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From Soil to Sustenance: Development and Implementation of Extension Project for Food Security through Urban Gardening

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RESEARCH ARTICLE

Abstract

The COVID-19 pandemic has profoundly affected rural livelihoods. The loss of income and employment prospects constituted significant issues in impoverished communities in the Philippines. The economic repercussions of COVID-19 are especially concerning, given that the studied villages represent a segment of the most impoverished and vulnerable populations in the Philippines. To lessen the economic impact of COVID-19, *Pagpapayabong ng Produktong Agrikultura* was first launched among thirty (30) residents of Lucban, Quezon, composed of senior citizens, displaced workers, and solo parents, and consequently replicated to the twenty (20) 4P's grantees and thirty (30) members of the Parent and Teacher Association of *Paaralang Elementarya ng Lucban* 7. The project was implemented and later replicated by the Southern Luzon State University in collaboration with STAARRDEC, LGU-Lucban, DepEd-Lucban, and DSWD-IVA to address the issues of food shortages and unemployment confronting the COVID-19-affected communities through the transfer of available mature agricultural technologies in farming. The goal of this project is to empower the beneficiaries to be self-sufficient in food after the pandemic and ultimately uplift the quality of their lives. Development of IEC materials, facilitation of training on urban gardening and SNAP hydroponics, preparation of organic fertilizers and pesticides, and distribution of farming inputs among beneficiaries were the project strategies to attain its goal. Further, marketing strategies were also integrated into the project to introduce gardening as one of the potential sources of income in the future. Project beneficiaries were highly satisfied with the overall implementation. Beneficiaries were able to establish urban gardens where they continuously grow vegetables. Research revealed that container gardening outperforms SNAP hydroponics in terms of effectiveness. However, further research on the adaptability of crops to be planted and strengthening the marketing capability of beneficiaries must be implemented.

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1 INTRODUCTION

Malnutrition and food insecurity are two of the most significant global issues today. The COVID-19 pandemic exacerbates the prospects for food insecurity and malnutrition. Furthermore, Asia (381 million) and Africa (250 million) remain the predominant regions for the global undernourished population. The data indicate a rising prevalence of undernourished youngsters. The 2020 State of Food Security and Nutrition in the World Report indicated that the Philippines had the highest number of food-insecure individuals in Southeast Asia from 2017 to 2019, with 59 million

Filipinos experiencing moderate to severe food access deficiencies. The malnutrition issue in the Philippines is significantly more acute. The anticipated daily death toll of children due to malnutrition in the country is 95 (United Nations, 2019).

The COVID-19 pandemic has significantly impacted rural livelihoods. The loss of income and employment prospects constituted significant issues in impoverished communities in the Philippines. The economic repercussions of COVID-19 are especially concerning, given that the studied villages represent a segment of the most impoverished and vulnerable populations in the Philippines. After substantial employment and income losses, communities have an elevated risk of additional poverty escalation.

In June 2020, the Southern Tagalog Agriculture, Aquatic and Resources Research, Development, and Extension Consortium (STAARRDEC) proposed a post-lockdown project, *"Pagpapayabong ng mga Produktong Agrikultura: Sagot ng STAARRDEC laban sa COVID-19*," to lessen the economic impact of COVID-19. This consortium-led project is being implemented in cooperation with its five (5) member state universities and colleges (SUCs), as well as BPI-LBNCRDPSC, DA-RFO IV-A, DA-ATI IV-A, DTI IV-A, and the Local Government Unit (LGU) where the SUCs are located. The project supports RA 11469, or the *"Bayanihan to Heal as One Act"* of the government, and complements the Department of Agriculture's *"Plant, Plant, Plant Program."* The project goal is to empower the beneficiaries to be self-sufficient in food after the pandemic and, in the end, uplift the quality of their lives, as well as to attain food security and poverty alleviation.

From June 2020 to October 2021, the project was able to conduct four training courses: Preparation of Organic Fertilizer, Container Gardening, SNAP Hydroponics, and Product Development. These trainings highlighted and stressed guidelines for preparing the layouts of urban gardens using containers, positioning vegetables, space requirements, and inputs needed in SNAP hydroponics; converting agricultural waste into organic fertilizer; and marketing products. The thirty (30) beneficiaries who finished the trainings received important farming materials, like 10-L bottles, soil conditioner, urea, complete fertilizer, garden soil, various seeds, supplies for SNAP hydroponics, A-riser, and educational materials, and they got help to develop their urban gardens in the community from the Southern Luzon State University Office of the Extension Services and the Local Government Unit-Municipal Agriculture Office.

Moreover, Southern Luzon State University, through Extension Services, truly appreciates the benefits of the mentioned project for its beneficiaries; therefore, it is initiating the adaptation of the concept and selected activities from the STAARRDEC project to enhance opportunities for new beneficiaries by empowering them to achieve self-sufficiency in food after the pandemic and contribute to food security and poverty alleviation. The new sets of beneficiaries attended a series of training related to farming that developed their knowledge and skills in organic agriculture and urban gardening. The project called *"Pagpapayabong ng Produktong Agrikultura: Sagot ng SLSU sa Pagbangon sa Pandemya (Adaptation of STAARRDEC Project)"* and *"GULAYAN: Gardening Using Limited Agricultural Yard towards Amplifying Nutrition"* was created to support the ongoing partnership between DSWD and SLSU in helping 4P's grantees in Lucban, Quezon, and to respond to the request from Paaralang Elementarya ng Lucban, Quezon, to enhance its Seed of Love Project, which aims to gather funds and resources for the ongoing feeding program for students. This study is anchored on the Sustainable Livelihood Framework (SLF). SLF is adopted to study and understand the livelihoods of poor communities, particularly those facing food and income poverty. It views urban farming as a crucial livelihood strategy for achieving sustainable development and localizing the Sustainable Development Goals (SDGs). A livelihood is considered sustainable if it can cope with and recover from stresses and shocks, maintain or enhance capabilities and assets, and not compromise the livelihoods of others (Chaminuka et al., 2021).

The general objective of this study is to address the issues of food shortage confronting the COVID-19-affected communities through the transfer of available, mature agricultural technologies in farming. Specifically, it aims: (1) To capacitate the beneficiaries in producing consumable vegetables through the use of mature agricultural technologies; (2) To establish a mini urban garden in the community; and (3) To provide technical assistance on the proper management of mini urban gardens.

Food security is becoming an increasingly serious concern for many governments (Chanco, 2023). Food security, as defined by the Food and Agriculture Organization (2019), is the state in which all individuals consistently possess physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary requirements and preferences for a vigorous and healthy life. Additionally, food security is a complex and challenging issue to address, as it cannot be delineated by geography or restricted to a singular demographic, educational, locational, or economic category. Despite the availability of sufficient food to nourish the whole global population, one billion individuals (16% of the world's populace) endure persistent hunger. The difficulty of achieving food security rests in addressing the escalating food shortages caused by a combination of waste and a continuously increasing population. Predictions indicate that global food production must increase by 70% by 2050, notwithstanding existing limitations in infrastructure (McCarthy et al., 2018).

Between 2014 and the start of the COVID-19 epidemic, the number of people experiencing food insecurity and hunger had been steadily increasing. The COVID-19 crisis has worsened all types of malnutrition, especially in children. The United Nations Development Programme (UNDP) (2015) established Sustainable Development Goal 2 to address the global issue of hunger and malnutrition. SDG-2 targets and indicators must be in line with the availability, access, usage, and stability pillars of food security if hunger is to be eradicated (Food and Agriculture Organization, 2008).

In line with that, the COVID-19 epidemic and susceptibility to natural calamities underscored the necessity to enhance the Philippines' food security. Food price inflation reportedly rose from 6.5 percent in August to 7.7 percent in September. The primary drivers of increased food inflation are sugar, confectionery, and desserts (30.2%); corn (26.2%); and oils and fats (20.1%). This increase in food price inflation exacerbates the prevalence of nutritional inadequacies and undernutrition, which leads to a compromised immune system and heightens vulnerability to COVID-19 and other viral infections (Food and Nutrition Research Institute, 2020). Provinces, cities, and municipalities were categorized as low, medium, or high risk according to IATF announcements and the incidence of COVID-19 positive cases. A greater number of assessed households in low- and moderate-risk areas faced food insecurity compared to those in high-risk areas, which encompass provinces and highly urbanized cities (HUCs) with superior access to food supplies and government or private food contributions.

The primary issue of food insecurity in the Philippines is the low productivity of the agricultural sector. Farming methods are antiquated, the economics of agriculture impoverish the farmers, and the government is focused on rice (Chanco, 2023). Food security has come a long way, but the government still needs to address issues in the agriculture industry to ensure that this objective is met. This point was made clear in recent research by the Philippine Institute for Development Studies (PIDS), a government think tank, which assessed how well the Agriculture and Fisheries Modernization Act (AFMA) of 1977 was doing in terms of accomplishing its goal of ensuring food security.

The PIDS research recommends that the government use a "systems approach" to achieve coherence in its policies for food and nutrition security. It should consider "other systems," including those related to health, water and sanitation, social protection, and education. A strategic strategy that integrates the security of food and nutrition must be formulated. This plan must encompass objectives, key performance metrics, and notable activities and initiatives from diverse stakeholders.

1.1 Urban Gardening as a Source of Livelihood and Food Security

Urban farming serves as a significant strategy for poverty reduction through multiple interconnected pathways, primarily by enhancing food security, generating income, and reducing household expenses (Galhena et al., 2013, Chaminuka et al., 2021). Urban farming provides households with the opportunity to sell surplus produce, which can be a vital source of cash income (Türker & Akten, 2023; Balmer et al., 2005). For some, especially women in resource-poor

families, these sales can be their primary source of livelihood (Chaminuka et al., 2021). Income generated from selling garden products can be used for essential household necessities, rent, children's school fees, and savings, thereby addressing various dimensions of poverty, including income and education poverty. Studies have shown that families in some regions can generate more than 22% of their cash income through home gardening activities, with tree crops and livestock sometimes accounting for over 60% of household income. This also fulfills Sustainable Development Goal (SDG) 8, promoting decent work and economic growth (Trinh et al., 2003).

In addition, according to Blanckaert et al. (2004), by cultivating their own food, urban households decrease their reliance on purchasing food from markets. This is particularly crucial for low-income urban populations, who often spend a large portion (60–80%) of their income on food, making them highly susceptible to price volatility. Producing food at home means these funds can be redirected to other needs, leading to increased disposable income and improved economic well-being. Home gardens, for instance, offer a cheap source of nutritious foods for families who cannot afford expensive animal products (Bassullu & Tolunay, 2010). Moreover, urban farming directly contributes to food security by ensuring the availability, accessibility, utilization, and stability of food (Reyes-García et al., 2013). It provides consistent access to fresh, diverse, and nutritious foods, improving dietary quality and overall well-being. For underprivileged and resource-poor households, urban gardening can make nutrient-rich foods that are not economically accessible readily available. By alleviating food insecurity, urban farming helps to break the cycle of poverty, which is often exacerbated by poor health and lack of education due to malnutrition. This directly supports SDGs like No Poverty (SDG1) and Zero Hunger (SDG2) (UNDP, 2015). Additionally, urban farming acts as a crucial livelihood strategy for poor communities, especially in vulnerable contexts susceptible to shocks, trends, and seasonal challenges like hunger and high prices. It increases resilience against economic crises and disruptions in the food supply chain, making households less vulnerable to external pressures.

A livelihood is considered sustainable if it can cope with and recover from stresses and shocks, maintain or enhance capabilities and assets, and not compromise the livelihoods of others (Food and Agriculture Organization (FAO), 2013). While not always providing major employment opportunities, urban agriculture creates significant avenues for job training, skill development, and supplementing income, particularly for youth, disabled individuals, and immigrants (Asghar Pilehvar, 2021). This fosters decent work and economic growth (SDG8). Urban gardening is characterized as a production system that the poor can easily enter at some level, often requiring low capital input and simple technology. This inherent accessibility makes it a viable strategy for poverty alleviation for many, even those with very little or no land, through innovative techniques (Dominati et al., 2010). Farming has the potential to scale up into larger agribusiness ventures, promoting entrepreneurship and further contributing to income generation and employment.

The Sustainable Livelihoods Framework (SLF) illustrates how urban farming, when supported by livelihood assets such as natural capital (land), human capital (farming skills and knowledge), social capital (networks), financial capital (income), and physical capital (equipment), can lead to positive livelihood outcomes like increased income, improved well-being, and enhanced food security (Zainal & Hamzah, 2017, Chaminuka et al., 2021). However, the effectiveness of urban farming in poverty reduction hinges on adequate support and the resolution of challenges such as limited access to suitable land, lack of farming inputs (seeds, fertilizer, pesticides), insufficient extension services, and unsupportive policies. If not properly managed, issues like the careless use of chemicals can pose environmental and health threats, potentially undermining sustainable development goals (Chaminuka et al., 2021)).

2 METHODOLOGY

2.1 Strategies of Implementation

The Southern Luzon State University (SLSU) Office of Extension Services has undertaken several initiatives to implement the Pagpapayabong ng Produktong Agrikultura: Sagot ng SLSU sa Pagbangon sa Pandemya (Adaptation of STAARRDEC Project) and GULAYAN: Gardening Using Limited Agricultural Yard towards Amplifying Nutrition. Inspired by the concept of the STAARRDEC project, the SLSU Extension Office developed its own program to equip beneficiaries with essential farming knowledge and practical skills. These include training on urban gardening, SNAP hydroponics, and the preparation of organic fertilizers and pesticides.

Figure 1 shows the project employs a strategic approach to strengthen community capacity for sustainable and resilient food production through the use of innovative agricultural technologies and hands-on learning activities.

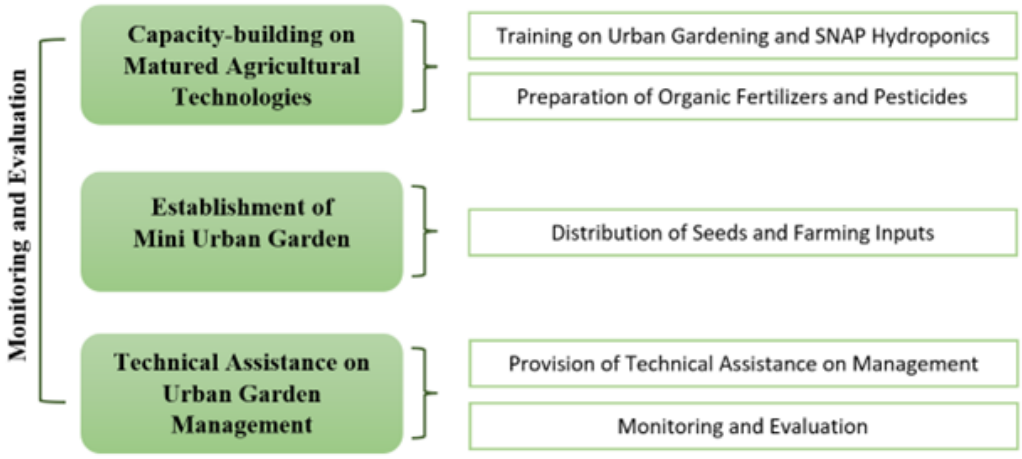

Figure 1. Strategies of Implementation of the Project *Pagpapayabong ng Produktong Agrikultura: Sagot ng SLSU sa Pagbangon sa Pandemya* (Adaptation of STAARRDEC Project) and *GULAYAN: Gardening Using Limited Agricultural Yard towards Amplifying Nutrition*

Recommended materials, including vegetable seeds, farming inputs, SNAP hydroponics supplies, and solutions, were distributed to help beneficiaries establish mini urban gardens in their backyards and school premises. Consistent monitoring of the beneficiaries' progress was emphasized to provide further technical assistance in guiding them on the proper management of urban gardens.

2.2 Conceptual Framework

Figure 2 illustrates the use of the Input-Process-Output framework in describing the project's conceptual framework. The input consisted of residents from the community, mature agricultural technologies, farming inputs, and IEC materials. Regarding the process, the project offered a series of training sessions on urban gardening, SNAP hydroponics, preparing organic fertilizers and pesticides, reproducing IEC materials, and distributing seeds and farming inputs. At the end of the project implementation, trained beneficiaries who have been introduced to mature agricultural technologies will reproduce IEC materials. Beneficiaries are expected to establish mini-urban gardens in their backyards and on school premises.

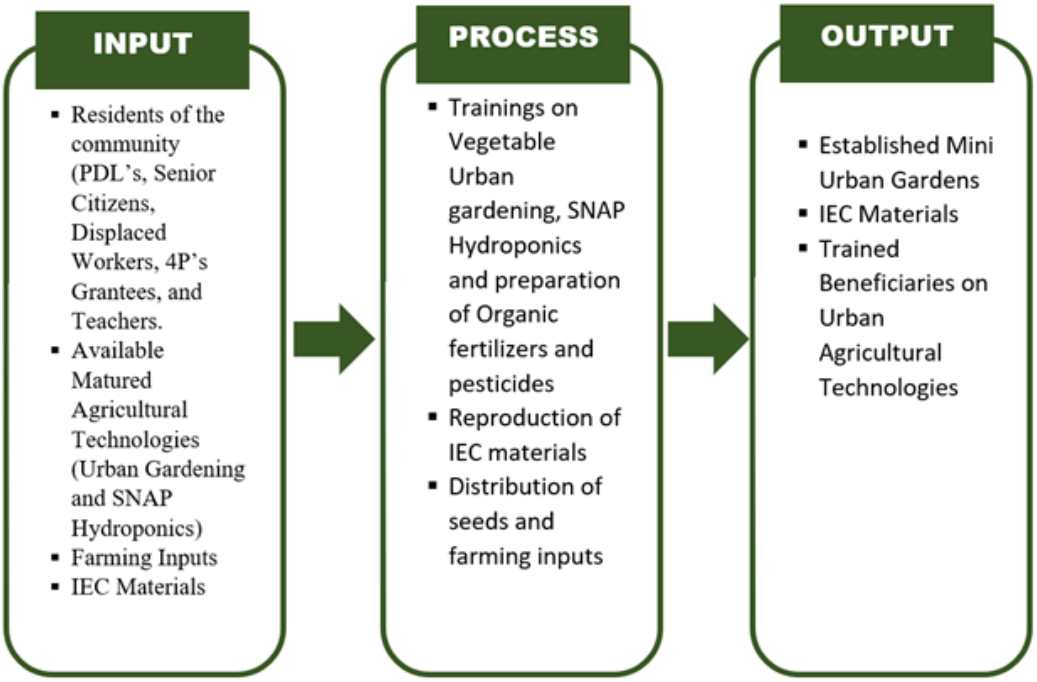

Figure 2. Conceptual Framework of the Projects *Pagpapayabong ng Produktong Agrikultura: Sagot ng SLSU sa Pagbangon sa Pandemya* (Adaptation of STAARRDEC Project) and *GULAYAN: Gardening Using Limited Agricultural Yard towards Amplifying Nutrition*

3 RESULTS AND DISCUSSION

Table 1 presents the evaluation of the training conducted, wherein the majority of the beneficiaries evaluated the training as excellent. The project was able to conduct a series of training sessions on making organic fertilizers and pesticides, understanding the concept of urban gardening, managing container gardening properly, and introducing SNAP hydroponics. Based on the evaluation rated by the beneficiaries, they were highly satisfied with the appropriateness of the given training. The training was suitable for the beneficiaries who have limited knowledge and skills in farming. Moreover, the concept of container gardening and hydroponics suits well the available spaces of the beneficiaries in their respective backyards. According to Kamali et al. (2025), effective training on specialized techniques and sustainable practices is critical for establishing and sustaining successful urban farming initiatives. This includes training on organic fertilizers and pesticides, urban gardening methods like container gardening, and advanced techniques such as hydroponics, especially for vulnerable populations.

Table 1. List of conducted trainings and the beneficiary's evaluation percentage per Training

Trainings Conducted	Evaluation/ Percentage					
	5	4	3	2	1	Total
Training on Organic Fertilizers and Organic Pesticides	74.7%	15.62%	9.68%	-	-	100%
Training on Urban Gardening (Container Gardening)	87.61%	7.32%	5.07%	-	-	100%
Training on SNAP Hydroponics	84.22%	14.0%	1.78%	-	-	100%

Legend: 5 = Excellent, 4 = Very Satisfactory, 3 = Satisfactory, 2 = Fair, 1 = Poor

The establishment of mini urban gardens was the focused output of this project. A total of 18 beneficiaries and 1 school successfully established mini urban gardens. The beneficiaries were able to cultivate vegetables such as *ampalaya*, *dahoon ng sibuyas*, *kamatis*, *lettuce*, *pak choi*, *talong*, *kangkong*, *sili*, and *luya* using container gardening. Further, SNAP hydroponics were only used on lettuce and pak choi. Table 2 shows the total volume of harvested vegetables using container gardening and hydroponics. Based on the data collected, there were 2,743.4 kg of harvested vegetables in container gardening and 586 kg of harvested vegetables in SNAP hydroponics. Chaminuka et al. (2021)) argue that the establishment of extension services for skill enhancement and improved productivity is necessary to train urban farmers in pesticide application. Consequently, the farmers would acquire essential knowledge that would enhance productivity while mitigating health hazards associated with pesticides. The study directly associates training and effective knowledge acquisition with enhancing agricultural productivity. This benefit is evident in the agriculture produced by the beneficiaries after attending the training.

Table 2. List and total volume of harvested vegetables using container gardening and SNAP hydroponics

Vegetables	Container Gardening	SNAP Hydroponics	Total Volume of Harvest
Ampalaya	229.8	-	229.8
Dahon ng Sibuyas	52.28	-	52.28
Kamatis	280.44	-	280.44
Lettuce	0	308	692
Pak Choi	593.82	278	941.82
Talong	448.5	-	448.5
Kangkong	813.96	-	813.96
Sili	151	-	151
Luya	173.6	-	173.6
Total	2,743.4	586	3,783.4

4 CONCLUSION

The sixty (60) trained beneficiaries of urban gardening and SNAP hydroponics were able to set up mini urban gardens in their respective backyards and to cultivate the school garden to fully support the feeding program of the school. Additionally, establishing mini urban gardens effectively assists the beneficiaries in ensuring a daily supply of vegetables, which helps reduce their food expenses. According to Galhena et al. (2013), urban gardening directly contributes to household food security by increasing the availability and accessibility of food. It provides easy access to fresh plant and animal food sources in both rural and urban areas. For vulnerable households, urban gardens serve as an instrumental and reliable food source, providing regular access to fresh and diverse food supplies throughout the year. In addition. Urban gardens act as a robust food system, increasing resilience and ensuring food security in the face of economic crises, political isolation, population pressures, resource limitations, and unforeseen events like pandemics. They provide a buffer during food shortages or emergencies by allowing for crop preservation (Kamali et al., 2025). Thus, the urban gardening project implemented for the beneficiaries helps food sustainability and security.

5 RECOMMENDATIONS

Based on the abovementioned conclusions, the following are recommended: categorize the beneficiaries in terms of level of knowledge and capability in farming in order to appropriately design the trainings and other necessary activities; conduct further study on the suitability of vegetables in the weather and soil conditions of the area; and allocate sufficient farming inputs among beneficiaries to support them in establishing their mini urban garden.

6 LIMITATION AND FUTURE WORKS

The SLSU Extension Services will continuously provide relevant retooling activities among the beneficiaries and assist them in the management of mini urban gardens by providing technical support and distributing additional farm inputs like seeds and soil conditioner when necessary. Moreover, replication of the said project will also be prioritized to promulgate the best practices in sustaining food security not only in the municipality of Lucban, Quezon, but also in the other cities and municipalities of Quezon Province. During the implementation of the projects, the following challenges were encountered: postponement of trainings due to COVID-19 strict health protocols, lack of a SNAP Hydroponics speaker, insufficient access to SNAP Hydroponics materials, excessive rain in the area, and an inappropriate variety of vegetables to be planted.

Rural livelihoods have suffered greatly as a result of COVID-19. In disadvantaged communities in the Philippines, loss of income and job possibilities were the main issues. Despite the negative effects of COVID-19, beneficiaries of the project were still able to cope with the situation through learning such skills that can help them sustain their daily food consumption and expenses. Urban gardening can be a great help among depressed families to sustain food security and can be a source of alternative income in the future.

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