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Container gardening program as a way of food augmentation: action research

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Abstract Container gardening is seen as a long-term endeavor that promotes economic, environmental, and social well-being as well as physical, mental, and social health. Despite government efforts, the public does not actively engage in urban agriculture activities, and it is challenging to retain participants' interests. This study aimed to design a container gardening program that can be implemented as a banner program for BTVTED students. This descriptive study involved fifty (50) respondents from selected areas who fit under the inclusion criteria and were randomly chosen to answer the acceptability survey regarding the use of container gardening. The data and research findings were conducted through the use of the mean and the standard deviation, discovered that number of participants mostly engaged are females and the level of acceptability for container program as a way of food augmentation with regards to the economy has the highest value, which means that the respondents agreed it can produce foods from own crops, it can also generate income and supply food and subsistence of family. The researchers recommended that local governments might be able to encourage the growth of container gardening engagement in several activities, such as a campaign to educate participants and non-participants about the advantages of container gardening in the future.

Keywords: augmentation, sustainable practice, container gardening, Philippines

1. Introduction

Container gardening is the process of growing all plants, including vegetables and herbs. In containers rather than on the ground. Respondents struggle to find alternatives to cultivate food and to provide some alternatives to escalate hunger during a pandemic, despite cities' rapid improvements (Deveza and Holmer 2015). The community must continue to keep a close eye on the situation and act as needed to avoid the worst outcomes for food security and nutrition. To search for elements such as accessibility, use, stability, and use that may have an impact on food security. Those who had been displaced by natural disasters or armed conflicts were also among those who experienced food insecurity and lived in urban areas (World Food Program USA 2019). Concerns about food insecurity rise around the world. Urban agriculture expanded more quickly during the pandemic to preserve food security. It became crucial even after the pandemic to fulfill the needs of the continuously expanding urban population and lessen the strain on rural agriculture (Mishra and Pattnaik 2021).

Food availability can be affected by things like extreme weather conditions, improper storage, pests, diseases, or the economy itself. If one of these events happened, suddenly there will be a shortage of food supply. People simply do not require the need for food, but it is all about the right kind of nutritious food. One out of three people, mostly children, were found to be underweight. Children who lack essential nutrients at a young age may suffer from malnutrition and disorders. People never realized that as long as they were able to feed on an empty stomach, they forgot the value of nourishment. Nutritious food must always be accessible and uninterrupted; it must also be consistent (World Food Program USA 2019). Preceding studies have shown that when someone faces a challenging life situation, it leads to a stressful feeling that later creates a negative effect on their health and well-being (Gee et al 2018).

In particular, Japan needs to better manage its rising social security and national healthcare costs due to the world's fastest-aging population (25.9% are over 65) (Statistic Bureau, Ministry of Internal Affairs and Communications 2020). The social and emotional facets of health should be taken into account in addition to physical health improvement through exercise (Rosenberg et al 2020). It has been stated that city planning has a significant role to play in the advancement of public health given these kinds of societal needs (Giles et al 2016). Offering city dwellers, the chance to participate in urban farming and gardening is one project that has drawn a lot of attention (Soga et al 2017). In the U.S., food insecurity is a growing problem (Coleman-Jensen et al 2017). A lack of food means not only a lack of food in general but also a lack of nutritious food. Frequently referred to as "food deserts," these places lack access to fresh, wholesome, and reasonably priced food (Swafford et al 2021).

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In the Philippines, between one-fifth and one-tenth of the population is considered poor respectively (Mendoza et al 2016). The pandemic has brought food security, vegetable supply instability, and the situation of food insecurity among vulnerable groups. These continuous structural changes in the Philippines, such as population demography, income, and urbanization are some of the key drivers of diverse food consumption. Likewise, in the Philippines, particularly in the project conducted by the University of the Philippines Los Baños, Laguna, which is part of the Department of Science and Technology-Philippine Council for Agriculture, Aquatic, and Natural Resources (DOST-PCAARRD), the research focuses on the possibility for home gardens to complement the food-producing population in the future considering COVID-19 as a major danger to food security. In addition, it covers the production of rising seeds and planting supplies, as well as practical crop management and food safety, as well as adoption and sustainability activities. The setup shows how common vegetables are planted in an area with limited space (Afable 2021). Container gardening also helps fight hunger at home and climate change around the world. It also brings people back to nature and teaches them useful skills. The next generation of the Filipino working class may never experience hunger in the same way if these practices are passed on and utilized. To the fullest extent by those needing a path out of hunger and towards prosperity (Walsh 2017).

There are many unexplored areas of research that still exist within the broad topic of container gardening. It is hoped that through this thesis, more attention is drawn to the potential of gardening for health and well-being and that their gardening experience is considered further by researchers, policymakers, local initiatives, and tool manufacturers (Kolk 2019). In addition, this study explains the connection between urban farming activities and bettering urban residents' well-being, although further research is needed. Motivated by the paucity of research explaining this relationship, this study will investigate and propose a framework that shows how urban container gardening activities can elevate the well-being of urban citizens (Grebitus et al 2020). While the modern local food movement has focused on communal and individual food production, gardening projects from the past had similar objectives of supplying food, supplementing incomes, and reducing financial constraints. These are more accurately described as community food security projects that increased access to fresh produce and were supposed to be able to "throw off the moral malaise" of low-income people afflicted by the recession. The USDA Community Food Projects are highlighted as effective examples of grant-funded urban and community garden projects. It aims to "re-link production and consumption to maintain an adequate and accessible food supply in the present and future." (Nicola et al 2020).

The community/household members that would help them to have a sustainable source of food during a pandemic or for low-income families; the consumers/respondents that would be able to manage malnutrition and give health benefits to the consumers as these crops are all organic and fresh. To young children, where they can be educated about the importance of learning how to plant simple crops in their backyard at a young age; finally, to the researcher, who will serve as a guide for other researchers and seek more information about the significance of this research to the lives of many.

The researchers conducted this action research to determine the level of acceptability for container gardening program as a way of food augmentation. Through this study it opens the opportunity for residents as a good starting point in giving emphasis on the importance of utilizing container gardening in producing plants for food. Generally, this study aims to implement a container gardening program for food augmentation. Afterwards, this can be a good intervention to help the 4Ps *(Pantawid Pamilayang Pilipino Program)* beneficiaries- a Philippine national poverty reduction strategy of the government to the poorest of the poor to improve their way of living, health, nutrition and education. Thus, it will address the impact of hunger and poverty among residents.

2. Material and Methods

Respondents. The respondents of this study were selected households' residents in the areas of Aplaya, Digos City, and Kiblawan, Davao del Sur, ages 25–65, and their educational background is not necessary. This study received fifty responses in total. Ages below 25 are excluded from the data gathering as these are the ages of students and workers that do not have enough time to spare. In the study, the researchers decided to set the age limit according to the level of availability of any households in the community. In some instances, if respondents tend to withdraw from participating, researchers would discuss the documents they signed before committing to the survey. Giving assurance that this would not harm their lives. Instead, it gives benefits to the respondents as well as to the community. Despite the time limitations of this study, strategies were used to come up with and arrange a semi-structured one-on-one interview guide that would let participants express themselves.

Instruments and Materials. One of the undertakings of this research is to introduce the container gardening program to the selected areas in Barangay Aplaya, Digos City, and Kiblawan, Davao del Sur. The researchers utilize the following materials that are part of the study. Planning is the initial step in developing a container garden. The following materials should be given special attention.

The researchers conducted an actual survey by an adopted questionnaire from Noriah Othman, Rabiatual Adawiyah Latip, Mohd Hisham Ariffin, and Noralizawati Mohamed in the area of Aplaya, Digos City and Kiblawan Davao del Sur (Board 1). This action research offered a cultural background for the study design and helped to ground the findings. With the goal of

"Frame food insecurity through a perspective that authentically represents actual experiences to design strategies or policies." Additionally, free seed starts and gardening advice will be distributed to all.

Board 1 list of materials used in container gardening including its utilization.

Materials	Utilization
1. Location	Any location well do.
2. Types of Plants	Petchay also known as cabbage in English, scientific name "Brassica Rapa" – one of the leafy vegetables that can easily grow and harvest even from the comfort of own home. Alugbati also known as Malabar Spinach – is one of the popular kinds of vegetables, especially in Asia. It has relatively fleshy leaves and tuberous rootstocks. It can survive in both temperate and very hot environments.
3. Soil	Using a suitable soil mixture is one of the elements to "container gardening" sustainability. Simple garden soil may not be sufficient on its own. or successful as the soil is devoid of minerals, but simple is fine to use.
4. Choosing containers	The researcher chooses and uses containers as a manifestation set for the grower, depending on the availability of such materials. Materials that can be used are the following: recycled plastic containers and plastic pots in all shapes and sizes may be used. This study can also reduce the amount of plastic waste in the community. The goal is to recycle objects that are normally thrown in the garbage, specifically mineral water, empty bottles of soft drinks, gallons, etc. These objects can be used to make new products.

The Board 2 is the rating scale to be used upon answering on an actual interview.

Board 2 Rating scale for interpretation of respondents responses.

Range of Mean	Descriptive Level	Descriptive Interpretation
4.20 – 5.00	Very High	This means that the participant strongly agreed to engage themselves in container gardening using recycled bottles.
3.40 – 4.19	High	This means that the participant agreed to engage themselves in container gardening using recycled bottles.
2.60 – 3.39	Moderate	This means that the participant moderately agreed to engage themselves in container gardening using recycled bottles.
1.80 – 2.59	Low	This means that the participants disagreed to engage themselves in container gardening using recycled bottles.
1.00 – 1.79	Very Low	This means that the participants strongly disagreed to engage themselves in container gardening using recycled bottles.

2.1 Design and Procedure

This study employed a descriptive research method. A descriptive method is a type of research strategy that seeks information to comprehensively characterize a phenomenon, circumstance, or population; it addresses the what, when, where, and how questions (Voxco 2021). The way of taking data was by asking one-on-one interview questions and observing the planted crop using a plastic container in the area of Digos City. The expected month or months for crop growth were one or more months. The planted crop of the respondents in the container will be monitored and checked to make sure the seed they planted is alive, and they will have to wait for the different kinds of plants to be harvested at the right time. The data collection is based on fundamental techniques, including observation, which is a way of gathering research data by systematic counting, measuring, and categorizing. In the actual interview questions, the researchers will distribute questionnaires that allow

respondents to express their observations of the activity. How the study is beneficial daily and desires to engage in the study. Through the use of a container gardening program, neighborhood bond ties, and community practice in exchanging and giving crops to some households and sharing garden produce, the exchange unites the citizens. As a result of the study, the people who took part saw the results and were willing to do more of these things to keep healthy food around and improve food security, stability, and availability.

The researchers also approached the questionnaire's primary author to request permission to use it as an instrument. The researchers themselves personally administered the instrument to the respondents with permission from the school. Preparatory research was done by initiating in-person discussions with the barangay chairman in particular areas to obtain a letter of permission before conducting the study. The questionnaire would be retrieved, organized, and tabulated as part of the validation procedure.

Participants were introduced to container gardening as gardeners and volunteers in this study. This was an attempt to reduce the power dynamic that might develop between researchers and subjects while also establishing trust and a gardening relationship with potential volunteers. Researchers provide the seedlings and recycled containers for those willing to participate in the study, and the participants have been monitored for 1 month for outcomes and results. After that, the researchers did a real interview that was validated with the help of the indicators about container gardening, which had descriptions ranging from "very low" to "very high."

Answering questions is part of the action research process and a means of gathering interactive information. All of the following are done in a participatory way: formulating questions, acquiring data, analyzing the collected data, and preparing suggestions. Each item contains information that can assist in answering various aspects of the research topic. With an overall total rating based on respondent assessments in terms of social, physical, and mental health, the economy, and the environment (= 4.34; SD= 0.660), this indicates a very high level of engagement of participants in the container gardening program.

3. Results and Discussion

This study determined the profiles of twenty-five (25) households from Aplaya, Digos City, and twenty-five (25) households from Dapok, Kiblawan, and Davao del Sur, with a total of fifty (50) participants. Presented in Table 1 was the distribution of participants. The first column shows the profile, the second column indicates the frequency, and the third column determines the percentage.

Sex. Table 1 shows on characteristics of respondents in terms of gender it obtained a frequency of 35 females, which is the greatest level with an equivalent of 70% of the total population, while a frequency of 15 men with an equivalent of 30%, as seen in the table below. This shows that the majority of the participants are female. The analysis shows that women are the primary household managers, and that women gardeners help the environment and the economy more than males (Howard, P.L. 2006). Men and women around the world engage in gardening differently (Zasada et al 2020). It is also found that household container gardening increased nutritional diversification and food security (Assefa et al 2020). One intriguing conclusion from earlier study is how prevalent container gardening is among women. A lot of women cultivate in containers. This could suggest that container gardening has the ability to empower women and subvert conventional gender norms in urban agriculture. To investigate this matter in greater detail, additional study is necessary (Assefa et al 2020).

Age. As shown in Table 1 below, a frequency of 20 with a percentage of 2.0% is under the age of 25–34 years old. A frequency of 10 with a percentage of 2.0% is under the age of 35-44 years old. A frequency of 6 with a percentage of 4.0% for ages under 45-54 years old. A frequency of 6 with a percentage of 2.0% under the age of 55-65 years old. A frequency of 7 with a percentage of 8 is under the age of 65 years old and above. This table shows that those aged under 25–34 years old had the highest volume of participants out of all other respondents.

Table 1 Characteristics of the Respondents in terms of Gender and Age.

SEX	***F***	***%***
Male	15	0.30
Female	35	0.70
Total	**50**	**100.0**
AGE		
25 – 34	20	2.0
35 – 44	10	2.0
45 – 54	6	4.0
55 – 64	6	2.0
65 years old and above	7	8.0
Total	**50**	**100.0**

3.1. Level of Acceptability for Container Gardening Program as way of Food Augmentation, (n=50)

Presented in table 2, shows level of acceptability for container gardening program as a way of food augmentation of respondents in Aplaya, Digos City and Kiblawan, Davao del Sur, which have 4 indicators namely. With an overall total rating based on respondent assessments in terms of social, physical and mental health, the economy, and the environment obtained a (= 4.34; SD= 0.660).

This implies that despite being able to do container gardening with limited time, commitments and engagements, respondents overview results strongly agreed to participate in container gardening using recycled bottles.

*Social***.** Table 2 explains the level of acceptability for container gardening program as a way of food augmentation in terms of social had a computed result (= 3.93; SD= 0.691) obtained a high level of perception in engaging themselves to Container Gardening.

This implies that the respondents believe that it can enhance social bonding, builds social networks and develop relationship to neighbors in the community. As stated by the previous researchers (Brennan 2021), gardening with others at a community garden or other group settings takes teamwork to achieve shared goals and increase your social connections and your support system. Study says, many individuals find it difficult to socialize after retirement, but community gardens can be a fun way to do so while also benefiting the local area (Hayes 2017). In addition, it is stated in the study of Christensen, Dyg, and Allenberg (2019) the garden generates both bridging and bonding "cognitive" social capital, according to the main findings, and the gardeners consistently approved that the space seems to have a strong community and is incorporated with equality and diversity.

Physical and Mental Health. Table 2 explains the level of acceptability for container gardening program as a way of food augmentation in terms of physical and mental health had a computed result of (= 4.43; SD= 0.091) obtain a very high level of perception in engaging themselves to Container Gardening.

This implies that the respondents believe that it can improve my nutrition level, do some exercise and improve mental health and wellbeing. A study conducted in Japan revealed that elderly people benefit from household gardening, which also has positive effects on people's habits regarding diet and physical activity (Machida 2019). A multi-study review found that "any green environment boosted both self-esteem and mood, while the presence of water caused higher impacts" (Hall and Knuth 2019). Studies has showed that patients' wellness can be improved by the use of gardening as a holistic therapy to lower stress and anxiety (Thompson 2018). The study of Beavers et al (2022), stated that gardening helped them feel better, reduced stress and was a significant part of their spirituality, aided in their personal growth. These findings suggest that gardening may improve the physical and mental health of a variety of individuals.

*Economy***.** Table 2 explains the level of acceptability for container gardening program as a way of food augmentation in terms of economy had a computed result of (= 4.59; SD= 0.581) obtain a very high level of perception in engaging themselves to Container Gardening.

This implies that the respondents believe it can produce foods from own crops, it can also generate income and supply food and subsistence of. This suggests that the respondents are persuaded by the idea of other people's economic well-being, particularly in Canada. To provide fresh food to those who live in apartments or condominiums and lack the money to purchase fresh fruits and vegetables, new community and allotment gardens have been established in the province of Ontario and the City of Toronto (Stahlbrand and Roberts 2020). Furthermore, in the study of Porter (2018), findings indicate that it is plausible that productive food gardening would increase food security by supplying nutritious significant amounts of food. Growing food successfully at home might help remove some geographical and financial barriers to accessing fresh vegetables. Also, according to the study of Winkler, Maier, and Lewandowsk (2019), the self-production of food in urban gardens has a significant impact on consumer behavior. The participants in urban gardening in Germany purchase more seasonally, regionally, and organically produced food.

Environment. Table 2 explains the level of acceptability for container gardening program as a way of food augmentation in terms of environment had a computed result of (= 4.40; SD= 0.635) obtain a very high level of perception in engaging themselves to Container Gardening.

This implies that the respondents believe it can beautify space even in limited area, reduce pollution for sustainable environment as recycling plastic for containers and enhance the image and promote value of container gardening in the community. The key findings from the study of Thomas (2019), that consumer gardening habits and demographic traits affect people's general propensity to favor gardening products with environmental attributes. The propensity to favor gardening products with environmental benefits was significantly influenced by the tendency to participate in environmental or gardening clubs and the practice of gardening to grow food, also consumer preferences for potting mix with 25% biochar were analyzed in terms of its environmental attributes. In addition, the practice of Recycling household waste and garbage benefits the environment in more ways and offers health advantages as garbage is controlled and reduced (Barrameda 2017). By reusing items, it is possible to avoid the improper disposal of used containers and decrease the amount of rubbish produced, these serve as recycled containers. From the study of Sazada et al (2020), findings indicated that the benefits of sustainability can be expected primarily in environmental and sociocultural aspects, particularly for urban biodiversity conservation and aesthetically pleasing green urban spaces, and that they can be less anticipated in terms of economic contributions and food

production. The gardener's motivation and socioeconomic background influence their gardening behavior and sustainability more so than the type and size of their garden.

Table 2 Level of Acceptability for Container Gardening Program as way of Food Augmentation (n=50).

Indicators	Mean	SD
Social	**3.93**	**0.691**
If I participate in the urban container gardening, I believe I can enhance social bonding in a community.	3.94	.740
If I participate in the urban container gardening, I believe I can build social networks.	3.84	.710
If I participate in the urban container gardening, I believe I can develop my relationship to some farmers.	4.02	.622
Physical and mental health	**4.43**	**0.734**
If I participate in the urban container gardening, I believe I can improve my nutrition level.	4.56	.611
If I participate in the urban container gardening, I believe I can release my tense.	4.26	.803
If I participate in the urban container gardening, I believe I can improve my mental and health wellbeing.	4.46	.788
Economy	**4.59**	**0.581**
If I participate in the urban container gardening, I believe I can produce foods from my crops.	4.60	.571
If I participate in the urban container gardening, I believe I can generate my side income.	4.52	.614
If I participate in the urban container gardening, I believe I can supply my food and subsistence of family.	4.66	.557
Environment	**4.40**	**0.635**
If I participate in the urban container gardening, I believe I can beautify my neighborhood area	4.26	.723
If I participate in the urban container gardening, I believe I can reduce pollution for sustainable environment.	4.40	.639
If I participate in the urban container gardening, I believe I can enhance the image and aesthetic value of neighborhood.	4.54	.542
Overall	**4.34**	**0.660**

4. Final considerations

The research was conducted to determine the level of acceptability for container gardening programs as a way of food augmentation in selected areas of Aplaya, Digos City, and Kiblawan, Davao del Sur by selected respondents. (2) to determine the level of acceptability for a container gardening program as a way of food augmentation in terms of social, physical, and mental health, economy, and the environment, (3) to design a container gardening program for 4P's beneficiaries for food augmentation. This implies that the respondents were convinced as they experienced container gardening's economic benefits in Aplaya, Digos City, and Kiblawan, Davao del Sur.

The following are the findings of the study:

1. To determine the demographic profile of the respondents in terms of age and sex, it was revealed that females allocated the most participants and obtained a frequency of 35 and a percentage of 0.70, while the male participants obtained a frequency of 15 and a percentage of 0.30. In terms of age, it was discovered that 20 respondents belonged to the age range of 25 to 34 years old and received the greatest number of participants, while those aged 45 to 54 and 55 to 65 received the fewest.

2. To determine the level of acceptability for container gardening program as a way of food augmentation with 4 types of indicators. The indicator that got the highest mean and standard deviation is the economy which obtained a (= 4.59; SD= 0.581) with a very high level of perception towards container gardening. Followed by physical and mental health (= 4.43; SD= 0.091) and a very high level of perception towards container gardening. . Followed by, an environment that obtained a (= 4.40; SD= 0.635) and still on a very high level of perception towards container gardening. And lastly, the lowest rank of indicators is social engagement which only obtained a (= 3.93; SD= 0.691) but still obtained a high level of perception towards the container gardening program. The overall score in respondents' engagements is (= 4.34; SD= 0.660), this implies that respondents strongly agreed to participate in the container gardening program.

5. Implications

Consequently, local governments might be able to encourage the growth of container gardening engagement in several activities, such as a campaign to educate participants and non-participants about the advantages of container gardening in the future. The respondents from the identified area revealed that females ages 25-35 set an overall result of 4.34, which states that they agree with participating in container gardening. Container gardening; will greatly help the residents to supply their basic needs, especially food to alleviate hunger and provide food security. The result of the study leads to an opportunity to implement container gardening for 4P's beneficiaries and interested residents to improve their way of living, health, nutrition and education. Indeed, addressing food insecurity on a long-term basis requires an integrated strategy due to the complicated interactions involving food security, accessibility, consumption, and nutritional status with low-income respondents' health, mental capacity, productivity, and economic growth. Home gardening plays an important role in this method, as it allows individuals to obtain food without depending on other services (Chakraborty and Basu 2018). In this regard, the research

focuses on practices that may encourage the growth and sustainability of crop gardening in cities in the face of increasing land scarcity.

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Ethical considerations

The researchers observed full ethical standards in the conduct of the study following the study protocol assessments and standardized criteria by the institution. The following steps were taken to observe the ethical standards needed in the study, the researchers asked permission from the authors of the research instrument used.. Afterward, the researchers were granted permission by the authors to utilize the tools. Following the health and Safety protocols in gathering the data is a must. The survey was conducted with the respondents following the ethical considerations such as voluntary participation, informed consent process, permission form the organization, and without biohazard and conflict of interest issues in collecting the data for the study and archiving with confidentiality.

Conflict of Interest

The authors declare that they have no conflict of interest.

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References

Assefa M, Kassie M, Simtowe, F, Shiferaw B (2020) Household Container Gardening and Its Contributions to Food Security and Dietary Diversity: Evidence from Ethiopia. Sustainability 12:845. DOI: 10.3390/su12030845

Barrameda TV (2017) Surviving in the city through home gardens: a case study of Home Gardeners in Barangay UP Campus. Philippine Journal of Social Development 9.

Beavers AW, Atkinson A, Varvatos LM, Connolly M, Alaimo K 2022. How Gardening in Detroit Influences Physical and Mental Health. Int. J. Environ. Res. Public Health 19:7899. DOI: 10.3390/ijerph19137899

Christensen S, Dyg PM, Allenberg K 2019. Urban community gardening, social capital, and "integration" – a mixed method exploration of urban "integration-gardening". Copenhagen, Denmark, Local Environment 24:231-248 DOI: 10.1080/13549839.2018.1561655

Coleman-Jensen A, Rabbitt MP, Gregory C, Singh A (2017) Household Food Security in the United States in 2016. ERR-237, U.S. Department of Agriculture, Economic Research Service.

Dan Brennan MD (2021) How Gardening Affects Mental Health. Available in: https://www.webmd.com/mental-health/how-gardening-affects-mental-health?fbclid=IwAR1tQPk5tbtc_7wc7AYKAUyn838Louwmhbp9SKMw5ksIneqIIORjqgPyWQ. Accessed on: Eline K 2018. Barriers to Gardening for Older Women and Methods to Overcome Them. https://pureportal.coventry.ac.uk/files/31023684/Kolk._PhD_Pure.pdf

Giles-Corti, B, Vernez-Moudon, A, Reis R, Turrell G, Dannenberg AL, Badland H, Foster S Lowe, Sallis J.F, Stevenson, M (2026) City planning and population health: A global challenge. Lancet 388:2912–2924

Hall C, Knuth M (2019) An update of the literature supporting the well-being. Available in: October 7, 2021. Accessed on: https://ellisonchair.tamu.edu/files/2019/07/An-Update-of-the-Literature-Supporting-the-Well-Being-Benefits-of-Plants-A-Review-of-the-Emotional-and-Mental-Health-Benefits-of-Plants.pdf.

Howard PL (2006) 'Gender and social dynamics in swidden and homegardens. Latin America 2006:159–82.

Julianne QA (2021) IPB project promotes S&T-based home gardening in the time of a pandemic. Accessed on: https://uplb.edu.ph/all-news/ipb-project-promotes-st-based-home-gardening-in-the-time-of-a-pandemic/

Kilian SD, Robert H (2015) Container Gardening: A Way of Growing Vegetables in the City.

Kim H (2017) 5 Secret Health Benefits of Gardening. Accessed on: https://www.aarp.org/health/healthy-living/info-2017/health-benefits-of-gardening-fd.html

Machida D (2019) Relationship between Community or Home Gardening and Health of the Elderly: A Web-Based Cross-Sectional Survey in Japan. International Journal of Environmental Research and Public Health 16:1389 DOI:10.3390/ijerph16081389

Mc GSL, Höltge, J, Maercker, A, Thoma, MV (2018) Sense of Coherence and Stress-Related Resilience: Investigating the Mediating and Moderating Mechanisms in the Development of Resilience Following Stress or Adversity. Frontiers in Psychiatry 9:378.

Mendoza RU, Olfindo R, Maala C (2016) Spatia Disparities and Poverty: The Case of Three Provinces in the Philippines. ASOG WORKING PAPER 16-003. DOI: 10.2139/ssrn.2834759

Misha A, Pattnaik D (2021) Urban Agriculture During and Post COVID-19 Pandemic. Biotica Research Today 3:062-064.

Oktafiani R et al (2021) J. Phys.: Conf. Ser. 1918 052026 Determination of seed plant in Jepara's urban farming during the pandemic Covid 19.

Othman N et al (2017) 3rd AQoL2017Kuching, 14-16 Oct 2017. E-BPJ 2:335-340.

Purwanto et al (2021) IOP Conf. Ser.: Earth Environ. Sci. 892 012070 Urban farming and food security: household's adaptive strategy to COVID-19 crises.

Raphael AA, Owusu A, Charles P, Stephen AT (2019) A review of practices for sustaining urban and peri-urban agriculture: Implications for land use planning in rapidly urbanising Ghanaian cities. 84:260-277. DOI: 10.1016/j.landusepol.2019.03.004.

Rosenberg M, Kondo K, Kondo N, Shimada H, Arai H (2020) Primary care approach to frailty: Japan's latest trial in responding to the emerging needs of an ageing population. Integr. Healthcare J. 2:e000049.

Samarpan C, Debabrata B (2018) Homestead Gardening: An Emerging Venture Towards Achieving Food Security and Nutritional Security - A Study of Selected Areas of West Bengal. International Journal of Applied and Natural Sciences 7:49-62.

Silvana N, Antonio F, Glacomo C, Roberta B, Carlo N, Paolo S, Andrea E (2020) Food Supply and Urban Gardening in the Terms of Covid-19. BulletinUASM Horticulture 77:1843-5254, Electronic ISSN 1843-5394. DOI: 10.15835/buasvmcn-hort: 2020.0051

Soga M, Gaston K, Yamaura Y (2017) Gardening is beneficial for health: A meta-analysis. Prev. Med. Rep. 5:92–99

Stahlbrand L, Roberts W (2020) Local food system responses to COVID-19: Toronto and its city region. Available in: https://ruaf.org/news/local-food-systemresponses-to-covid-19-toronto-and-its-city-region/. Accessed on: September 20, 2020.

Statistic Bureau, Ministry of Internal Affairs and Communications (2020) Japan Statistical Yearbook 2020. Available in: http: //www.stat.go.jp/english/data/nenkan/1431-02.html. Accessed on: February 20, 2020.

Swafford M, Sisk C, Branson J, Paradis A, Dale KRF, Abigail B, Shelby C (2021) Addressing Food Insecurity in Food deserts for Children Through Container Gardening. Journal of Family and Consumer Sciences 113:16-22. DOI: 10.14307\JFCS113.4.16

Thomas ML (2019) An Analysis of Consumer Preferences for Gardening Products with Environmentally Friendly Attributes. Master's Thesis, University of Tennessee.

Thompson R (2018) Gardening for health: a regular dose of gardening. Clin Med (Lond). 18:201–205. DOI: 10.7861/clinmedicine.18-3-201

Voxco (2021) Available in: https://www.voxco.com/blog/quantitative-research-examples/.

Walsh A (2017) Container Gardening In The Philippines. Available in: https://borgenproject.org/container-gardening-philippines/.

Winkler B, Maier A, Lewandowski I (2019) Urban Gardening in Germany: Cultivating a Sustainable Lifestyle for the Societal Transition to a Bioeconomy. Sustainability 11:801. DOI: 10.3390/su11030801

World Food Program USA (2019) What causes hunger. Available in: https://youtu.be/zOyI6N4Teq0.

Zasada I, Weltin M, Zoll F, et al (2020) Home gardening practice in Pune (India), the role of communities, urban environment and the contribution to urban sustainability. Urban Ecosyst 23:403–417. DOI: 10.1007/s11252-019-00921-2