Urban Farming and Food Security Nexus for Food Sovereignty and Food System Planning: The Case of a Highly Urbanized City in Metro Manila, Philippines

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ABSTRACT

Rapid urbanization goes together with the expansion of urban poverty and the incidence of urban food insecurity. Creative urban farming strategies to achieve food sovereignty and a comprehensive food system plan are needed to address food insecurity and food injustice in vulnerable households in an urban economy. The research analyzed the relationship between urban farming and food security based on three (3) aspects: livelihood generation, vulnerability context, and asset (land) ownership as the basis of crafting a food system blueprint to address food injustice and food sovereignty. It adopted a case study method to evaluate a nearly decade-old urban farming program that provides food and livelihood and promotes environmental well-being and good health for the marginalized sector of selected geopolitical units of a highly urbanized city in Metro Manila. The study revealed that vulnerable families in highly urban economies depend on urban farming to feed their families daily and have alternative job opportunities on full-time or part-time engagements. The lack of access to constant income hinders the ability of households to purchase food and provide for the health needs of the family members. The involvement of vulnerable households in urban farming programs and food system development initiatives makes them resilient to variations and spikes in food prices. Food insecurity is also aggravated by a lack of ownership/tenure rights on land allocated for urban farming. Thus, households may not have access to affordable food, and innovativeness in the urban farming system is hampered. In this context, urban farming needs to be integrated into food system planning to address food injustice and provide direction and guidance in food production, distribution, and consumption. The right to own land as a farming asset should be a requisite in realizing a just food system that supports food sovereignty.

Keywords: Urban farming, Food security, Food justice, Food systems planning, Sustainable development goals

BACKGROUND AND STATEMENT OF THE PROBLEM

Urbanization in developing countries is increasing globally, with more than 55% of the global population residing in urban areas as of 2022, projected to rise to 68% by 2050 (Kiribou et al, 2024). This rapid urban growth is pronounced in regions like the global south, where all 15 of the world's fastest-growing cities are located. It can be noted that although the natural increase in the population plays a huge role, rural-to-urban migration is also a significant contributor to urbanization. Until the early 2000s, the Philippines had one of the highest levels of urbanization among its neighboring Asian countries, with approximately 48 percent of its total population reported as living in urban areas (Habitat, 2020). According to the Food and Agriculture Organization (FAO, 2016), urbanization spans diverse socio-spatial forms, creating a patchwork of uneven geographies. However, the rapid expansion of urban areas has brought about numerous challenges, particularly concerning food security.

As cities grow, the complex and interconnected social, economic, environmental, political, and cultural processes that shape urban food systems become increasingly evident. Urban food security is a key challenge

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for most households in cities. Therefore, there is a need to reconsider and use the existing space creatively and find an answer to "how a space can be changed into a powerful space." In response to these challenges, there is a pressing need to develop resilient and sustainable urban food systems that harmonize international trade, local production**,** and rural-urban linkages**.** Such systems must also address the inequalities and disconnections that arise from rapid urban growth. Urban farming is an emerging strategy to address this issue, which creatively uses available urban spaces to enhance food production, achieve food sovereignty, and reduce food injustice. Urban farming is a promising strategy to improve food production, achieve food sovereignty, and mitigate food injustice. In Kenya, urban farming has been instrumental in diversifying economies, improving nutrition, and providing climate adaptability options by reducing reliance on long-distance transportation of agricultural produce. Innovative practices such as vertical farming, hydroponics, and composting of organic urban waste contribute to sustainable and nutritious food production chains. (GLOW Programme (2023). In this context, the study determined how urban farming can become an effective tool in achieving food autonomy to address the issue of food insecurity.

Despite the potential of urban farming, there is limited empirical evidence of its effectiveness in achieving food autonomy in highly urbanized areas (Quezon City Government, 2023). In Quezon City, Metro Manila, the Joy of Urban Farming Program has been in place for nearly a decade to improve food security, generate livelihoods, and promote environmental well-being. However, the extent to which this program has contributed to livelihood generation reduced food insecurity, and enhanced food sovereignty among marginalized communities remains underexplored. It described urban farming practices in a highly urbanized city, analysed the contribution of a decade-old urban farming program in livelihood generation and food insecurity, identified strategies for enhancing urban farming practices based on the experience of the program beneficiary, and developed a food system plan to improve food autonomy.

Therefore, this study seeks to address the gap by investigating how urban farming practices can be optimized as a tool for food autonomy in a highly urbanized context. Specifically, it examines the Joy of Urban Farming Program in Barangay UP Campus and Barangay Pinyahan of Quezon City, Metro Manila, analysing its impact on food security**,** identifying challenges faced by beneficiaries, and proposing strategies to enhance the effectiveness of urban farming as a sustainable urban food system solution.

REVIEW OF LITERATURE

Relearning urban agriculture

Giradet (2005) notes that urbanization in highly urbanized cities of developing countries has not only resulted in significant environmental challenges. It has also resulted in the growth of a considerable phenomenon like urban farming. In 2024, urban agriculture has become a worldwide phenomenon, with more than 800 million individuals participating globally, as reported by the Food and Agriculture Organization (FAO).

Urban farmers must be innovative and adaptable to survive in a globalizing food system. They must cope with city constraints and tap into urban assets and resource flows as effectively as possible. Food sovereignty is people's right to healthy and culturally appropriate food produced through ecologically sound and sustainable methods and definition of own food and agriculture systems. It puts those who produce, distribute, and consume food at the heart of food systems and policies rather than the demands of markets and corporations. For instance, many cities in Italy and France still have strong relationships with their immediate hinterland, with peri-urban agriculture evident.

In China, there is also evidence of urban farming as an essential part of its economic system, even with the rapid urban industrial growth. Giradet (2005) further noted that throughout Africa, in Ghana, Kenya, Tanzania, and elsewhere, more food is growing within cities because they are often still in very low density, and there is room for food growing. Women tend to be the cultivators in urban areas. Havana in Cuba is a particularly remarkable example of urban agriculture development. As a result of the collapse of the Soviet Union, Cuba lost a large proportion of its sugar export earnings. A few years ago, the authorities decided to practice food import substitution and to encourage urban agriculture within the city. While urban farming is increasingly recognized as an essential source of food and income generation in cities worldwide, adequate national, municipal, and local

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institutional frameworks are often lacking. Therefore, urban agriculture is an important area for government support at the national and grassroots levels.

Urban farming

According to Mougeot (2000), urban farming is an industry located within (intra-urban) or on the fringe (peri-urban) of a town, a city, or a metropolis, which grows and raises, processes and distributes a diversity of food and non-food products, (re-) using primarily human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services mainly to that urban area. Urban farming is an essential aspect of the broader issue of urban sustainability, both by being able to supply food from close-by and by offering livelihoods for city people. Another critical aspect of urban agriculture is its efficiency in the usage of waste. For instance, in Adelaide, Australia, attempts are being made to use wastewater in urban food production. Although there is a concern about traces of heavy metals that could accumulate in the soil, Adelaide's wastewater crop irrigation system is regarded as one of the great success stories of urban farming. (Giradet, 2005). There is a need to turn the linear throughput of resources through our city into circular systems, where minimal inputs also result in minimal waste outputs (Giradet, 2005). He further argued that a significant push is still needed to reduce the wasteful resource consumption and the vast, sprawling ecological footprints of existing cities. There is a need to move towards much more localized, efficient, circular urban systems, and this scenario certainly includes the use of land within and on the edge of cities for food production.

In Cuba, urban agriculture has transitioned from ensuring food security to promoting food sovereignty. This shift is characterized by land redistribution, agricultural diversification, and agroecology, empowering communities to control their food systems (Goeury, 2024). Food sovereignty is gaining traction in urban and peri-urban agriculture, particularly in the Global South, where it is seen as a response to food insecurity. However, institutional support is necessary to realize its potential (Chihambakwe et al., 2018). Urban agriculture can significantly impact food security by increasing access to fresh produce, especially in low-income communities. However, the distribution and accessibility of urban-produced foods remain challenges that need addressing to maximize benefits (Siegner et al., 2018). Urban farming is vital in Indonesia for food security, and government support is crucial for sustaining these practices. The pandemic highlighted the importance of local food systems in maintaining food supply chains (Hanifa et al., 2023).

Urban Farming in the Philippines

Urban food production in the Philippines started in 1973 during the Green Revolution under the Marcos regime, which was primarily geared towards rice sufficiency and backyard food production programs in urban areas. This was to strengthen the country's food security and generate livelihood and employment opportunities for people experiencing poverty. Urban farming surfaced in cursory discussions, research, and development activities among the administrative council as early as 1990. With limited land available, nursery management for ornamentals, rapid propagation of orchids, greenhouse management of high-value crops and vegetables, and the development of native chicken were the only options practiced. Small poultry farms were also practiced in Laguna in the 1980s.

In 1990, a systematic approach to urban agriculture was introduced in Quezon City, Metro Manila, with its Urban Agriculture Program conceptualized by the Bureau of Agricultural Research of the Department of Agriculture (DA-BAR). The program aimed to develop technologies for raising and using crops, livestock, and fish in urban settings. Such technologies included the conversion of biodegradable solid wastes into humus or compost, recycling of wastewater, integrated pest management, and use of organic or herbal pesticides, among others (Morcozo 1995). As reported by Duldulao (2001), urban agriculture has been practiced even before we had the term for it. It was observed to be practiced in Las Piñas, Paranaque, Pasay, and Quezon City in Metro Manila. It became a national program in 1998 when urban agriculture was included as one of the programs of the DA in Region IV (CALABARZON Region). This formally began the Urban Agriculture Program (UAP) in the Philippines. In response, Barangay Holy Spirit in Quezon City was identified as the pilot area representing a city in Metro Manila. Along the railroad tracks in Lipa City, Toribio represents an urban area in the province. A UAP task force was formed at DA Region IV to implement the projects. These two projects succeeded in

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demonstrating the feasibility of urban agriculture. One has to picture himself going to the poorer areas of Metro Manila. Instead of seeing garbage scattered around, one sees spans of land planted with vegetables and the area glowing with flowers. This is the vision of the *Gulayan at Bulaklakan* project: a component of the government's urban agriculture program in Barangay Holy Spirit. The project, a component of The Joy of Farming program, aims to provide food and livelihood and promote environmental well-being and good health among the marginalized sector of urban society. The project integrated schools, communities, government, and non-governmental units, leading to interactive participation among stakeholders and helping implement the project.

All over the world, many cities are facing various developmental challenges, and the Philippines is no exception. Philippine cities fail to keep pace with rapid urbanization, and on the other hand, multi-dimensional poverty in urban areas is deepening and widening. The government has been unable to address increased demand given the accelerated pace. The result has been the proliferation of informal settlers in urban areas without adequate access to decent living conditions. The number of informal settlers in the Philippines has increased gradually, from 4.1 percent of the total urban population in 2003 to 5.4 percent in 2012. In 2012, 5.4 percent of the urban population, or about 2.2 million people, lived in informal settlements in the Philippines. In Metro Manila alone, an estimated 1.3 million people, or close to 11 percent of the population in the region, lived in informal settlements (World Bank, 2017). The largest city in Metro Manila, Quezon City, experiences numerous challenges due to urbanization, which is propelled by rural-urban migration and increased natural growth. The town attracts migrants from different parts of the country because of various pull and push factors. For instance, rural-to-urban migration is propelled by the search for job opportunities and better living standards, while some of the push factors may include wars and violence from the southern part of the country.

As a result, the city now faces various developmental challenges, such as urban poverty, unemployment issues, and food insecurity (Kariuki, 2017). This means that unemployed individuals will find it challenging to generate an income, affecting their ability to feed their families. The inability of people to access formal employment results in deprivation and vulnerability, which leads to food insecurity (Beall et al., 2000). The concept of vulnerability concerning urban poverty and farming requires attention to understand its meaning within the study.

Vulnerability refers to the absence or insufficiency of assets and/or capabilities necessary to overcome/address the shocks and stresses of life. People living in poverty are often considered vulnerable because they are not capable of guarding themselves against shocks or disasters. For example, many people, even though there is employment available in an area, might not be employed because of a lack of skills and education.

Income is an essential factor for the livelihood of households. Not having access to a constant income hinders an individual's ability to purchase food or provide for their health needs and other aspects required to achieve a whole life. Food insecurity is a vulnerability often faced by the urban poor. Merwe (2011) describes food security "as physical and economic access to sufficient, safe and nutritious foods which meet an individual's dietary needs and preferences for an active and healthy life." He also notes key dimensions of urban household food security, two of which are food availability and food accessibility. Armar-Kleimesu (2000) states that access to food has a more considerable impact on food insecurity than food availability and that three issues affect access. Urban farming provides a direct food source, particularly for low-income families, mitigating the effects of rising food prices due to supply shortages caused by natural disasters or economic factors (Nacua et al., 2019). Key challenges include limited space, lack of training, and insufficient funding, which hinder the adoption of urban agriculture (Cortes et al., 2022). Despite these barriers, there is a strong willingness among urban residents to engage in urban farming if provided with adequate training and resources. (Cortes et al., 2022).

Joy of Urban Farming Program

The Joy of Urban Farming program is a food initiative that has around 174 urban farms in *barangays* (48 farms), elementary schools (78 farms), communities (38 farms), and parishes (10 farms). The Vice Mayor of Quezon City conceptualized the program. It was propelled to address developmental challenges like malnutrition, food insecurity, and high food prices. The program stakeholders included various organizations and schools involved in food garden development. The Vice Mayor's office is funding the program in partnership with the DA, Department of Environment and Natural Resources (DENR), Department of Education (DepEd), NGOs, and

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Allied Botanical Corporation (ABC). These provide technical support, such as the provision of equipment and materials needed for farming. The Joy of Urban Farming Program does not only offer vegetables to feeding programs. It also educates students on the importance of health and nutrition. It provides training and advice to local government units to invest more in organic fertilizer as urban farming promotes organic farming, hence protecting the environment. Quezon City was the first to launch urban farming within NCR. The program teaches families to start farming in their backyards – which can provide them with food security or extra income. The program also intends to protect the environment because chemical fertilizers are not used. This will maintain the natural condition of the environment and make the vegetables safer to eat. The table below simplifies the Strengths-Weaknesses-Opportunities-Threat (SWOT) analysis of the Joy of Urban Farming Program based on data analysis.

Table 2. 1: SWOT Analysis for Joy of Urban Farming Program

Strengths	**Weaknesses**
Years of operation – 9 years Use of organic farming Help the community with food availability Source of alternative employment opportunities Promote Agri-tourism site Serves as laboratory area for research and teaching institutions Demonstrate a high level of food safety Policies in favour of urban farming	Dependency from the office of the Vice mayor Dependency of the beneficiaries on the program
Opportunities	**Threats**
Social enterprise linkages to the market Increase interest in organic urban farming Availability of vacant land Farm school and research lifestyle trend - “going vegan”	Uncertainties in farm income Unavailability of land for agriculture Political will Change in power or influence Selling difficulty

Source: Alumasa, S. (2019)

STUDY DESIGN AND APPROACH

Conceptual framework

Quezon City has been home to most of the population in Luzon Island. Its urbanization has been quite sporadic and unplanned, resulting in the urban poor having various planning challenges like food insecurity, unemployment issues, and lack of formal source of income. Urban farming can be a suitable tool and strategy for the livelihood generation of the urban poor in Quezon City. Given this, the conceptual framework below provides the various dimensions of a person’s livelihood and the strategies and associated opportunities. This framework investigates how people use their resources to make a living. Farrington et al. (2002) argued that the framework utilizes this information to assess how people avoid poverty and how best to resolve the issues of vulnerable people.

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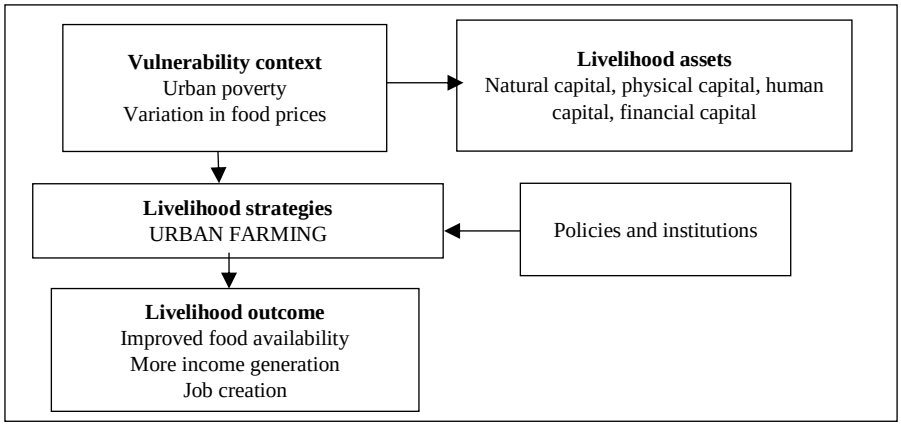

Figure 3. 1 Conceptual framework

Source: Farrington et al. 2002, as modified by the author

METHODOLOGY

Research design

The research analysed the relationship between urban farming and food security based on three (3) aspects: livelihood generation, vulnerability context, and asset (land) ownership as the basis of crafting a food system blueprint to address food injustice and food sovereignty. It adopts a case study method to evaluate a nearly decade-old urban farming program that provides food and livelihood and promotes environmental well-being and good health for the marginalized sector of selected geopolitical units of a highly urbanized city in Metro Manila. The Joy of Urban Farming Program in Quezon City was used as the case study for the urban food garden in the Barangay UP Campus and Barangay Pinyahan.

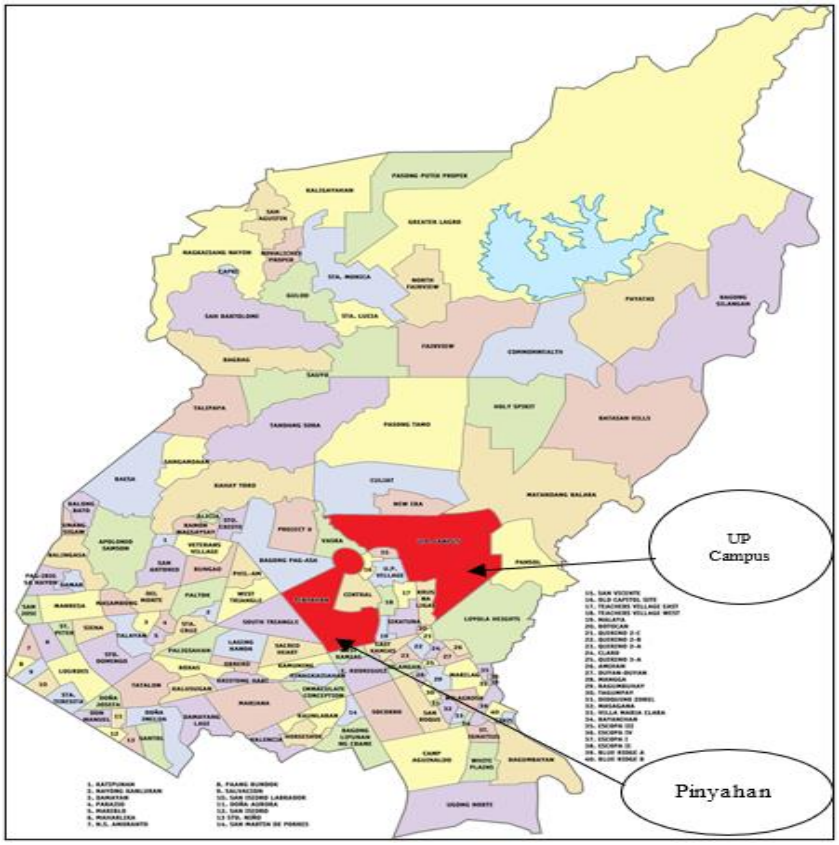

Figure 3. 2: A map of Quezon City showing the study areas

Source: Quezon City Development Planning Office

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Sampling

The study employed purposive sampling to select participants. The target population was the Joy of Urban Farming Program beneficiaries within the two barangays (Pinyahan and UP Campus). The final sample size was 60 beneficiaries, representing almost the entire beneficiary population in the selected areas. Given the relatively small population of beneficiaries in the targeted barangays, this sample size was considered adequate for generating insights into the program's impact on food security.

Data collection methods

Both primary and secondary sources of data collection were employed. Primary data collection tools included structured questionnaires to capture quantitative data related to the socio-economic profile of the respondents, livelihood outcome, and food security status. Open-ended questionnaires were used to gather qualitative insights, including beneficiaries' perceptions of the program's impact on their livelihood. The questionnaires were directly administered to the beneficiaries through face-to-face interviews. Purposive sampling ensured the respondents were directly involved in the Joy of Urban Farming Program.

RESULTS AND DISCUSSIONS

Urban farming practices in a highly urbanized city

Urban farming in the study area mainly produced crops in homes, communities, and open urban spaces, which involved cultivating vacant lands. Backyard gardening was more common, and vertical gardening was used as an innovative strategy to use limited land since agricultural lands in Quezon City were unavailable. The program beneficiaries produced mostly early maturing crops such as tomatoes, pepper, beans, and leafy vegetables like *pechay*, mustard, spinach, and lettuce. These crops took around 3-6 months to be harvested. Therefore, it can be deduced that the respondents had a continued food supply throughout the year.

Characterizing the beneficiaries of the Joy of Urban Farming

Socio-demographics. Out of the 60 respondents interviewed in the study, 40 (67%) of the urban farmers were males, and 20 (33%) of the respondents were female. The high number of male than female respondents can be explained by the patriarchal system in the Philippines, where men are traditionally believed to be the primary breadwinners, while women are responsible for the household chores. In addition, the high number of males to females in this study on urban farming can also be supported by the Philippines sex ratio, which is 102 males per 100 females (Philippine Gender Profile, 2008). According to the study, the average age of urban farmers is 37 years old. Quezon City has many young people compared to the old generation.

As noted, the young generation between the ages of 21 and 30 are leaving urban farming jobs to look for alternative ways of livelihood as they perceive farming as a rural activity. This confirms that young people consider agriculture tedious and would instead opt for other income-generating activities. In addition, the young people do not have adequate knowledge about farming and are not aware of the potential benefits of the activity. This can be further explained by the average age of the urban farmers, who are 37 years old.

Understandably, perceptions of many issues and willingness to engage in specific livelihood opportunities differ among people of different age groups. Age is, therefore, an essential factor in this study. Around 90 percent of the urban farmers were married, while 2.0 percent were single. The single urban farmer happened to be under the age of 20. Since the Philippines is a Catholic society, marriage is highly recognized, which explains the high percentage of married respondents. The high rate of married urban farmers can also relate to diverse livelihood opportunities because of the household size. Most married people tend to have dependents, which pushes them to engage in diverse alternative livelihood opportunities to cater to the family. This can also be supported by the research where the majority of the married urban farmers had other jobs, either full-time or part-time when work was available.

Having an urban farm was an alternative source of livelihood for the respondents. There were 36 respondents

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with around 3-5 members in a household, followed by 13 members with around 6-8 in a household. The average household size for urban farmers is around 4-5 persons, and most households have more members ranging from 3-5 and 6-8, respectively. It was indicated that the number of dependents in a particular household is slightly higher than the productive person in the family. Hence, there is a need for an alternative source of livelihood for survival and food availability to cater to the dependent generation in a household. These findings seem to align with the data concerning household population by age group in Quezon City, in which the percentage of the young population is much higher than the old population (Philippine Census, 2015).

Vulnerability of the respondents. Agricultural practices are usually predominantly rainfed and, therefore, vulnerable to climate change, particularly changes in temperature regimes, precipitation patterns, and extreme weather events. These changes in weather patterns and climate extremes will likely jeopardize agricultural production and food security. The effects that climate change, like droughts, have on agriculture will affect the livelihood of the communities in many ways, such as a hydrological drought with deficiencies in the availability of surface and groundwater supplies over periods and a socio-economic drought with physical water shortages affecting the health, well-being, and quality of life of communities and urban farmers.

Urban farmers can avoid vulnerability from seasonal change, such as harsh weather conditions and variation in food prices because they have other jobs from which income is generated. The food garden, an alternative job opportunity, also provides them with some benefits. Urban farmers do not just depend on the food garden for survival. The benefits of the food garden to the urban dwellers are the availability of food, which will ensure they have access to food to avoid shocks and vulnerability. The other benefits include alternative sources of income and alternative job opportunities.

The survey indicated that most urban farmers complained of harsh weather as a threat to the continuous low production of vegetables. This can negatively impact people with low incomes and urban farmers because they are not growing as much produce for their households. This might, in turn, lead to food availability and accessibility problems, eventually leading to food insecurity among urban dwellers. Likewise, variations in food prices may make urban farmers vulnerable to food insecurity. Rising food prices hurt all people regardless of their status. However, the poor and unemployed are the most affected because they cannot afford necessities. An increase in food prices has limited access to and availability of urban dwellers ' food. Urban dwellers spend much on food because of increased food prices in urban areas. Hence, this makes urban dwellers vulnerable to accessing food.

Likewise, increasing food prices makes it difficult for households with little or no income to mobilise savings. On the contrary, the respondents' conditions are different because the urban farmers not only depend on food gardens to feed their families every day, but they also have alternative job opportunities in which sometimes they work full-time or part-time or when work is available. The other point on vulnerability concerns employment and cash income. Poor households often lack formal employment, making it difficult to generate income. The Global Food Security Index of 2014 notes that in many developing countries, a lack of basic infrastructure and income affects people’s ability to afford and access nutritious food. This can also be supported by a study conducted in Cape Town and Johannesburg, which found a close relationship between income levels and food security. The study indicated that households with the lowest income had the highest levels of food insecurity (Frayne et al., 2009). In this connection, the study indicated that 51 respondents (85%) stated that they have alternative job opportunities. In comparison, nine (9) respondents (15%) said that urban farming is their only source of livelihood. It is paramount to look at alternative job opportunities undertaken by urban farmers to understand their perceptions on many issues and their willingness to engage in certain livelihood opportunities.

Therefore, urban farmers can avoid vulnerability to seasonal changes such as harsh weather conditions and variations in food prices because they have other jobs in which income is generated. The food garden, an alternative job opportunity, also provides them with some benefits. Urban farmers do not just depend on the food garden for survival. The benefit of the food garden for urban dwellers is the availability of food, which will ensure they have access to food to avoid shocks and vulnerability. The other benefits include alternative sources of income and alternative job opportunities. This can further be supported by the study conducted by Niekerk (2015) in Johannesburg, in which it was found out that the urban gardeners at the Siyakhana initiative did not heavily rely on the food gardens to feed their families every day since they were being provided with an income

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that they use to feed their households. This enabled the gardeners to avoid vulnerability and shocks such as extreme weather patterns unfavorable for crop production.

Therefore, it can be deduced that having an alternative job opportunity, such as urban food gardens, can enable an urban farmer to avoid the problems of absence or insufficiency of assets such as food and/or capabilities necessary to overcome/address the shocks and stresses of life. The urban farmers will be capable of guarding themselves against shocks. For example, many people, even though there is employment available in an area, might not be employed because of a lack of skill and education. In line with this, Moser (1998: 11) notes the importance of exploring vulnerability and how it can lead to "resilience or responsiveness in exploiting opportunities and resisting or recovering from the negative effects of a changing environment."

Contribution of the decade-old urban farming program in livelihood generation and food security

The analysis of the livelihood and assets of beneficiaries is an essential dimension of the study. The program's contributions to livelihood generation and food security are discussed in the context of household income, food availability status, previous employment, level of education, learning opportunities, program support, land ownership, and access to land.

Household income. The income of households from the food garden and other alternative jobs is an essential asset for the respondents (urban farmers) because it represents their financial capital. Not having access to a constant income hinders an individual's ability to purchase food or to provide for their health needs and other aspects required to achieve a full life. Income is thus an essential factor for the livelihoods of households. However, it is also necessary to remember that it is not the only measure of vulnerability. Therefore, a household can be considered vulnerable when deprived of one or more factors.

The respondents indicated that the food garden enabled them to have food readily available, and income spent on food was reduced since they could produce the food they eat, which mobilized them to save. The food garden has allowed them to develop their human capital to avoid certain vulnerabilities, such as food insecurity. The general perception among farmers is that since they do not possess tenure rights to the land they farm, they are likely to lose their land at any moment, discouraging them from engaging in urban farming.

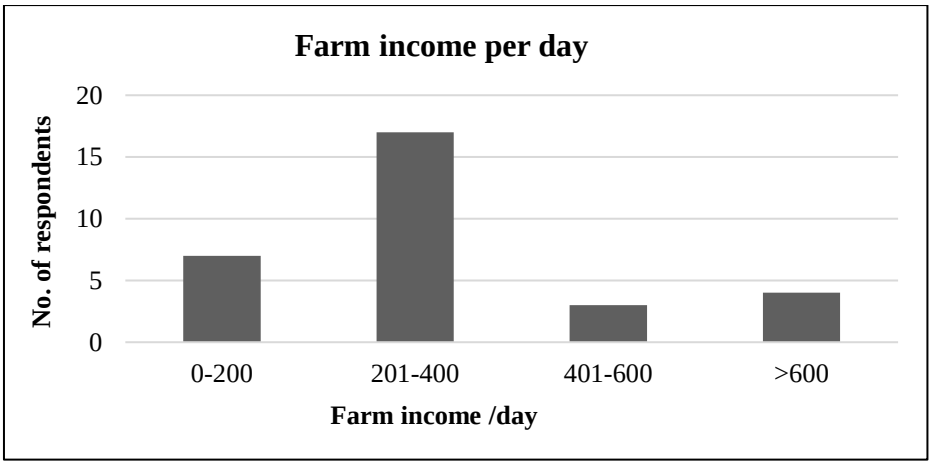

Figure 4. 1: Farm income per day

The 31 respondents from the survey indicated that they use the food garden for subsistence and commercial purposes. Of the 31 respondents, 17 had a daily farm income of PhP201- 400 (US$4-8). The rest have daily farm income ranging from PhP0-200 (7 respondents), PhP600 (3 respondents), and PhP401-600 (3 respondents).

Of all the respondents interviewed, most (73%) indicated that from the earnings they get from the food garden and other alternative jobs, they support three to five family members. They remarked that they were the only members of the family generating income. When asked why they were the only ones, most said the other family members are children and hence cannot work. The other 23% of the urban farmers noted that at least one or two family members are helping out in income generation in the family either on the urban farm or in other jobs.

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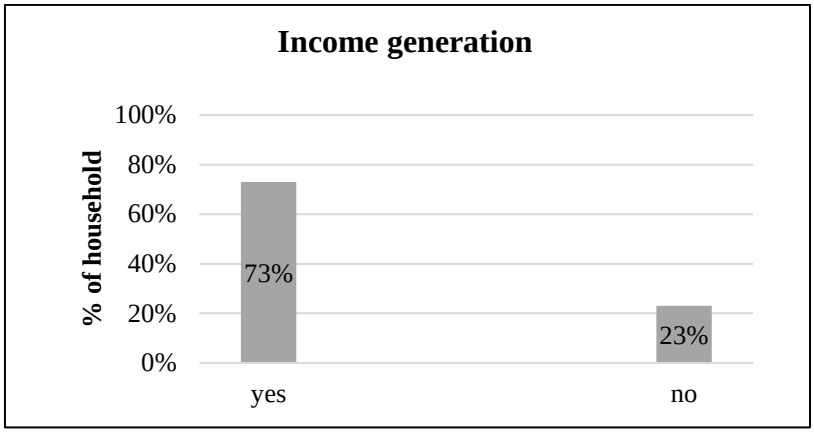

Figure 4. 2: % of household members generating income

They receive help from their sons, daughters, grandchildren, or spouses. Two respondents indicated that all family members are helping out in income generation in the household. It can noted that more people in the household generating income leads to more income in the household. From this observation, it can be deduced that anybody in an urban setting can practice urban farming, be it as a support for a family member, to help generate income, or to improve food accessibility for the household.

The other respondents indicated they still need more financial support from the program to purchase seedlings. This shows that even though the program is helping the beneficiaries regarding seedlings, they still have not changed their mindset of being supplied with seedlings every time. This is also supported by the interviews conducted with the manager of The Joy of Urban Farming Program, in which she expressed concerns that the beneficiaries did not want to be independent as they wanted to be helped every time. The beneficiaries need to be independent and learn to be independent. When asked if they had additional source of income, 85% of the respondents said they had other jobs that might not be permanent, but they worked on it when the job was available. For instance, some of them are construction workers who only work if a construction project occurs. Others stated that they are garbage collectors, tricycle drivers, jeepney drivers, and pedicab drivers. Furthermore, when asked if they receive financial support from The Joy of Urban Farming Program, they only receive other support, such as seedling and training, but not financial support from the program. Therefore, income is an important factor in the livelihood of households.

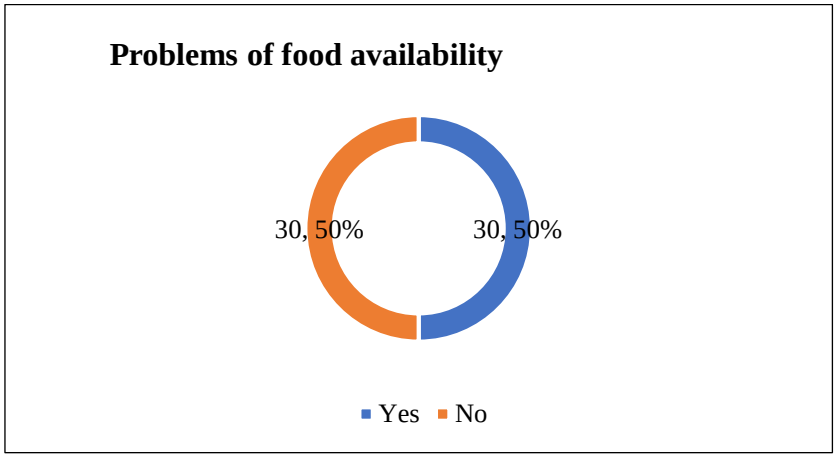

Figure 4. 3: Proportion of household showing food availability problems

Food availability. Since urban dwellers must buy most of their food, urban food availability depends primarily on whether urban households engage in urban farming. None of the urban farmers indicated that they had any severe food insecurity issues in their households. However, they suggested that they would struggle now and then, but not often. Half of the respondents stated they had food insecurity problems before engaging in urban farming. They mentioned that the food garden helped them since food is readily available and income spent on food is reduced since they can produce some of the food they eat, thus mobilizing them to save. This can also be

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supported by the results of a Pearson correlation test, which show the statistically significant impact of household size on food availability and sufficiency. The correlation coefficient of -0.369 between the two variables denoted a negative moderate correlation. This denoted that food availability within a household tends to decrease as the size of the household increases. It is more likely to have food availability problems when the household size increases. The p-value, which is 0.004, being less than the significance level, indicated enough evidence suggesting that the correlation observed exists in a given population. In line with this, it was evident earlier in the study that most of the urban farmers in the study areas had 3 to 5 and 6 to 8 family members. This may be explained by the number of urban farmers who indicated that they had problems with food availability before. This is further supported by a study conducted by (Kutiwa, S, Boon, E&Devuyst, D. (2010) on urban agriculture in low-income households in Harare. According to the findings after cross-tabulation analysis, household food sufficiency was significantly associated with household size.

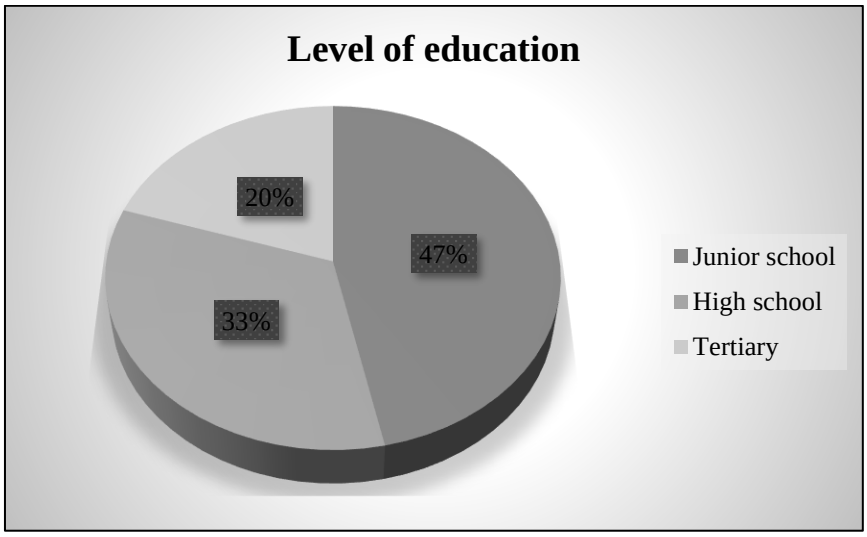

Figure 4. 4: Level of education of the urban farmers

Level of education. Concerning urban farming, human capital mainly relates to knowledge, skills, and training in performing urban farming. In the context of vulnerability, looking at the level of education achieved by urban farmers is crucial because it will enable them to determine how urban farmers can improve their human capacity. The survey revealed that 47 percent of the respondents had a junior level of education, while 33 percent had a high school education level. Only 20 percent of the respondents had reached tertiary level. Those who reached the tertiary level of education had promising jobs before and after starting urban farming. Some indicated they are nurses, contractors, desk officers, and therapists. This suggests that human capital, such as education, plays a prominent role in the capabilities of poor individuals. The fact that many urban farmers did reach junior and high school levels may have contributed to their previous struggles with finding appropriate employment to provide for their households.

The food garden has allowed them to develop their human capital to avoid certain vulnerabilities, such as food insecurity. In addition, most of the urban farmers have primary levels of education. This is in line with Kekana (2006), who, in his study of urban agriculture in Soshanguve, concluded that urban agriculture farmers will have a comparatively lower level of education. According to the survey, only 33 percent of the respondents had high school levels of education. This contrasts with studies done in Dar es Salaam in Tanzania, Harare in Zimbabwe, and Kampala in Uganda, which found that a significant percentage of urban farmers have post-high school education. Some urban farmers in these cities are professionals holding senior jobs in the public and private sectors, even though they employ people to farm for them in these cities (Maxwell & Zziwa, 1992). Even though education may not affect whether a family decides to carry out urban farming, it impacts urban farming in the study area because the higher the education level, the less willing to engage in urban farming.

Learning opportunities. The Joy of Urban Farming Program not only provides vegetables for feeding programs but also educates students on the importance of health and nutrition and offers training and advice to any residents who are willing and interested in urban farming or adopt practices of urban farming.

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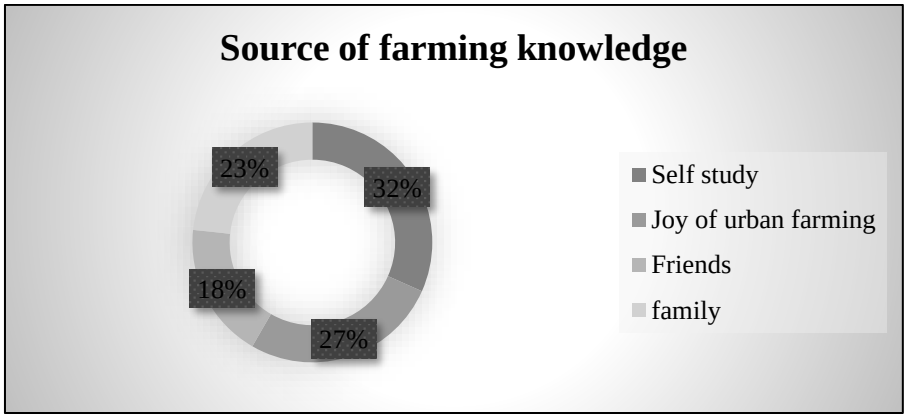

Figure 4. 5: Duration of working in the urban farm

It can be noted that 32 percent of the respondents indicated that they learned everything about it through self-study. About 27 percent learned through training and seminars conducted by the program. They further stated that the program did not only provide training to them, but they did provide seedlings too. Approximately 23 percent of the respondents knew how to farm from family members. As mentioned earlier, some of the urban farmers are being helped by their family members, and in turn, they can have their garden as they already got the knowledge on farming from their families. The remaining respondents (18%) generated ideas from friends.

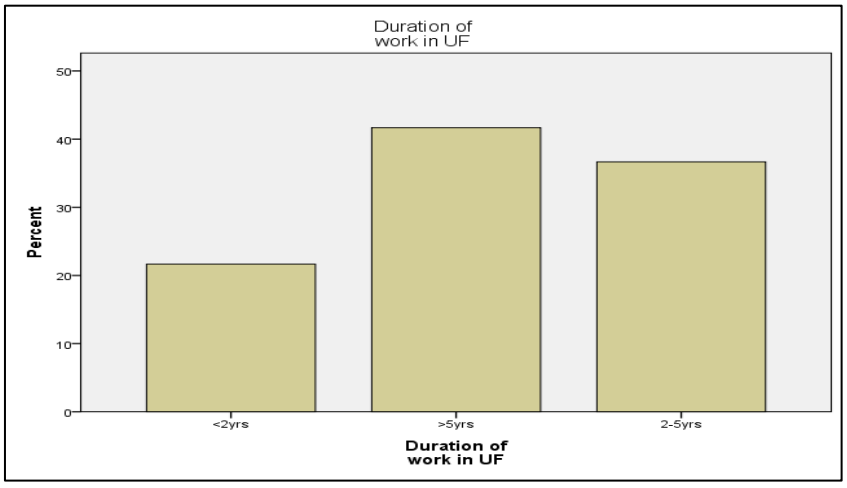

Figure 4.6: Source of farming knowledge

Since the knowledge of urban farming is based on experience, close to half (42%) of the respondents noted that they have been doing urban farming for more than five years. More than one-fourth (36%) of the respondents have practiced urban farming for 2-5 years, while 22 percent for less than two years. The urban farmers also noted that they enjoy working in their gardens because they get nutritious food. The other respondents got farming knowledge from friends and others through self-study.

This group of respondents are beneficiaries of The Joy of Urban Farming Program since they receive other support from the program, such as seedlings. Some of the respondents in Barangay Pinyahan receive farming tools. The Joy of Urban Farming Program has created a platform for urban farmers to develop their human capital. Therefore, despite having very little education, urban farmers are given the opportunity to progress by becoming skilled in farming practices to produce their own food.

Support from the Joy of Urban Farming Program. Urban farmers usually receive support from the program, including trainings and seminars, provision of seedlings, and farming equipment. This is done to encourage urban dwellers to plant their food. The Joy of Urban Farming Program was more than a food garden program, and it involved research, consultation, and training on diverse farming practices such as greenhouse garden and teaching. It is also important to note that the urban farmers who started farming long ago, even before the Joy of Urban Farming Program, get support such as training on the practice.

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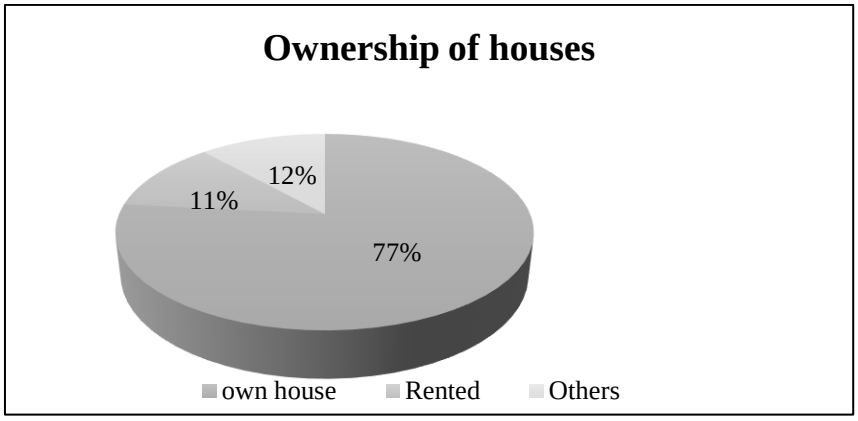

Figure 4. 7: Mode of house ownership of the urban farmers

Home ownership. Physical capital is significant because basic infrastructure is important in improving livelihoods. In addition, it is vital to understand the living conditions of the urban farmers to include the type of their housing. It also represents an additional livelihood strategy they were able to employ. Most of the urban farmers (77%) own their houses, while the remaining rent their houses. Most of the houses owned by the urban farmers were made of temporary structures and iron sheets. Even if they owned their houses, they were of poor quality regarding materials and size. However, it can be concluded that the income from their livelihood activities helped at least to build the house. In this sense, the food garden has provided the urban farmers with physical capital so they do not have to worry about house rental.

Access to land. Agricultural land in urban areas has the lowest value and is therefore considered uneconomic. Thus, little or no land is allocated for this purpose in urban areas. The diverse infrastructural development aggravates this; hence, agricultural lands are lacking Most urban farmers who cultivate in open spaces acquired the land by "first claim," wherein the first person who found a vacant piece of land and started using it became the de facto owner. However, according to Toriro (2009), these farmers have limited tenure security. The actual owners of the land (private or public institutions) can decide to use it at any time. Therefore, the study found that the city government-owned 40 percent of the land. Only 11 percent were self-owned, so they had a guarantee of land tenure security. Around 22 percent of the respondents used vacant land, which the University of the Philippines Diliman owns.

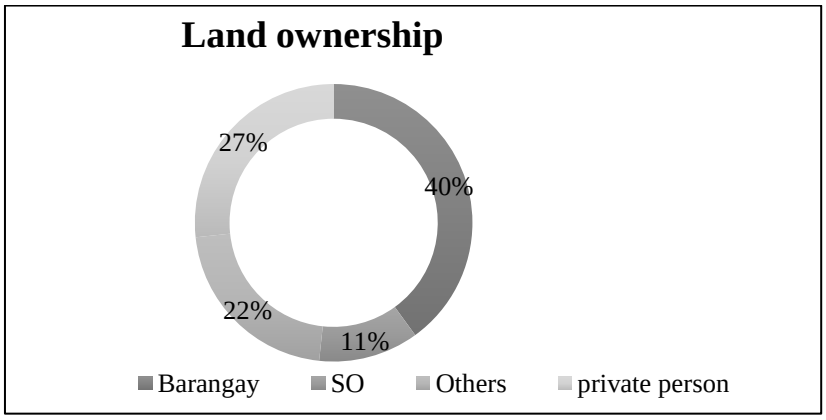

Figure 4. 8: Land ownership of urban farmers

The general perception among farmers is that since they do not possess tenure rights to the land they farm, they are likely to lose their land at any moment, discouraging them from engaging in urban farming. Given the economic meltdown and increased urban food insecurity, the government and city authorities need to recognize the importance of urban farming.

In conclusion, it can be deduced that The Joy of Urban Farming Program has enabled some respondents to have access to land for farming by involving specific stakeholders such as the churches and schools in which they use a community garden in farming.

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Extend and typology of urban farming. Due to limited land for urban farming, the respondents have adopted innovative strategies that maximize space, require less labor, and provide a variety of crops.

Strategies on the enhancement of urban framing practice as experienced by the program beneficiary

The benefits obtained by the Joy of Urban Farming Program beneficiaries were tangible but not enough based on the farmers' perception. Most of them stated that it would have been better if they also got financial support.

The program has to be sustained for the beneficiaries to feel secure in their ability to receive regular support through the help of the program. There is a need to plan how the beneficiaries of The Joy of Urban Farming Program will generate income through their food gardens, obtain necessary training on the available new technology, and how the program will continue providing support to those willing to have their food garden. Results indicated that the respondents could plant their vegetables, sell some, and eventually get some income through The Joy of Urban Farming Program.

The respondents also got some support such as training from The Joy of Urban Farming Program, which improved their human capital. Although most respondents do not have access to their land, urban farming has enabled them to utilize some of the vacant land and their backyards to decorate their food gardens. The program has also helped them use limited farming spaces such as vertical and rooftop gardening since they require limited space. However, the Program does not provide support in terms of land access. It is important to note that access to physical capital is essential because many people often relate poverty to the inability to obtain housing and land ownership.

Institutional structures are essential for urban farming programs because they enhance the overall sustainability of the programs. There is a lot of support from the Office of the Vice Mayor in urban farming in Quezon City. However, the Planning Office does not consider urban farming as one of the open space development strategies in the city.

Food system plan to enhance food autonomy

There is a need for some interventions to support sustainable urban farming in Quezon City and ensure the sustainability of the Joy of Urban Farming Program, considering its benefits to the recipients. The following are seen as essential components of the food system plan.

Provide various sources of financial support for the program. The Joy of Urban Farming Program is financially dependent on the budgetary allocation from the Office of the Vice Mayor. Thus, there is a need to ensure diverse financial support from the Office of the Vice Mayor and contributions from other development partners. In line with this, there is also a need for the support of the national government, such as the DA, to ensure the program's sustainability. This will encourage the adoption of urban farming in highly urbanized cities such as Quezon City.

Integrate urban farming into the planning process. Urban farming needs to be integrated into the planning process. During the decision-making process on urban gardening/farming, zoning, and land-use planning, all the stakeholders who, in one way or another, are affected or impacted by the program need to be included. This also consists of the program's beneficiaries, such as urban farmers. In line with this, there should be an agreement to facilitate access to resources for urban households, such as temporarily using vacant and unused private lands.

Formulate strategies for urban farming. At the policy level, The Joy of Urban Farming Program must ensure that urban farming strategies are considered, such as security of tenure and assistance in marketing. In collaboration with the program, the local government should assist by facilitating better markets for the gardeners' produce and considering social enterprise, especially those into organic farming and those linked to the markets. This is necessary because some of the respondents noted that whenever they hawk their produce in the streets, sometimes they are being confiscated.

Integrate urban farming in urban development planning. In recognition of the important role urban farming systems play in the lives of poor urban residents, it should not be excluded from urban development planning. Instead, an attempt should be made to understand and optimize its role in urban systems. In line with this, there

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is a need to prioritize activities that can uplift disadvantaged communities' drive to improve their livelihoods by alleviating poverty, improving livelihoods, providing employment, and generating incomes. Urban farming is the best strategy to address these developmental challenges.

Establish criteria for the sustainability of urban farming to include access to agricultural land, secure land tenure, and enhance the nature of farming. Accessibility to agriculturally cultivable land is a factor that encourages urban agriculture. Reuther and Dewar (2005: 101) identify insufficient land availability as the most significant constraint on urban farming. There is a problem with making land available because of the competing needs in highly urbanised areas such as Quezon City. For urban farming practices, the land needs to be available in terms of size and soil quality, which will enable the employment of farming practices.

In Quezon City, plenty of private and public land can be used for urban agriculture activities. Many open land spaces in underdeveloped vacant areas can be used for urban agriculture.

The research identified that there are lands inside the University of the Philippines that are unutilized. Methods of allotment as practiced in the United Kingdom (Viljoen, 2005:12), where spaces are offered to interested individuals for non-commercial food growing by the local authority, can be replicated in Quezon City. This will solve the problem of insufficient land, as most residents interested in urban agriculture reported. This form of usufruct is ideal because the allotted land can revert to its intended use instead of just lying idle.

Regarding secured land tenure, urban farming is done on legally owned plots or plots lawfully provided for farming is paramount. This is important because it will encourage urban farmers to cultivate their food without fear of being evicted.

The nature of farming is another primary feature of sustainable urban farming. This refers to the very essence of agriculture that can be practiced in or near the population centers. Because of the deleterious effects of chemical fertilizers and pesticides on human health, agricultural activity in or near cities must minimize their use directly and indirectly through soil and water contamination. However, it is necessary to remember that the turn toward agro-ecological, sustainable, and environmentally friendly technologies must be enforced.

Another criterion for urban farming includes areas not prone to hazards to prevent loss and damage. The availability of water is also paramount as it will enhance irrigation processes.

SUMMARY AND CONCLUSIONS

The research analysed the relationship between urban farming and food security based on three (3) aspects: livelihood generation, vulnerability context, and asset (land) ownership as the basis of crafting a food system blueprint to address food injustice and food sovereignty. Institutional structures are vital for urban farming programs because they enhance the overall sustainability of the programs.

The findings revealed that although urban farming significantly enhances food security and resilience, it is not the sole source of livelihood for vulnerable families. Most participants also engage in alternative jobs, either full-time or part-time. However, the lack of constant income continuously challenge the households' ability to purchase food and meet their health needs. Involvement in urban farming programs does make these families more resilient to food price fluctuations, yet the lack of secure land tenure remains a critical barrier. Without ownership or tenure rights, households have limited access to affordable food and cannot innovate within the urban farming system. The study highlights the need to integrate urban farming into formal food system planning as a strategic measure to address food injustice**.**

Additionally, ensuring the right to land ownership as a farming asset is crucial for establishing a just and sustainable food system that promotes food sovereignty**.** For the sustainability of the program, there is a need for government support, the availability of agricultural land for urban dwellers, and the security of tenure. During the decision-making process on urban gardening/farming, zoning, and land-use planning, all the stakeholders who, in one way or another, are affected or are impacted by the program need to be included.

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At the policy level, the Joy of Urban Farming Program must ensure that urban farming strategies consider all aspects of urban farming, such as tenure security and marketing assistance. Urban farming must be integrated into the food system planning to address food injustice and provide direction and guidance in food production, distribution, and consumption. The right to own land as a farming asset should be a requisite in realizing a just food system that supports food sovereignty. To build on these findings, future research should explore the long-term sustainability of urban farming programs within highly urbanized areas and investigate the role of policy frameworks in securing land tenure for urban farmers.

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