense food including subsidized commodities exacerbated existing obesity and malnutrition. The Egyptian experience shows that building household resilience should go beyond purely coping with and recovering from conflicts and crisis and three policy options are proposed: improving supply chain efficiency, improving targeting, and complementing and substituting.

In fact, food insecurity at the household and the country level is a main cause of conflict in Arab states comparing with the rest of the world; this confirms the widely believed perspective that food insecurity is one of the main factors that have sparked revolutions (Breisinger et al., 2012).

As reported by (Maystadt et al., 2014), the key clarification of this “Arab exceptionalism” is that all Arab states are assumed as food importers and the large majority of their people are net food consumers, and that makes Arab states and their residents highly vulnerable to global food price spikes such as those took place in 2008 and 2011.
Chapter 4

Research Methodology

This chapter has presented the research methodology that has been used in conducting the study. The adopted methodology to achieve this study uses the following approaches: reviewing the literature related to urban agriculture, questionnaire for gathering necessary data, and interview with representatives of relevant stakeholders in agricultural activities.

4.1 Research flowchart

This research consists of seven phases, summarized in figure (4.1), as follows;
1- The first one is to present the problems in order to establish research objectives.
2- The second phase of the research includes a review of theoretical and related literatures and describing the study area.
3- The third phase of the research focused on the preparation of the questionnaire, by distributing several copies of the questionnaire to the pilot study, where experts from governmental, non-governmental, local and international organization were communicated. The purpose of the pilot study was to prove that the questionnaire contents are clear to be treated in a proper way that helps in achieving the study objectives. The questionnaire was modified based on the comments and feedback of the experts.
4- The fourth phase of the research was the distribution of the questionnaires. The filled-collected questionnaires were used to analyze their contents in order to achieve the objectives of the research.
5- The fifth phase of the research included field interviews with stakeholders while their responses were analyzed.
6- The sixth phase of the thesis concentrated on analyzing and discussing the gathered data. The Statistical Package for the Social Sciences (SPSS 20) was used to conduct the required analysis.
7- The last phase of this thesis included the conclusions and recommendations.
4.2 Research objectives and related methodology employed

The study was aimed at evaluating the role of urban agriculture on food security. The research objectives steer the study in choosing the most appropriate research design and research methodology. This is reflected in Table (4.1) below.

<table>
<thead>
<tr>
<th>#</th>
<th>Research Objectives</th>
<th>Research method employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>To explore the importance of the urban agricultural and its effect on Gaza food security’s crisis.</td>
<td>- Literature review; - Questionnaire with community members - Interviews with relevant stakeholders</td>
</tr>
<tr>
<td>2-</td>
<td>To assess the role of urban agriculture for its practitioners, including those famers whose farms locate within the buffer zone, during the war of 2014.</td>
<td>- Questionnaire with community members - Interviews with relevant stakeholders</td>
</tr>
<tr>
<td>3-</td>
<td>To examine the availability of nutritious fresh food for household consumption and sale for the urban agriculture practitioners.</td>
<td>- Questionnaire with community members - Interviews with relevant stakeholders</td>
</tr>
<tr>
<td>4-</td>
<td>Investigate the socio-cultural conditions and job opportunities could be saved by implementing appropriate urban agriculture concepts.</td>
<td>- Literature review; - Questionnaire with community members - Interviews with relevant stakeholders</td>
</tr>
</tbody>
</table>
4.3 Research period

The study started on October 2017 when the first draft of the thesis proposal was approved. Review the literature was completed at the end of November 2017. One month was enough for testing the validity, piloting and questionnaire distribution and collection, all completed by the end of December, 2017. However, in March 2018, the data, analysis and discussion, conclusion and recommendation were completed.

4.4 Research Design

The purpose of this study was to uncover the contribution of urban agriculture in alleviating urban food insecurity in Gaza strip. After a thorough review of the literature, I concluded that a case study design would be the most appropriate design for my research. In this research, Beit Lahia city was the case study area and I present the current impact of urban agriculture on food security and other livelihoods using the questionnaire technique.

4.5 Sample characteristics and sample design

The study has been conducted in the research case study, Beit Lahia city, which is locating in the northwest of Gaza strip. This specific site was selected as a study area given that the performance of urban and peri-urban agriculture is relatively higher in this particular area comparing with other areas of Gaza strip as shown in figure (4.2).

In any research, interviewing or collecting data from the whole population would be challenging. However, identifying a representative sample from the population for the research, would be cost effective, the results would be more accurate, the speed of data collection would be quicker and there would be fewer challenges with the availability of participants for the research (Blumberg et al., 2008).

For the purpose of this study, the target population was composed of two distinct groups involved in urban agriculture, individual producers and stakeholders.
For the individual producers, there is no accurate or official number for the people who are involved in the urban agriculture in Gaza strip in any of governmental or international report. Therefore, we agreed, myself with the endorsement of my supervisor, to select 140 households who practices urban agriculture to participate in the study and to complete the questionnaires. However, 131 copies of questionnaire were collected after being filled by the respondents; two of them were excluded as they were not clear. Number of agricultural societies in Beit Lahia, as well as employees at Beit Lahia municipality, were contacted to help in reaching for those people who are involved in urban agriculture in Beit Lahia. Some of the participants were gathered in the same place and completed the self-administered questionnaires whereas others were completed individually by the participants in their houses. It is noted that the definition of food security was not clear to a number of the respondents, in my turn; I helped them to understand the meaning of this term and its profile in Gaza strip.

For the interview technique, representatives from stakeholder’s organizations, which were found in Gaza strip and who are involved in urban agriculture activities, have been carefully selected as participants of the study.

4.6 Questionnaire design

The contents of the questionnaire for this study were designed according to the literature review and were structured around the research objectives and gave direct
information as required by the study. Closed-ended questions allow the participants to select one or more of the choices from a fixed list of answers. The questionnaire comprised of four sections to accomplish this research’s aim, as follows:

1. Section one: General information about the respondents.
2. Section two: Information related to urban agriculture activities for the respondents.
3. Section three: The war impact on the practitioners of urban agriculture.
4. Section four: The role of urban agriculture on food security for the respondents.

The last version of the questionnaire was prepared in English language (attached in Annex 1), while the distributed version was in Arabic language (attached in Annex 2), since the respondents are Arabic-language natives and therefore to get more credible and realistic results where the questions of the questionnaire were derived from the study area and the literature review that presented in Chapter 2 and 3.

A draft questionnaire was prepared under the supervision of the supervisor who added/ deleted some questions and requested to test the content validity and reliability with experts in food security and agriculture in the Gaza Strip. However, the comments made by the experts were put into consideration and therefore they agreed that the questionnaire is suitable to achieve the goals of the study.

4.7 Pilot study

The survey instrument was piloted, as it is customary practice, to measure its reliability and validity and test the collected data. The pilot study was completed by distributing the prepared questionnaire to a number of academic referees and experts who have experience in the same field of the research components to get their remarks on the questionnaire.

Five experts were communicated to evaluate the validity of the questionnaire, they were asked to verify the validity of the main topics of the questionnaire and its relevance to the research objectives. Meanwhile, two experts in the statistics were asked to test the instrument used was statistically valid and that the questionnaire was well-designed to provide relations and tests among variables.
All comments and modifications were obtained and discussed with the study’s supervisor before being taken into consideration. Finally, the questionnaire was established with minor changes and additions.

4.8 Methods of Data Collection

In this study, the researcher has exploited both primary and secondary sources of data to collect the necessary and appropriate data. Thus, a combination of qualitative and quantitative data has been used as an input for the evaluation of the role of urban agriculture on food security. A variety of methods were performed by the researcher in order to achieve triangulation or confirmation of the same information by different sources thereby to increase the validity of the results. In light of this, interview and survey questionnaire have been used as the primary data gathering tools. The secondary sources include the use of journals, books, statistics and web pages.

Survey questionnaires have been administered to a sample of individual producers to gather the necessary quantitative information required for assessing the contributions of urban agriculture in reducing urban food insecurity at the household level.

However, the questionnaire contains simple questions, so it has some limitations as it has no control over respondents who may give general answers (Naoum, 2007). So, interviews have been conducted with urban agriculture stakeholders and key informants in order to find out the extent of the actual practices of urban agriculture and the policy support that is rendered to the sector and to collect the qualitative information that couldn’t be obtained through conducting the household survey.

4.9 Methods of Data Analysis

Analysis of data in any research involves summarizing the large of data gathered and presenting the results in a way that communicates the most important features. The study’s data analysis strategy or the specific procedures followed to address each of the research objectives and the nature or form of the expected results have been laid out.

For this study, the necessary data has been collected, analysed and displayed in numerical rather than narrative form. During this phase, the collected data has been checked and organized. Then the data has been analysed using the statistical package for the social sciences (SPSS 20). During which, appropriate forms of presentation were
obtained. Descriptive statistics, cross tabulations, including frequency counts, percentages, and other relevant data analyses presentation forms have been utilized in the study. The following statistical tools were used in the analysis:

1. Tabular display for the data.
2. Cross tabulations for the data.
3. Frequencies and descriptive analysis.
4. Normality tests.
6. Effect size (Cramer's V)
7. Mann-Whitney test.
9. Chi-Square test of independence.

4.10 Statistical Rules:
The following rules were used for different statistical tests:

1- Normality Test
Rule:

If P-value is smaller than the significance, $\alpha = 0.05$, then the data is not normally distributed and we should use nonparametric tests such as Mann-Whitney test and Kruskal-Wallis test.

If P-value is greater than the significance level, $\alpha = 0.05$, then the data is normally distributed and we should use parametric tests such as T-test and Pearson correlation coefficient.

2- Two independent samples: The Independent Samples Mann-Whitney test is used to examine if the two means are significantly different from each other.
Rule: If P-value is smaller than the level of significance, $\alpha = 0.05$, then there exists significant difference between the two means.

3- More than two independent samples: Kruskal-Wallis test is used to examine if the more than two means are significantly different from each other.
Rule: If P-value is smaller than the level of significance, $\alpha = 0.05$, then there exists significant difference among the means.

4- Chi-Square test is used for testing the relationship between two nominal (qualitative) variables.

Rule:
If P-value is smaller than the level of significance, $\alpha = 0.05$, then there exists significant relationship between the two nominal variables.
Chapter 5
Data Analysis and Discussion

This chapter is based on analyzing the data, presentation of descriptive and inferential statistics as well as discussions of the results. After data collection, data was subjected to clerical editing to ensure that all questionnaires were properly filled. Afterwards, data was entered into the computer using SPSS to generate descriptive statistics, which include simple frequencies and percentages of the responses. Such statistics have been used in the presentation and illustration of data in this chapter.

The Role of Urban Agriculture in Alleviating Urban Food Insecurity is analyzed in this Chapter as well as the 2014 war impact on the role of Urban Agriculture. This study was aimed at assessing the contribution of urban agriculture in alleviating urban food insecurity at the household level in Gaza Strip and how the Israeli wars against Gaza impacted the food security with particular reference to Beit Lahia city.

5.1 Presentation of the General Information results
5.1.1 Gender of Respondents

Figure (5.1) shows that 85.3% of the respondents "farmers" are males, while 14.7% of them are females. It is clearly shown that percentage of men is much higher than the women’s as it is not easy to reach out to the women in Gaza households due to religious and cultural considerations. Furthermore, men are responsible for the management of the filed works like seeding, tillage, irrigation, application of fertilizers and pesticides. While the work of the women limited to the harvest of the product and in many cases selling in the market. Therefore, in the peasant society, personal contacts and external relations are the men responsibility. In some cases, the farm belongs to widow who can perform the activities within the farm to raise their children.
5.1.2 Age of Respondents

Figure (5.2) shows that about 1% of the farmers are under the age of 20 years, 27.1% are from "21-30" years, 34.1% are from "31-40" years, and 38% of them are aged more than 41 years. It is concluded that the percent of youth amongst the respondents is a relatively high, because Urban Agriculture can be considered as a main source of income for Beit Lahia residents.

According to PCBS (2018), the percentage of 0-17 years accounted for 48% in Gaza Strip, and the percentage of 18-29 years accounted for 23.2% while the age of 60 years and over accounted for 4.3% of the total population of Gaza Strip.
Al-Najar in (2007) reported that the total amount of cultivated lands in the five Governorates of Gaza Strip witnessed a significant increase comparing with the areas recorded in previous years. The noteworthy increase in agricultural lands was due to the involvement of the young generation and former workers in Israel who lost their jobs due to the second Intifada and the siege imposed in the Gaza Strip to reopen their farms by planting new types of citrus and the moving towards intensify their agricultural activities, which was clearly recorded with the increase of greenhouses. Therefore, the expanding of urban agriculture projects would provide more jobs to people.

5.1.3 Level of Education of the Respondents

Figure (5.3) shows that 17.8 percent of the urban farmers are Illiterate, 31 percent passed Primary education, 24.8 percent passed Secondary education while 26.4 percent of them are holding university degrees in different fields.

![Figure (5.3): Level of education for the respondents](image)

The educational level of the urban agriculture practitioners targeted in this study considerably varies from the one that is illiterate to the level of university graduate. The 26.4% of farmers who hold university degree explain to some extend the unemployment records in the field of their specialization in the different field such as education, industry and construction engineering. This situation demonstrates people from different background of life are involved in urban agriculture using it either as a major source of livelihood, or additional source of livelihood or the adaptive or coping strategy.
According to (PCBS, 2012), the illiterate people in North Gaza Governorate in the age group of 15 years and over constitute 6.4% of the total of the Palestinian population of the same age group in the Governorate. Illiteracy is more prevalent among females than males since there were 3.4% of the total number of Palestinian males in the Governorate aged 15 years and over and 9.5% of the total number of Palestinian females in the Governorate of the same age group. The highest concentration of illiteracy was at rural areas 20.6% followed by refugee camps 6.9% and urban areas 6.1%.

For the uneducated farmers, reportedly they immerse in the Urban Agriculture as it is not easy for them to get another opportunities in the different sectors in Gaza strip due to present economic hardships and the high rate of unemployment. According to the ILO report (1972), to be uneducated young is the worst of all possible circumstances from the point of view of seeking work.

In a study performed by De Muro & Burchi (2007) on the relation between the education and food security, they found that hunger is highly correlated with the illiterate people. In the research case study, only 17.8 percent of the respondents have no formal education while most of the respondents received some form of education which implies that the level of food security in the case study should be relatively high. However, the level of food insecurity in Gaza strip is still high as pointed out in chapter “2” as the education does not protect the people from the impact of economic crisis that Gaza experience since many years, in addition to the vey saline and costly municipal water in all over Gaza strip, around 3 NIS per cubic meter, which may affect the quality and quantity of the crops. It is important to mention that some urban farmers in Gaza strip still depend on municipal water for their crops irrigation.

In the study area, it was noted while performing the survey that the non-educated urban farmers were hesitated while completing the questionnaire. This can be considered a big challenge for those researchers who use questionnaires for their study as it may effect on the credibility of the study.
5.1.4 Respondents’ Household size

Table (5.1) shows that 14% of the farmers’ household size are from "1-4" individuals, 25.6% are from "5-6" individuals, 37.2% are from "7-9" individuals and 23.3% of them have more than 10 individuals.

The Statistical analysis shows that farmers’ household size ranges from 1-15 individuals, with a mean of 7.6 individuals, Median of 7 individuals and Std. Deviation of 3 individuals.

Table (5.1): Household size of the respondents

<table>
<thead>
<tr>
<th>Household size (individual)</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>18</td>
<td>14.0</td>
</tr>
<tr>
<td>5-6</td>
<td>33</td>
<td>25.6</td>
</tr>
<tr>
<td>7-9</td>
<td>48</td>
<td>37.2</td>
</tr>
<tr>
<td>10 &amp; more</td>
<td>30</td>
<td>23.3</td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
<td>100</td>
</tr>
</tbody>
</table>

It is worth mentioning that the average household size in Gaza Strip is 5.6 individual according to PCBS (2018). In the meantime, the population of the northern governorate of the Gaza Strip is characterized by three distinct sectors: 83.4% of the population live in urban areas, 15.6% live in refugee camps and only 0.1% of the north governorate population live in rural areas (PCBS, 2012). The above-mentioned data indicates that the density of household in the study area is a relatively high, which support the idea that Gaza Strip is amongst the most populated area in the globe and most of the population are young generation.

5.1.5 Monthly Income of the Respondents

The data analysis shows that the monthly income urban farmers ranges from 100-3000 NIS, with a mean of 710.8 NIS, Median of 600 NIS and Std. Deviation of 505.4 NIS.

The income believed to be much more of what the respondents reported, as they focus on cash and export crops which make large income. However, while performing the survey, it was noted that the urban farmers were behaving in a way to draw the
attention and the sympathy of the INGOs/NGOs seeking for more support and more benefits form the fund donations.

According to (Zhou, et al., 2014), the income status of the household influences the level of food security, while the poverty, which decreases purchasing power at the household level, is considered as a main factor to food insecurity.

Since the International poverty line varies between $1.25 and $2.50 per person per day (the poverty line in Palestine is $1.8 according to PCBS, 2016a), the majority of the Urban Agriculture practitioners in the area of the study are not suffering from poverty, taking into consideration that approximately 39% of Gaza people are suffering from poverty (PCBS, 2016a). Noticeably, farmers in Beit Lahia did not pay for water as an asset, but only pay for the operation of pumping (A-Najar, 2011). Thus, the low farms input cost makes them profitable and explains the sensible income of the urban farmers, and therefore the HH food security status sounds good. However, water security is questionable in the long run if the current practice is continued, due to the very high consumption of irrigated water for the crops which are cultivated in green-houses, particularly strawberry which consume more than 1150 m3/dunam/year (PWA, 2013b)

5.2 UA activities in Beit Lahia

5.2.1 Type of House for the Urban Farmers

The majority of the respondents (80.6%) are living in multistory buildings, as shown in figure (5.4). This percent gives an important indicator that the UA practitioners have good livelihood conditions which could also be seen from their monthly income.

However, approximately 20% of the respondents are still living in Asbestos or steel as shown in the below table. The type of the house depend mainly on the location, the houses in the village where greenhouse is the common practice are multistory building, while the temporarily houses from Asbestos or steel are in the border areas as the farmers use it during the working hours and their willing not to construct permanent concrete houses due to the continues invasion of the Israeli force. It is found that most of them have started the UA activities in the past couple of decades due to the high records of unemployment which increased after the blockade.
5.2.2 Area of the used land for UA

The Statistical analysis shows that the area of the used land for the respondents of UA practitioners ranges from 0.5 -20 dunum, with a mean of 2.9 dunum, Median of 2 dunum and Std. Deviation of 3.2 dunum. One of the main reasons to small area of each farmer is the fragmentation of land ownership that often covers wide areas in Gaza, due to the traditional legacy system and partitioning the land to all family members for generations. In interview with GUPAP official, he reported that the partitions of agricultural property (1 to 3 dunum per farmer) imply that UA in Gaza is often being performed on small land areas. However, the water scarcity and low quality of available inputs in Gaza strip leads to low land investments and low productivity (Personal interview conducted by researcher, 2018).

Also based on findings, the mean of the lands area locate within the buffer zone is 2.82 dunum, and in the village is 3.38 dunums while in the city, the mean is only 1.81 dunum, as shown in table (5.2). It is noticed that the area of the lands locate in the buffer zone or in the village is larger than those locating inside the city. This is because of the vacant lands which can be used for cultivation inside the city are very limited due to the high rate of urbanization in Gaza strip, which is one of the most inhabited areas in the world.
Table (5.2): Land area in respect to its location

<table>
<thead>
<tr>
<th>Location of the farm</th>
<th>Mean of the lands area (dunum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>1.81</td>
</tr>
<tr>
<td>Buffer zone</td>
<td>2.82</td>
</tr>
<tr>
<td>Village</td>
<td>3.38</td>
</tr>
</tbody>
</table>

5.2.3 Land Ownership

According to (MOA, 2014b), agriculture is the dominant sector Gaza's economy and its contribution reach to 32 percentage of the overall economic production. As per the figure (5.5), around 55 percent of the urban farmers' land ownership are private or self-owned, 1.6 percent are owned by Waqf and 42.6 percent of the urban farmers are using rented lands for their UA activities.

The relatively high percent of the urban farmers, who have rented lands to practice the UA, can be considered as a good sign to the benefits of such activities.

![Figure (5.5): Land ownership](image)

5.2.4 Types of agriculture crops

According to the agricultural census conducted by MOA in cooperation with PCBS (2011), there are over 100 main crop types in Gaza strip, and fruit trees are the most dominant group.
Based on the data gathered from the respondents, the vegetable and fruit and permanent trees production are the most important production system in Beit Lahia, with less percentage of other types of productions.

Figure (5.6) shows that 32.6 percent of the agriculture crops are "Permanent trees", 58.9 percent are "vegetables and fruits", 0.8 percent are "fodder" and 7.8 percent of agriculture crops are other types. The type of agricultural crops in the study area match the overall agricultural type in the Gaza Strip (MOA, 2011), but the high percentage of vegetables and fruits cultivation in Beit Lahia is due to its good quality water which is using for the irrigation. Brackish water could be utilized to irrigate crops which can tolerate salinity (FAO, 2008).

![Bar chart showing the percentage of different types of agricultural crops](image)

**Figure (5.6): Type of agriculture crops**

### 5.2.5 Main source of irrigation water

In Gaza Strip, there are about 4000 Agricultural legal water wells and more than 7765 illegal Agricultural wells distributed all over the strip (PWA, 2016).

In Beit Lahia city, according to the result of the respondents, the majority of them depending on the wells as 42.6 percent are using their own water wells as one of the sources to irrigate their crops while 44.2 percent buy the water from private water wells which owned by neighbors. Only 13.2 percent of the respondents are depending on municipal water wells as a source of irrigation to their crops as shown in figure (5.7).
The using of municipal water wells to irrigate crops is illegal practice of the farmers, because the municipal water supply system considers only the domestic use. The main outcomes of the study conducted by (Al-Najar et al., 2013) that farmers use the domestic network illegally for irrigation purposes leading to high percentage of unaccounted for water which leads to higher water consumption per capita in Beit Lahia, apparently exceeds 230 l/c/d according to water well production and the unaccounted for water, more than 60% in semi urban quarters where green houses are the main agricultural practice. The difference between supply and demand indicates that the farmers use illegal connections to irrigate the adjacent agricultural areas (Al-Najar et al., 2013).

Figure (5.7): Main source of irrigation water

5.2.6 Main reason for respondents to start UA

Figure (5.8) shows that the unemployment was ranked as the first reason for the respondents to start UA with 63.0 percent in the area of the study. It is clearly shown that the respondents aim to have job opportunities by practicing UA to improve their HH income and therefore the food security will be improved.
Low HH income was ranked as the second reason with 59.1 percent. It is also noted that the HH low food supply plays an important role to motivate the respondents to start UA with 52.8 percent in the area of survey. However, only 15.7 percent started the UA to obtain safer food.

Also, the key informant responses to the interview question on the reason for HH to engage in urban agriculture reveals that the households are practicing UA due to unemployment problems and low income.

The urban farmers behavior agree with study conducted by Al-Najar (2014), where Urban agriculture development started after the siege imposed on the Gaza Strip in 2007 where many families lost their work opportunities in the city. Beside the return of farmers to their land which had created seasonal jobs, the government in Gaza Strip also offers the state-owned for farmers to enhance the agricultural sector and therefore to minimize the unemployment records.

5.2.7 The ultimate use of UA product for the respondents

Figure (5.9) shows that 16.3% of the respondents use UA product to supply their HH with food and 9.3% of them used to sale the product in the market.

The ultimate use of the products for more than two-third of the respondents, was HH food supply and market sale with 74.4 percent. Such phenomena, which are being practiced by the urban farmers, help them to secure the household livelihood by
reducing expenses on consumption the high price products and alleviate the local market expenditures at somehow.

Both cases, whether the products were sold in the market or were consumed by the HH, can be considered as indicators to the improvement of the food security for the HH level.

![Figure (5.9): The ultimate use of UA product](image)

5.2.8 The labor activities contributors for the UA farms

The findings presented that family labor contributes in the labor activities for UA respondents’ farm by 69.5 percent. Around 50 percent of the respondents hired labors to take part in the farm’s labor activities. In the meantime, the UA practitioners themselves contribute by 71.9% in the labor activities of their farms. See figure (5.10).

The data confirms that a high proportion of urban farmers prefer to do UA activities by one of the family members or the farmers themselves, apparently to safeguard their crops against theft. This finding may also refers to the high density of the Beit Lahia families as presented earlier. According to the PCBS, the average number of the families of the farmers is more than 6 sons and daughters.
According to the MOA (2014b), the agricultural sector had contributed to 30.4 percentages out of the total employment in Palestine, with approximately 91 thousand workers, in addition to the large number of unaccounted informal employed workers, especially amongst women. Reportedly, 20.9% of the West Bankers and 8.4% of the Gazan have been earning from the agricultural sector either as a major or a supplementary income.

Mougeot (2000) notes that experiences gained from many cities of the world where UA and PUA is better regulated indicate that the beneficial effect of farming in cities are provision of better poverty alleviation, nutrition and more jobs creation.

All of the interviewees, representatives from FAO, UNDP, GUPAP, ACAD, MOA and UAWC, suggested that UA contributes in jobs creation either for its practitioners or by bringing external labors.

5.2.9 The role of the woman in UA

Women have the ability to convert agricultural products into food and nutritional security and they are primarily responsible for taking care and feeding of the family (Slater, 2001). And according to World Bank (2006), food processing and production within and around cities participate in supplying the urban poor with safe, affordable, and reliable food and at the same time improve income generation and create more jobs to a large number of women.

The data in figure (5.11) below reflects that 78.3 percent of the respondents believe that household woman plays an important role in UA activities, while 21.7
percent suggest that the women are not involved in UA activates. Urban agriculture is taking place close to home, making it more suitable for women as they do not need to leave their children or their household burdens to go far for the farms. According to (Korongo, 1999), women are an important category of economic and social actors who facilitate the role of the family in human survival in their various multiple roles. And therefore seemingly the present economic hardships in Gaza strip force women to accept this responsibility, whether or not there is a cultural obligation for women's productive role.

![Figure (5.11): The role of the woman in UA](image)

When the key informant from different organizations were asked whether the Gaza HH women partake in UA activities or not, all of them confirmed that the women in Gaza play an essential role in the agricultural sector. GUPAP and UAWC official further added that 50 percent of Gaza agro work is shouldered by women (Personal interview conducted by researcher, 2018).

5.2.10 The Problems faced by UA practitioners

UA can be a health hazard, if it is not regulated and well-organized. UNDP (1996) stated that there are a number of cases that urban agriculture practicing brought health problems to its practitioners. Use of polluted rivers, wastewater and untreated compost may contaminate crops and livestock and then they might become health hazards for human beings.
For the respondents of the study survey, 47.2 percent of them reported that they face health problem as can be shown in figure (5.12). 38.6 percent face Pollution problem. Diseases and pollution are not limited to farmers’ society but to the whole residents of Gaza Strip due to polluted and contaminated water resources. This may contribute to the spread of water-related diseases. The diseases among the people were linked with source of drinking water, sewage flooding and age of water, intermittent water supply and wastewater networks (Yassin et al., 2006). 39.4 percent assumed that lack of technology is one of the problems that they face while practicing UA activities. However, according to the survey, the main problem that UA practitioners experience is the lack of governmental support as 75.6 percent cited. The MOA official, in the interview performed with him by the researcher, justified the lack of the governmental support due to the blockade imposed on Gaza, which badly impacted all Gaza sectors, not only the agricultural one.

Dispute with neighbor, Vandalism and food safety were amongst other problem that the respondents experience, but with less percent.

Figure (5.12): The problems faced by UA practitioners

The main challenges in the implementation of UA are that most of urban planners and environmental managers, have more consideration to the economic benefits of UA while doesn’t pay enough attentions towards other benefits of UA. Quon (1999) found
that the government response improperly in the land use planning process without realization of the social, environmental and economic advantages of UA and therefore provide less resource, technical and financial support.

5.2.11 Farmers' suggestions towards alleviating the Problems they face

Respondents made several suggestions in order to alleviate the problems that urban farmers face. The majority of the respondents demanded the intervention of all stakeholders; especially the Ministry of Agriculture and NGOs/INGOs, to either assist farmers with farm inputs (such as fertilizers, water, pesticides, and seeds) or even with cash assistants. Some of the respondents requested security support to protect their crops from theft and some propose that the Ministry of Agriculture should provide the farmers with awareness sessions to advise them on farming techniques that would enhance their produce. However, the rest asked for technological support for their cultivation.

5.3 The impact of Israeli assault of 2014 on Urban Farmers

5.3.1 Assault Damage Assessment

Agricultural fields in the different area of Gaza Strip faced severe destruction during the war. Gaza MOA in 2015 reported that 30% of agricultural land was damaged during the 2014 war and a large number of the wells used for irrigation, irrigation systems, productive trees, greenhouses, agricultural equipment and post-harvest facilities were totally destroyed or severely damaged, causing shortages in the fresh produce in Gaza markets. See table (5.3).

Meanwhile, according to a report published in 2014 by UNITAR in cooperation with UNOSAT, due to 2014 war approximately 1,800 hectares of agricultural fields have been razed or severely damaged. In addition, 657 greenhouse structures were destroyed, of which 214 severely damaged and 392 moderately damaged. These greenhouses were easily damaged as they often made of plastic sheeting and when explosive devices blew up nearby, and were often directly targeted by different type of weapon or even subjected to leveling operation.
Table (5.3): Gaza agricultural damages due to 2014 assault

<table>
<thead>
<tr>
<th>Sub-Sector</th>
<th>Type</th>
<th>Unit</th>
<th>Damages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Production</td>
<td>Greenhouse totally damaged</td>
<td>Dunum</td>
<td>357</td>
</tr>
<tr>
<td></td>
<td>Greenhouse partially damaged</td>
<td>Dunum</td>
<td>2,862</td>
</tr>
<tr>
<td></td>
<td>Open Field Vegetables</td>
<td>Dunum</td>
<td>17,548</td>
</tr>
<tr>
<td></td>
<td>Trees Orchards (dunum)</td>
<td>Dunum</td>
<td>12,878</td>
</tr>
<tr>
<td></td>
<td>Rain-Fed Crops (dunum)</td>
<td>Dunum</td>
<td>1,170</td>
</tr>
<tr>
<td></td>
<td>Water Tanks for farmers and Breeders</td>
<td>Tank</td>
<td>4,788</td>
</tr>
<tr>
<td></td>
<td>Water Carrier Lines</td>
<td>Km</td>
<td>1,393</td>
</tr>
<tr>
<td>Water Wells</td>
<td>licensed wells</td>
<td>Well</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>unlicensed wells</td>
<td>Well</td>
<td>237</td>
</tr>
<tr>
<td>Livestock</td>
<td>Sheep &amp; Cattle Farms</td>
<td>Farm</td>
<td>1,532</td>
</tr>
<tr>
<td></td>
<td>Poultry Farms (Layers &amp; Broilers)</td>
<td>Farm</td>
<td>922</td>
</tr>
<tr>
<td></td>
<td>Poultry Farms (Layers &amp; Broilers)</td>
<td>Farm</td>
<td>922</td>
</tr>
</tbody>
</table>

Source: (MOA 2015)

5.3.2 Location of the respondents’ farms

Figure (5.13) shows that 13.2% of the farms are located within the city, while 53.5% of them are located in village.

![Figure (5.13): Location of the farm](image)

After Israel withdrawal from Gaza Strip in 2005, a buffer zone was established along Gaza border with Israel, in which Gaza residents were banned entry. This zone has stretched 300 meters from the border with Israel into Gaza since 2010. This area, which is either entirely and officially off-limits or effectively restricted due to the high–
risk associated with entering it, compose approximately 17% of the total area of the Gaza Strip and is home to some 35% of its agricultural farmland. As per the data obtained by the respondents, 33.3 percent of them have their farm located in the buffer zone. According to OCHA report (2014), during the 2014 war, 44% of Gaza within a 3 Km wide strip declared as a ‘buffer zone’.

5.3.3 The effect of the 2014 assault on UA practitioners

Wars have a negative impact on the different aspects of the community include the agricultural Economical sectors. The farmers are subject to experience damage to the natural and to the technical components include the damage of irrigation schemes, livestock death and deforestation. Economic destruction includes demographic changes and population shifting which affects labor supply; creating additional pressures on local resources and the deteriorating or destroying of rural infrastructure (Teodosijevic, 2003).

During the 2014 war, the huge loss of civilian life and the intensive random shelling attack by Israeli force against all Palestinian assets in Gaza strip, tens of thousands of Gazan have fled their homes seeking for safer havens, mainly in the northern area and in eastern parts of Gaza City.

<table>
<thead>
<tr>
<th>Have you left your house/ farm during the war?</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>117</td>
<td>90.7</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>9.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>129</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If yes, could you reach to your farm during war?</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>18</td>
<td>15.4</td>
</tr>
<tr>
<td>No</td>
<td>99</td>
<td>84.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>117</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If no, did UA encourage you to stay in your house as your food can be saved?</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10</td>
<td>83.3</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>16.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Table (5.4) shows that 90.7 percent of the respondents have left their house/farm during the war. Meanwhile, only 15.4 percent of those who left their farms could occasionally reach their farms to perform some activities to their crops while 84.6 percent couldn’t.

For those 9.3 percent who didn’t evacuate their farms or homes during the 2014 war, 83.3 percent of them believe that their engagement in UA activities encouraged them to stay as their food could be saved. In an interview with UNDP official, he said that the war and the ongoing blockade have severely impacted the agricultural sector especially the fields located in the buffer zone. He further said that the three wars against Gaza in the past decade directly affected the quality of the soil used for cultivation. (Personal interview conducted by researcher, 2018). According to the MoA official, the agricultural sector can be classified as the most affected due to the last three wars against Gaza in 2008/2009, 2012 and 2014. He also affirmed that the fishermen and the farmers, mainly in the buffer zone, were affected by the ongoing siege and aggression by Israeli forces. The siege also limited the export of the agricultural crops, prevented the entry of some kind of production and inputs, which in turn badly impacted on the UA activities in Gaza strip (Personal interview with MOA official, 2018).

As per the data gathered from the survey for the area of the study, 88.4 percent of the respondents were affected due to 2014 war, either partially or severely. However, Only 11.6 percent of the respondents had their agriculture filed unaffected.

For the affected UA practitioners, as can be seen in the figure (5.14), 61.9 percent of them were affected by having their agricultural land razed or damaged. Around 29.7 percent of them lost a number of cattle or poultry as a result of the war. The houses of 55.9 percent of the respondents were partially or wholly damaged, while 9.3 percent of them lost at least one of their family members due to 2014 the war.
5.4 Role of UA on Food Security

5.4.1 UA impact on the HH monthly income

Urban agriculture has emerged as a significant contributor to address poverty and to improve food security, as reported in chapter “2”.

Figure (5.15) shows that 17.8% of the farmers’ HH income improved due to their engagement in UA, 63.6% of the income changed to some extent and only 18.6% of the farmers’ HH income didn't improve while practicing UA. The results revealed that the income changes for the respondents who have smaller areas of used land in UA are less than the income changes for those who have larger areas, while the respondents who use the products for own consumption have their income unchanged.
It statistical analysis reflects that those respondents, who earn their income from different sources in addition to UA, had their income improved due to their engagement in UA. The changes in monthly income range from 100 - 3000 NIS with a mean of 564.4 NIS, Median of 500 NIS and Standard Deviation of 424.8 NIS. Therefore, practicing the different types of UA activities have contributed in the improving the economic situation level of the household.

This result compatibles with the result of the study of Maxwell (2003); when reveals that urban agriculture can be a main or a secondary source of income, can directly provide access to large number of nutritionally rich foods at the household level (fruit, vegetable, meat) and can improve the of household food consumption stability.

5.4.2 UA contribution in HH food security

The food security and nutrition is the most important asset of the UA contributions (Veenhuizen, 2014). Also, UA contributes to improved food availability status as reported by Bryld (2003).

Table (5.5) shows that 61.2 percent of the respondent are feeling food secure due to engagement in UA, 28.0 percent are feeling food secure to some extent while 8.5% are feeling food insecure and 2.3 percent of the urban farmers' feeling about food secure are vary from one year to another.

<table>
<thead>
<tr>
<th>Are you feeling food secured due to engagement in UA?</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food secure</td>
<td>79</td>
<td>61.2</td>
</tr>
<tr>
<td>to some extent</td>
<td>36</td>
<td>28.0</td>
</tr>
<tr>
<td>Food insecure</td>
<td>11</td>
<td>8.5</td>
</tr>
<tr>
<td>Vary from one year to another</td>
<td>3</td>
<td>2.3</td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
<td>100</td>
</tr>
</tbody>
</table>

In total, approximately 89.2 percent of the respondents are feeling food secure due to their engagement in UA. This high percent demonstrates that practicing UA plays an important role to improve the HH food security.
According to the respondents, they are feeling food secure due to one or more of the following reasons:
- Increased food availability of HH
- Increase and diversified source of income for the HH.
- Providing more job opportunities.

However, the reason for those little who are feeling food insecure is at least one of the following:
- Lack of production
- Lack of input/ seeds for planting
- Low market demand
- Threat of pollution
- And/ or pesticide/ herbicide usage

The first three options of the above are clear sign to the deteriorated economic situation in Gaza strip which in turn impacted the food security situation in Gaza strip, even for those who are practicing UA. Based on interviews with key stakeholders in UA filed, the Director General of extension and rural development in MOA assumed that UA is a main tool to overcome the food security crisis in the developing countries. Representatives from two NGOs, the coordinator of GUPAP and the general manager of UAWC, both reported that sustainability of urban and peri-urban farming communities contribute in achieving food security and sovereignty by making the best use of available resources. FAO project coordinator and UNDP program coordinator (both belonging to UN entities) said that UA is provide food to the civilians in a timely manner with acceptable cost and better quality. In a separate interview with the director of CBO ACAD organization, he pointed out the UA plays important role to improve food security for its practitioners (Personal Interviews conducted by researcher, 2018).

5.4.3 Number of meals a day for UA practitioners

Figure (5.16) shows that 1.6 percent of the respondents’ HH have one meal in 24 hours, 24 percent have two meals while the majority with 72.1 percent of the households in the survey could afford three meals a day, and 2.3% of them have 4 meals per day.
Figure (5.16): Number of meals a day for UA practitioners

The majority of the households who practicing UA have three meals a day, as per the findings. This is strong evidence that UA contributes to improved food availability and therefore food security for the household level.

5.5 Type of UA and its relation with the source of income

In Chapter “3”, it was reported that urban agriculture includes poultry, animals, rabbits, bees and other indigenous animals in addition to food crops and fruit trees grown in cities. In many cities, urban fish production is also part of the food system (Drescher & Iaquinta 1999).

According to (MOA & PCBS, 2011), Gaza Strip agricultural sector has a wide range of cultivated crops. There are over 100 main crop types, and fruit trees are the most dominant group.

As shown in figure (5.17), the types of urban agriculture practiced by the sample urban farmers are categorized into four subsystems including poultry production, dairy production, fishery farm and agriculture crops production. Poultry is one of the activities of UA practiced by farmers' families by 21.7 percent, Diary by 5.4 percent, Fishery farm by only 3.9 percent and the Agriculture crops production by 86.8 percent.
Figure (5.17): Type of activity/ies of UA practiced by the family

As indicated above, urban agriculture in Beit Lahia city includes different types while the farmers practice one or combinations of these. It is clear that the agriculture crops production is the most important production system in Beit Lahia as the majority of urban farmers practice it. This is because of the high market demands on this type of production as well as its acceptable price for the low, medium and, of course, high income families, comparing with the other types of UA activities.

The urban farmers depend on one or more of the mentioned factors as sources of income, as per the figure (5.18). As shown, 89.1% of urban farmers are depending on "selling from agriculture produce" as a source of income. Meanwhile, 16.3% depending on "selling animal produce", 3.9% depending on "Fishery", and 9.3% of them are depending on charity or relatives, and 5.4% of the respondents have other sources for their income.
The results of the two figures above are very logical and making sense. It is highly reasonable that the majority of urban farmers who produce agricultural crops are, in the meantime, depending on these crops for their income when they use them for market selling. In table (5.6), which shows the measure of association between source of income and type of activity/ies of UA practiced by the respondents, the Pearson Chi-squared value of 81.322 with p-value 0.000 and effect size equals 0.374 indicate strong association between two variables. Therefore, it is concluded that source of income and the type of activity/ies of the urban farmers are not independent of each other. In other words, these variables are significantly related.

**Table (5.6): Measure of Association between type of UA and the source of income**

<table>
<thead>
<tr>
<th>Type of activities</th>
<th>Source of income</th>
<th>Chi Squared</th>
<th>P-value</th>
<th>Effect size (Cramer's V)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>selling from agriculture produce</td>
<td>selling animal produce</td>
<td>Fishery</td>
<td>depend on charity or relatives</td>
</tr>
<tr>
<td>Poultry</td>
<td>N 19</td>
<td>E 29.2</td>
<td>1</td>
<td>2.2 5</td>
</tr>
<tr>
<td></td>
<td>% 14.1%</td>
<td>51.5%</td>
<td>10.0%</td>
<td>31.3%</td>
</tr>
<tr>
<td>Dairy</td>
<td>N 5</td>
<td>E 9.0</td>
<td>6</td>
<td>2.2 1</td>
</tr>
<tr>
<td></td>
<td>% 3.7%</td>
<td>18.2%</td>
<td>10.0%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Agriculture crops</td>
<td>N 107</td>
<td>E 89.8</td>
<td>9</td>
<td>3 10</td>
</tr>
<tr>
<td></td>
<td>% 79.3%</td>
<td>27.3%</td>
<td>30.0%</td>
<td>62.5%</td>
</tr>
<tr>
<td>Fishery farm</td>
<td>N 4</td>
<td>E 7.0</td>
<td>5</td>
<td>16.3</td>
</tr>
<tr>
<td></td>
<td>% 3.0%</td>
<td>3.0%</td>
<td>50.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

* The relationship is significant at 0.05 level

N: Observed count, E: Expected count
In separate interviews with GUPAP and MoA official, both have agreed the above result when they stated that those involved in the different types of UA are considering these activities as a livelihood strategy and to be the main source of income for their families.

5.6 The interrelation between percent of food purchase and the type of UA for household

Figure (5.19) shows that 7% of the farmers spend less than 20 percent of their annual income on buying food, 14.7% of the respondents are spending between "21-30" percent, 31.8% of them are spending from "31-40" percent, and 46.5% of the urban farmers in the survey area are spending more than 40 percent of their annual income on buying food for their family consumptions.

![Pie chart showing percent of food purchase for the household]

**Figure (5.19): Percent of food purchase for the household**

Type of activity/ies of UA practiced by the family was presented in figure (5.17). However, table (5.7) shows the measure of association between percent of food purchase and the type of UA activity for household.

The Pearson Chi-squared value of 3.184 with p-value 0.364 and effect size equals 0.145 indicate a weak association between spend on buying food and type of activities of UA practiced by the family. It can be concluded that percent of food purchase and the
type of UA activity for household are independent of each other. In other words, these two variables are significantly not-related.

**Table (5.7): Measure of Association between percent of food purchase and the type of UA for household**

<table>
<thead>
<tr>
<th>Type of activity/ies</th>
<th>spend on buying food Less than 30</th>
<th>30 and above</th>
<th>Chi Square</th>
<th>P-value</th>
<th>Effect size (Cramer's V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poultry</td>
<td>N</td>
<td>9</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>6.6</td>
<td>21.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>25.0%</td>
<td>16.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dairy</td>
<td>N</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>1.7</td>
<td>5.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>8.3%</td>
<td>3.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>agriculture crops</td>
<td>N</td>
<td>23</td>
<td>89</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>26.5</td>
<td>85.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>63.9%</td>
<td>76.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fishery farm</td>
<td>N</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>1.2</td>
<td>3.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>2.8%</td>
<td>3.4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The relationship is significant at 0.05 level

N: Observed count, E: Expected count

In Gaza Strip, the households expend more than one-third of their monthly income on foods according to PCBS (2016a). However, based on the literature study in chapter “3”, households that practice urban agriculture are more likely to have access to a wider variety of nutritious foods such as animal and vegetables products. In the Global Monitoring Report (2012), it was reported that the poor households in developing countries spend 50-70 % of their income foods purchasing. However, practicing UA will contribute in saving food for the poor and then they will spend less to purchase food.

However according to the statistical analysis, in the area of the survey, it was not surprised that UA practitioners still spend a lot to purchase foods to meet their family requirements due to the modest productive capacity for the UA household, given that UA is, first, seasonal, and secondly, the gardens are small to support a family throughout the year.
It is also found that the UA practitioners in Beit Lahia city focus on cash crops and export such as strawberries and ornamental flowers, rather than food crops which contribute to feed the family members of the household. And therefore UA practitioners still use part of their earned income to purchase food to their families. Additionally, shifting from food crops to cash also force Gaza to import certain field crops, vegetables and fruits which resulting price increases and then affecting the local food security.

There is a need to the people who partake in UA to re-focus on food crops such as vegetables, fruits, animal products, and fish, to strengthen their food system.

### 5.7 The correlation between the motivation behind practicing UA and the benefits of the funded UA projects

Figure (5.20) shows that 95.2% of the farmers were encouraged by their "Own interest" to engage in UA, 1.6% encouraged by "governmental support ", 17.5% " NGO/INGO" and 1.6% encouraged by "UN" and 3.2% of them are encouraged by other things. It is also noted that some respondents were motivated by more than one factor such as self-motivation in addition to a governmental or UN support.

It is clear that most of respondents were self-motivated to practice the UA, which gives important indicator that UA practitioners are aware of its benefits and so that they taking part in it.

![Figure (5.20): The motive encouraged the respondents to practice UA](image-url)
And as shown in figure (5.21), 46.5 percent of urban farmers benefited from one of the funded UA projects in Gaza strip, while 53.5 percent of them were not benefited.

![Did you benefit from one of the funded UA projects in Gaza strip?](image)

**Figure (5.21): The contribution of the funded UA projects in Gaza strip**

The above-mentioned result, in figure (5.21), indicates that the organizations in Gaza, whether governmental or non-governmental, are not working enough to financially support the UA practitioners in the Beit Lahia.

In the able (5.8), which shows the measure of association between encourage to engage in UA and get benefit from one of the funded UA projects in Gaza strip, the Pearson Chi-squared value of 8.776 with p-value 0.012 and effect size equals 0.242 indicate strong association between the encouragement way for the urban farmers to engage in UA and if they get benefits from one of the funded UA projects in Gaza strip. Thus it can be noticed that the two variables are not independent of each other. In other words, these variables are significantly related.

From the statistical analysis, it can be concluded that the UA practitioners who were encouraged by one of the UA stakeholders were benefited from one of the funded projects within Gaza strip.
Table (5.8): Measure of association between the motivation behind practicing UA and the benefits of the funded UA projects

<table>
<thead>
<tr>
<th>Who encouraged you to engage in UA</th>
<th>Did you benefit from one of the funded projects</th>
<th>Chi Square</th>
<th>P-value</th>
<th>Effect size (Cramer's V)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own interest</td>
<td>N 53</td>
<td>67</td>
<td>8.776</td>
<td>0.012*</td>
</tr>
<tr>
<td></td>
<td>E 60.0</td>
<td>60.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% 70.7%</td>
<td>89.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Governmental support</td>
<td>N 2</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E 1.0</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% 2.7%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NGO/ INGO /UN and other</td>
<td>N 20</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E 14.0</td>
<td>14.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% 26.7%</td>
<td>10.7%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The relationship is significant at 0.05 level

N: Observed count, E: Expected count

According to Smit et al (2001), it was found that stakeholders in urban farming are all those affected by it, or affecting it. And that include the urban farmers themselves, people involved in the post-production stages, suppliers of inputs and services to urban farmers, the local government, NGOs and landowners. In Gaza strip, UN and INGOs are also can be considers as stakeholders as they are playing important roles in helping UA projects.

MOA representative in Gaza said, in a personal interview in 2018, that the ministry is working to train and to educate the farmers in Gaza strip, and it will continue support and develop UA. However, he added that the ministry does not have special budget to support or to fund UA practitioners due to the blockade imposed on Gaza strip.

In a separate interview with the agriculture program coordinator at UNDP, he said that his organization improved the capacity building of the UA practitioners on the using of fertilizers and new technique of cultivations. Also UNDP provides UA practitioners with temporarily cash support via job creation program. He further admitted that his
organization is not doing enough to improve Gaza UA situation because the donors now prioritizing to reconstruct Gaza after three wars took place in the past decade.

FAO representative also agreed with the UNDP one. He said that FAO supporting UA practitioners by providing them with fertilizer, seeds, pesticides and cash support. (Personal interview conducted by researcher, 2018)

The coordinator of GUPAP, the general manager of UAWC and ACAD director were interviewed separately. Their institutes also provide UA practitioners with fertilizer, seeds, pesticides and cash support, but in occasional fashion. However, they added that they have a limited capacity to support UA projects in Gaza due to lack of governmental support, lack of donors interesting in UA and lack of real partnership relation between local and international organizations working in Gaza.

All of the interviewees’ respondents agreed that Food Security, Job opportunities and Healthy food are motivating the household to engage in UA in Gaza strip. (Personal interviews conducted by researcher, 2018)

5.8 Correlation between the main objective for UA engagement and food gain during the war

Many worldwide urbanites have practiced UA as a livelihood strategy and source of income and to increase the efficiency of national food system (FAO, 2007). And according to UNDP report in 1996, urban farming improves social equity by providing its practitioners with an opportunity to earn additional income.

Figure (5.22) shows that 86% of the respondents’ main objective to engage in UA is being Major source of livelihood. The main objective for 9.3% of the respondents to engage in UA is being additional source of LH while only 4.7% of the respondents answered that "Survival/ Adaptive strategy to cope the difficult situation" is the main objective for them to practice UA.
Figure (5.22): The main objective of the HH to engage in UA

According to Teodosijevic (2003), as a consequence of conflict which normally has bad impact on the agriculture, food production is usually reduced and even may collapses, causing hunger and starvation and forcing large numbers of people to evacuate their homes seeking for safer havens.

The association between conflict and food security is intricate and dynamic. Based on several researches, food insecurity can be both a cause and consequence of conflict. Conflict often reduces the availability and access to food due to the disruption of agricultural production and local markets.

Figure (5.23) shows that only 34.9% of the respondents found that UA helped them to gain food during the war, while the majority with 65.1 percent of them were not able to supply their household with food and therefore that can be deemed as a clear indicator that the food security situation was deteriorated even for UA practitioners during the wars.

In general and according to the May Food Security Sector report, in 2016, due to the 2014 hostilities against Gaza strip, the record of the unemployment rate reached to a height of 44 percent in 2014, 11 percentage points more than in 2013, as the domestic economy was collapsed. Between May and August 2014, there was also a sharp increase, with 12 percent, in food price level. All of these factors were definitely
affected on the Food Security situation for the household level, including those who are practicing urban agriculture.

![Figure (5.23): Food supply during the war for UA practitioners](image)

The statistical analysis that measure the association between the main objective of the HH to engage in UA and if UA helping to gain food during the war for its practitioners shown in table (5.9). The Pearson Chi-squared value of 0.022 with p-value 0.882 and effect size equals 0.013 indicate a weak association between the two factors. And therefore it is concluded that the two variables are independent of each other. In other words, these two variables are significantly not-related.

**Table (5.9): The association between the main objective for UA engagement and food gain during the war**

<table>
<thead>
<tr>
<th>What is the main objective of the HH to engage in UA</th>
<th>Did you find UA helping you to gain food during the war?</th>
<th>Chi Square</th>
<th>P-value</th>
<th>Effect size (Cramer's V)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Major source of livelihood</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>39</td>
<td>72</td>
<td>.022</td>
<td>0.882</td>
</tr>
<tr>
<td>E</td>
<td>38.7</td>
<td>72.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>86.7%</td>
<td>85.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional source of LH or Survival</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>6</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>6.3</td>
<td>11.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%</td>
<td>13.3%</td>
<td>14.3%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This result confirms what was issued by FAO in its 2017 report that conflict is a key driver of situations of severe food crisis.

Moreover, according to a study performed by Hitzhusen & Jeanty (2006), depending on the location of the armed clashes in a country, conflicts can affect food
security status by creating food shortages when crops cannot be planted, weeded or harvested, and therefore the agricultural production levels decreasing dramatically. During the period of the conflict, food producing regions experience seizing or destroying of food stocks, livestock and other property, disrupting marketed supplies of food not only in a particular region, but also in adjacent regions.

The main objective for the UA practitioners in the area of survey, whether it was major source or additional source of livelihood, should improve the food security status for the household. However, during the wars against Gaza, it was found that the status of food security was not improved for its practitioners. During the wars, the majority of respondents were not able to practice the UA activities as they evacuated their farms/houses looking for safer haven, or they were not able to access into their urban farms due to the deteriorated security situation.

Millions of people have been displaced due to conflict and violence, causing and protracting food insecurity in host communities. For example, but not limited to, during 2014 war against Gaza strip, hundreds of thousands of people left their home and took refuge in another safer place and therefore they were vulnerable to food insecurity. According to September OCHA report issued in 2014, approximately 300,000 internal displaced people (IDP) were hosted by UNRWA schools scattered in all Gaza strip, all of them were assisting by ready-to-eat foods on daily basis.
Chapter 6
Conclusion and recommendations

6.1 Conclusion

The purpose of this study was to investigate the contributions of urban agriculture in alleviating urban household food insecurity in Beit Lahia City and to evaluate the impact of the 2014 war on the urban agriculture practitioners. Both quantitative and qualitative methodologies were employed in the study whereby questionnaires were prepared for the survey of randomly selected urban farmers from the study area, while discussions were also made with purposely selected key informants and urban agriculture stakeholders.

In Beit Lahia City, where the quality of the irrigation water is good comparing with other parts of Gaza Strip, 58.9 percent of urban farmers depended on vegetables and fruits for their urban cultivation, 32.6 percent of them depended on permanent trees, while the other 7.8 percent used other types of crops.

Urban agricultural activities are being performed by the urban farmers themselves or family members or even by external hired laborers. Given that such farming normally takes place within or at the edge of the cities, it strongly encourages women’s participation, as 78.3% of the respondents reported, as did all the interviewees.

A good indicator of household food security level, the average daily income of the urban farmers was acceptable to some extent as it was above the poverty line. Monthly income for them ranges from 100-3000 NIS, with a mean of 710.8 NIS.

Urban farming in Beit Lahia is faced with several problems, as all of the respondents believe that they are facing at least one problem of many. Lack of governmental support ranked first at 75.6%. Other problems facing urban agriculture include diseases (47.2%), lack of technology (39.4%), pollution (38.6%), food safety (13.4%), vandalism (12.6%) and disputes with neighbors (8.7%). In spite of these problems, urban agriculture has survived.
One of the major findings of the study is the revelation that those who are engaged in urban agriculture started due to one or more of the following: low food supply at the household level (52.8%), low income (59.1%), unemployment (63%), and low food safety for foods available to their household (15.7%). Meanwhile, it is important to mention that the ultimate use of UA products for 74.4% of the urban farmers was either for sale in the market or for household consumption. However, 46.5% of the urban farmers spent more than 40% of their income to purchase foods for their families despite their engagement in UA because they focused on cash crops and export instead of food crops. Furthermore, UA is seasonal and the average area of land used for cultivation is small (less than 3 dunums). All of these factors have negatively affected the productive capacity. It is worth mentioning that the small land available for cultivation can be considered a clear clue to the high rate of urbanization as well as to the dramatic increase of population in Gaza Strip.

It was also found that education level is a major factor that encourages involvement in urban agriculture as 82.2% of the respondents received some form of education while only 17.8% of the respondents have no formal education. 26.4% of the educated urban farmers have university degrees, but due to the high level of unemployment given the bad economic situation, they were forced to engage in urban agriculture as their source of income.

The most important finding of the study is that a very high percentage, approximately 89.2%, of the respondents reported that they are feeling food secure due to their engagement in UA. Reportedly, the food security level, for those who practice UA, is improved due to the increased food availability, the diversified sources of income and the more jobs created due to UA. At the same time, since food security level can be measured by the daily number of meals, it was found that 74.4% of urban farmers had 3 or 4 meals a day; this result is also a sign of the satisfying level of food security.

While farmers have largely recovered to date, UA was significantly affected during the 2014 war against Gaza Strip, especially those farms located within the buffer zone. 88.4% of the urban farms in Beit Lahia were partially or severely damaged. In addition to that, 90.7% of the urban farmers were displaced to safer havens during the
war; therefore the benefits of UA were very limited and food security was definitely worsened. The types of losses for urban farmers due to the 2014 war include razed land and damaged crops, house destructions, human losses and poultry death.

In a nutshell, UA significantly and positively contributes to alleviating household food insecurity in the study area, Beit Lahia City. However, its role was very limited during the 2014 assault.

6.2 Recommendations

Based on the findings of this study, the following possible recommendations and interventions in support of the UA have been made.

Currently, urban agriculture is not widespread in Beit Lahia, like other places in Gaza strip. With additional support, urban farms can be extended to make a larger contribution to the food security levels. Therefore, government intervention in different levels is much needed towards improving the urban agriculture activities in Gaza strip. The governmental intervention is not only fund support, but it also can be inputs or equipment provision, and even awareness sessions for the urban farmers.

Urban agriculture stakeholders should continuously provide a technical advice, improved agricultural inputs and other necessities for those urban agriculture practitioners, as well as they should work to strengthen the capacity building of urban farmers.

As part of their ethics and social responsibility, the non-governmental organizations should also support urban agriculture projects in Gaza strip. Since the available space for cultivations are limited in Gaza strip, the vacant spaces for these institutions, including the roofs, can be exploited for such activities.

To avoid pollution and diseases potential problems resulting from urban agriculture, Ministry of Agriculture, Ministry of Health and World Health Organization in Gaza, should be working together to give advices to the urban farmers to use safer water for irrigation process and also to advise them on the type of crops that can be grown without endangering their lives or the consumers lives.

The urban farmers should be recommended through the experts or stakeholders to focus on both food crops and cash crops in order to stabilize the local market demands.
Also, urban farmers should be focused on other types of urban agriculture, not only vegetables and fruits, but also fishery and animals farms.

The city planners should develop projects to obtain sustainable agricultural water by treating the household wastewater so that water can be safely used by the urban farmers for irrigations.

Generally, urban agriculture should be well-organized; therefore, the authorities and urban planners should include urban farming in city planning by allocating enough space in appropriate areas in the city. Also, the coordination and cooperation between all stakeholders working in the agriculture sector should be improved to organize their fund that supporting UA projects in Gaza Strip.
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Appendix
Appendix (1): Questionnaire in English

Dear Sir/Madam

Re: Questionnaire for Research on the role of Urban Agriculture on Food Security in Gaza Strip during the war of 2014: Case study of Beit Lahia city

I am currently a final year Masters in Crisis and Disaster Management at the Islamic University of Gaza, working to finalize my thesis on the relationship between Urban Agriculture and Food Security. I have chosen Beit Lahia city, as a case study for my thesis.

As a community member of Beit Lahia, I would appreciate it if you would voluntarily partake in the study and complete the attached research questionnaire which consists of four sections.

Please note that all information will be treated with strict confidentiality.

I appreciate your time and patience to complete the questionnaire and many thanks in advance.

Yours sincerely

Hadi Khalil
Researcher

Dr. Husam Al Nnajar
Supervisor
RESEARCH QUESTIONNAIRE On the role of Urban Agriculture on Food Security in Gaza Strip during the war of 2014

The purpose of the Research Questionnaire is to assess the role that the Urban Agriculture in Gaza Strip, have on Food Security. Please answer the questions without hesitation.

Section “A”: General Information

1- Gender:
□ Male □ Female

2- Age:
□ Under 20 □ 21-30 □ 31-40 □ over 41

3- Level of education:
□ Illiterate □ Primary □ Secondary □ Tertiary

4- Household size: ……………..

5- Source of income
□ selling from agriculture produce □ selling animal produce □ own business
□ Fishery □ depend on charity or relatives □ Other ……………..

6- Monthly income (NIS) ……………..

7- How much you spend on buying food (%)
□ Less than 20 □ 21-30 □ 31-40 □ more than 40
Section B: Information about Urban Agriculture

8- Type of house

☐ Multi store building  ☐ asbestos  ☐ steel  ☐ tent

9- Area of the used land for UA (Donum) ……………………

10- Land ownership

☐ Private  ☐ Waqf  ☐ Rented land  ☐ other ………………

11- Type of activity/ies of UA practiced by the family (you can choose more than one)

☐ Poultry  ☐ Dairy  ☐ agriculture crops  ☐ Fishery farm

☐ Other ……………

12- Type of agriculture crops

☐ Permanent trees  ☐ vegetables and fruits  ☐ fodder  ☐ other ……………

13- Main source of irrigation water

☐ Municipal water  ☐ private well  ☐ buy from private well

☐ rain fed

14- When did you start to engage in UA?
Please determine the year ………………

15- Who encouraged you to engage in UA? (you can choose more than one)

☐ Own interest  ☐ governmental support  ☐ NGO/ INGO  ☐ UN

☐ Other ………

16- Did you benefit from one of the funded UA projects in Gaza strip?

☐ Yes  ☐ No
17- What is the main reason/s for you to start UA? (you can choose more than one)
☐ Low food supply for household  ☐ Unemployment  ☐ Low income
☐ safer food

18- What is the main objective of the HH to engage in UA?
☐ Major source of livelihood  ☐ Additional source of LH  ☐ Survival/
Adaptive strategy to cope the difficult situation  ☐ other……

19- What is the ultimate use of UA product?
☐ HH food supply  ☐ Market sale  ☐ both

20- Who contributes in the labor activities for your UA farm? (you can choose more than one)
☐ Family labor  ☐ Hired labor  ☐ yourself

21- Did the household woman play important role in UA activities?
☐ Yes  ☐ No

22- What problem/s do you face as an urban farmer? (you can choose more than one)
☐ Diseases  ☐ Pollution  ☐ Dispute with neighbors  ☐ Food safety
☐ Lack of governmental support  ☐ Lack of technology  ☐ Vandalism

23- In your perspective, what solution will you recommend for the above-mentioned problem/s?
Specify please  ------------------------------------------
Section “C”: 2014 War’s effect on UA activities

24- Location of the farm

☐ Within the city       ☐ buffer zone       ☐ village

25- Have you left your house/ farm during 2014 war?

☐ Yes       ☐ No

26- If yes, Could you reach to your farm during war?

☐ Yes       ☐ No

27- If No to the question 25, did UA encourage you to stay in your house as your food can be saved?

☐ Yes       ☐ to some extent       ☐ No

28- Did you find UA helping you to gain food during war?

☐ Yes       ☐ No

29- Have your farm affected from 2014 war against Gaza?

☐ Yes       ☐ No

30- If yes to question 28, what type of losses as a result of the war? (you can choose more than one)

☐ Razzed land and damaged corps       ☐ dead cattle/ Poultry

☐ destruction of the house       ☐ human losses

31- Based on your previous experience in 2014 war. Are you going to stay in your farm in case of new war?

☐ Yes       ☐ No
Section “D”: Effect of UA on Food Security

32- Did the HH income change/ improve due to your engagement in UA?

☐ Yes  ☐ No

33- If “yes” to question 32, can you give information of your monthly income that you obtained from the UA activities only? ................

34- Are you feeling food secured due to engagement in UA?

☐ Food secure  ☐ to some extent  ☐ Food insecure  ☐ Vary from one year to another

35- If “food secure” to the above question, what is/ are the reason/s?

☐ Increased food availability of HH

☐ Diversified source of income

☐ Increased income of HH

☐ Job opportunity

☐ Other ...........

36- If “food insecure” to question 34, the reason is: (you can choose more than one)

☐ Lack of production

☐ Lack of input/ seeds for planting

☐ Low market demand

☐ Threat of pollution

☐ Pesticide/ herbicide usage

☐ Other ...........
37- How many meal/s did your HH have in 24 hours?

☐ 1 meal   ☐ 2 meals   ☐ 3 meals   ☐ 4 meals

38- Have you faced any difficulties in meeting your HH’s food needs during your engagement in UA?

☐ Rarely   ☐ Sometimes   ☐ Often
عزيزي/ المواطن الكريم

السلام عليكم ورحمة الله وبركاته وبعد،

أقوم حاليا بعمل دراسة لاتمام درجة الماجستير بعنوان "دور الزراعة الحضرية في أزمة الأمن الغذائي في قطاع غزة خلال حرب عام 2014، دراسة حالة - مدينة بيت لاهيا"، قسم إدارة الأزمات والكوارث بالجامعة الإسلامية.

هذه الاستبانة مكونة من أربعة محاور كما هو موضح في المرفق، المحور الأول عبارة عن معلومات عامة والمحور الثاني عبارة عن معلومات يخص ممارسة الأنشطة الزراعية الحضرية، بينما يتعلق المحور الثالث بأثر الحروب على الأنشطة الزراعية. أما المحور الرابع والأخير فهو عبارة عن دراسة لمعرفة مدى تأثير الزراعة الحضرية على الأمن الغذائي الأسري.

أرجو من حضرتكم التكرم بقراءة فقرات الاستبانة بدقة والإجابة عليها بموضوعية ورصافة وذلك باختبار الاجابة المناسبة لكل سؤال.

مع العلم أن جميع البيانات التي سيتم الحصول عليها ستعمل بسياق علمي وولا تستخدم إلا لأغراض البحث العلمي فقط.

شكرًا حسن تعاونكم.

شاكرًا حسن تعاونكم.

ملحوظة: يشير مصطلح الأمن الغذائي إلى توفر الغذاء للأفراد دون أي نقص في جميع الأوقات، ويعتبر بأن الأمن الغذائي قد تحقق فعلاً عندما يكون الفرد لا يخشى الجوع أو أنه لا يتعرض له، ويعتبر كمعيار لمنع حدوث نقص في الغذاء مستقبلاً أو انقطاعاً أو انتظاماً إثر عدة عوامل تعتبر خطيرة ومنها الجفاف والحروب، وغيرها من المشاكل التي توقف عائداً في وجه توفر الأمن الغذائي.

الباحث
هادي فتحي خليل
المحور الأول: معلومات عامة

1- الجنس □ ذكر □ أنثى

2- الفئة العمرية □ أقل من 20 سنة □ من 21 - 30 سنة □ من 31 - 40 سنة □ 41 سنة فأكثر

3- المستوى التعليمي □ غير متعلم □ تعليم أساسي □ تعليم ثانوي □ جامعي

4- عدد أفراد العائلة: ............................................

5- مصدر الدخل الأسري □ بيع منتجات المحاصيل الزراعية □ بيع حيوانات □ مزرعة أسماك □ الاعتماد على الأقارب أو الجمعيات الخيرية □ أخرى:.............................................

6- متوسط الدخل الشهري (بالشيكل) للäsرة: ............................................

7- نسبة الإنفاق على شراء الطعام المنزلي (%) □ أقل من 20 □ من 21 - 30 □ من 31 - 40 □ أكثر من 40
المحور الثاني: معلومات خاصة بالأنشطة الزراعية الحضرية

8- نوع المنزل الذي تسكن فيه
□ باترون □ استي □ زينكو □ خيمة

9- مساحة القطعة الأرضية المستخدمة للزراعة الحضرية بالدونم: 

10- ملكية الأرض تعود
□ ملك خاص □ أرض وقف □ أرض مؤجرة 
□ أخر: 

11- نوع النشاط الزراعي الحضري الذي تمارسه الأسرة (يمكن اختيار أكثر من إجابة)
□ دواجن □ ألبان □ محاصيل زراعية □ مزرعة أسماك
□ أخر: 

12- نوع النباتات الزراعية المزروعة
□ أشجار دائمة □ حضار وفواكه □ ألعاف □ أخر:

13- مصدر المياه الرئيسي المستخدم للري
□ مياه بلدية □ بئر خاص □ شراء المياه من بئر خاص □ زراعية بعلية (تعتمد على مياه الأمطار)

14- متى بدأت ممارسة الزراعة الحضرية؟ 
السنة ....

15- من الشخص أو الجهة التي دفعتك للانخراط في النشاط الزراعي الحضري؟ (يمكن اختيار أكثر من إجابة)
□ دافع ومصلحة شخصية □ جهة حكومية □ مؤسسة غير حكومية □ مؤسسة تابعة للأمم المتحدة
□ أخر:

16- هل استفدت من أحد المشاريع الممولة الخاصة بالزراعة الحضرية؟ 
□ نعم □ لا
17- ما هو السبب الذي دفعك لتمارسة الزراعة الحضرية؟ (يمكن اختيار أكثر من إجابة)

- انخفاض الإمداد الغذائي للأسرة
- البطالة
- انخفاض مستوى الدخل
- غذاء أكثر أمناً

18- ما هو الهدف الرئيسي للأسرة من الانخراط في الزراعة الحضرية؟

- مصدر رئيسي لكسب الرزق
- مصدر رزق إضافي
- خطة استراتيجية للتكيف مع الأوضاع المعيشية الصعبة
- هدف آخر ........

19- ما هو الاستخدام الرئيسي لمنتجات الزراعة الحضرية التي تمارسها؟

- امداد الأسرة بالغذاء
- بيعه في الأسواق
- الاثنين معاً

20- من الذي يقوم بالاّعتناء في الأعمال الزراعية الحضرية الخاصة بك؟ (يمكن اختيار أكثر من إجابة)

- أحد أفراد العائلة
- توظيف عامل خاص بأجرة
- بنفسك

21- هل تلعب المرأة داخل أسرتك دوراً مهماً في النشاط الزراعي الخاص بمزرعتك؟

- نعم
- لا

22- ما هي المشاكل التي تواجهها كمارس للزراعة الحضرية؟ (يمكن اختيار أكثر من إجابة)

- أمراض
- تلوث
- نزاع مع الجيران
- سلامة الأغذية
- نقص الدعم الحكومي
- نقص في المواد التكنلوجية
- سرقات أو سطو

23- من وجهة نظرك، ما هي الحلول التي تقترحها وتوصى بها للتغلب على المشاكل المذكورة أعلاه؟

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المحور الثالث: أثر حرب 2014 على نشاطات الزراعة الحضرية

24- موقع المزرعة الخاصة بك

- في منطقة قروية
- منطقة حدودية
- وسط المدينة

25- هل غادرت منزلك/مزرعتك خلال الحرب عام 2014؟

- نعم
- لا
26- إذا كانت الإجابة نعم، هل كان يمكنك الوصول لمزرعتك خلال الحرب؟

□ نعم □ لا

27- إذا كانت الإجابة لا، هل ممارستك للزراعة الحضرية شجعك للبقاء في بيتك أثناء الحرب بسبب مقدرةك على توفير غذائي؟

□ نعم □ إلى حد ما □ لا

28- هل وجدت ممارستك للزراعة الحضرية تساعداً في الحصول على غذائي أثناء الحرب؟

□ نعم □ لا

29- هل وجدت ممارستك من الزراعة الحضرية تساعدك في الحصول على غذائي أثناء الحرب؟

□ نعم □ لا

30- إذا كانت الإجابة نعم للسؤال السابق، ما نوع تلك الخسائر؟ (يمكن اختيار أكثر من إجابة)

□ تificados للأرض وتفشي للمحاصل □ موت بعض المواسمين □ أضرار للمنزل □ فقد في الأرواح

31- بناءً على تجربتك خلال حرب 2014، هل تخطط للبقاء في المزرعة الخاصة بك في حالة نشوب حرب؟

□ نعم □ لا

المحور الرابع: دور الزراعة الحضرية على الأمن الغذائي

32- هل الدخل الأسري تغير بسبب ممارستك في الزراعة الحضرية؟

□ نعم □ إلى حد ما □ لا

33- إذا كانت الإجابة نعم للسؤال السابق، ما هو متوسط الدخل الشهري (شيكيل) المكتسب من ممارسة الزراعة الحضرية فقط؟

□ يختلف من عام لآخر □ أشعر بالأمن الغذائي □ إلى حد ما □ لا أشعر

34- هل تشعر بالأمن الغذائي بسبب ممارستك للزراعة الحضرية؟

□ أشعر بالأمن الغذائي □ إلى حد ما □ لا أشعر □ يختلف من عام لآخر

35- إذا كنت تشعر بالأمن الغذائي حسب السؤال السابق، السبب في ذلك؟ (يمكن اختيار أكثر من إجابة)

□ زيادة في توفير الغذاء للأسرة □ التنوع في مصادر الدخل □ توفير فرص عمل □
36- اذا كنت لا تشعر بالأمن الغذائي حسب السؤال 34، السبب في ذلك؟ (يمكن اختيار أكثر من اجابة)

- عدم وجود نسبة كافية من الانتاج
- نقص في البذور والشتلات اللازمة للزراعة
- انخفاض الإقبال والطلب على السوق من قبل المواطنين
- بسبب التلوث الناتج عن النشاط الزراعي
- بسبب استخدام المبيدات الحشرية والمواد الكيماوية
- آسباب أخرى ...........

37- عدد الوجبات الغذائية الرئيسية اليومية للأسرة

- وجبة واحدة  □
- وجبتان □
- 3 وجبات □
- 4 وجبات □

38- هل واجهت أي صعوبات في تلبية الاحتياجات الغذائية لأسرتك خلال ممارستك للزراعة الحضرية؟

- نادرا □
- أحيانا □
- غالبا □
Appendix (3): The questions of the interviews

<table>
<thead>
<tr>
<th>Islamic University-Gaza</th>
<th>[الجامعة الإسلامية – غزة]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deanship of Graduate studies</td>
<td>كلية الدراسات العليا</td>
</tr>
<tr>
<td>Crisis and Disaster Managements’ Master Program</td>
<td>برنامج ماجستير إدارة الأزمات والكوارث</td>
</tr>
</tbody>
</table>

Dear Sir/ Madam

**Re: Structural interview for Research on the role of Urban Agriculture (UA) on Food Security in Gaza Strip during the war of 2014: Case study of Beit Lahia city**

I am currently in the final stage of Masters in Crisis and Disaster Management at the Islamic University of Gaza, working to finalize my thesis on the relationship between Urban Agriculture and Food Security. I have chosen Beit Lahia city, as a case study for my thesis.

As a key stakeholder in the agricultural activities in Gaza, I would appreciate it if you would voluntarily partake in the study and participate in the interview.

Please note that all information will be treated with strict confidentiality.

I appreciate your time and patience to participate in this one-on-one interview.

Yours sincerely

Hadi Khalil
Researcher

Dr. Husam Al Najar
Supervisor
1- Please provide the name of institution, and your positions?

2- Type of institute: international NGO- CBO- Governmental- UN-private?

3- The researchers defined UA as the agriculture that take place within or at the edge of the cities or residential areas. Do you agree with this definition, and what is the relation between UA and Food security?

4- Based on the UA definition, do you think that the agriculture in Gaza can be classified as an UA?

5- What kind of support do you provide to the UA practitioners?

6- Does the 2014 war and blockade have any effects on agricultural sector in Gaza? And how? And please mention any other factors that may effect on UA in Gaza.

7- Do you think that your organization doing enough to improve Gaza UA situation and therefore food security?

8- Are donors interested in supporting UA project through your organization?

9- Does your institution have plans or coordinate with other institutions to organize the UA activities in Gaza Strip?

10- What exactly the role of your institution toward supporting UA? Please choose from the following:

   (Provide fertilizer - Provide seeds and pesticides – Cash support)

   Please mention if other.

11- Do you think that UA contribute in household poverty alleviation for its practitioners?

12- Do you think that the Gazan household’s women playing important role in UA activities?

13- Do you think that your organization will keep supporting UA activities in Gaza Strip in the future?

14- In your opinion, what motivates households to engage in urban agriculture? Please choose from the following:

   (Food Security - Job opportunities – Healthy food)

   Please mention if other.
15- Do you think that the Israeli restrictions in the bordering area affected on the farmers whose farms located within the buffer zone?

16- What difficulties or obstacles do you encounter as UA stakeholders? Please choose from the following:

(Lack of governmental support – Lack of community awareness about UA importance – Lack of donors interesting in UA – The frequent Israeli aggression on the agricultural lands – The rapid urbanization pattern)

Please mention if other.