

Objective-led Impact Assessment on Organic Urban Gardening in Malaybalay City

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Abstract

Food security is a climate-sensitive sector and it is affected by climate change. Efforts to secure food in the country have been implemented by various organizations. Hence, the project on modeling organic production and enhancing climate resiliency in Malaybalay City. The study was undertaken to assess the adaptability and sustainability of organic urban gardening in enhancing climate resiliency among small-holder farmers and highlights lessons generated by the project collaborators. Data were collected through a pre and post evaluation scheme using a semi-structured questionnaire to determine community characteristics and needs before project implementation, and the short-term impacts two years after the project implementation. SWOT analysis, frequencies, percentages, and means were used to analyze the data. The study was able to determine positive socio-economic characteristics and attitudes for the successful adoption of the project. The study revealed that the receiving community has a highly favorable attitude and willingness to adopt organic urban gardening for climate resiliency. Comparing the results of the pre-evaluation and the short-term impact assessment, it can be concluded that the community gained positive impacts due to the implementation of organic urban gardening or square-foot gardening for food security and climate resiliency by the project proponent. Social, economic, and environmental impacts were identified to have improved after project implementation. Thus, project scaling-up can be recommended.

Key words: Organic urban gardening, climate resiliency, impact assessment, scaling-up

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This work is derived from an earlier project titled “Food Squared: Enhancing Organic Production and Climate Resiliency among Small-holder Farmers in Malaybalay City” implemented in 2017 to 2019. The location is in Natid-asan, in Malaybalay City, Philippines. The project objectives were to increase organic production through sustainable urban organic gardening and develop climate resiliency among its community members.

In order to sustain its outcome, it is important to assess its effect on environmental, social and economic concerns. This paper opted to use objective-led integrated assessment to determine the extent of how the project makes a positive contribution to defined social, economic, and environmental objectives or indicators concerning baseline conditions (Pope et al., 2005). This would facilitate the implementation of an effective capability development on organic gardening and determine the community needs to ensure the sustainability of the proposed project in enhancing organic gardening in the said area.

In 2004, when sustainability assessment within the impact assessment tradition was popularized, a conceptual framework was proposed where the emerging theory and practice of sustainability assessment could be understood (Pope et al., 2005). Three models comprised the framework: first, baseline-driven integrated assessment that aims to minimize the negative impacts across the three pillars of sustainability; second, objective-led integrated assessment that aims to maximize positive outcomes across the three pillars; and third, assessment for sustainability that aims to assess whether or not a proposed activity is sustainable.

Objectives

This study intended to achieve the following objectives:

- a. characterize the socio-economic and ecological profile of the receiving community;
- b. determine the small farmers’ attitude and willingness towards adopting organic urban gardening; and
- c. assess the short-term sustainability impact of the project.

Review of Literature

Sustainability Assessment Framework

The most important step in sustainability assessment is to define a sustainability vision (Pope et al., 2004). The vision is equivalent to a desired end state or sustainability scenario for the social-ecological system in question, as defined by all interested and affected parties during the participation process.

As with the better-known forms of environmental assessment (EIA and SEA), it is necessary to obtain information and knowledge of the environment in which the proposed development project is to be implemented (Haywood et al., 2009). The following are basic information needs:

(1) The current state of the environment (social, ecological, economic, and the status of the links between them); (2) knowledge, skills, and attitude (KSA) of target beneficiaries; (3) legal and institutional background of the local area, region, country (4) drivers of environmental change (e.g., specific economic development policies); (5) trends in environmental changes (e.g., year on year deterioration of water quality in a catchment); (6) future development scenarios (e.g., catchment development

plans that include several other land-use changes and other development, to enable the consideration of cumulative effects or conflicts and the contest for ecosystem services); (7) and, identifying opportunities and constraints offered by the unique character of the receiving environment, and all of the conditions listed above.

Theory of Reasoned Action

The attitude-behavior relationship theory states that people are rational and decide what to do on the available information (Herath & Wijekoon, 2014). They suggest that attitudes are developed through life experiences, both direct and indirect experiences and observations. This will then be used as a foundation for opinion and attitude towards a particular idea. This also connotes that attitude can be learned and can be changed. The same attitudes are influenced by knowledge and belief and may change over time as knowledge also changes.

Farmers' Attitude towards Organic Farming

The underlining determinant of farmer's attitude towards organic farming as an innovation involves the consideration of diffusion and adoption process orchestrated by channels of communication, timeliness of dissemination, social structure, and social values of the environment. On the same premise, socio-economic and mental factors influence the people's adoption of an innovation. According to Rogers (2003), a standard reference on diffusion studies, the five important characteristics of innovation related to an individual's attitude towards the decision-making process and eventual adoption are relative advantage, compatibility, complexity, observable, trial,

accessibility, and affordability (Sahin, 2006).

A study conducted among coconut farmers in Sri Lanka, concluded that farmers' attitudes and perceptions were among the major contributors to adopting organic farming. Knowledge about organic farming and contacts to extension workers have greatly influenced motivation towards adopting organic farming. Further involvement of a third party, such as the government or an NGO to assist organic growers could also ensure adaptability. Hence, the need for environmental governance (Herath & Wijekoon, 2014).

Materials and Methods

The study was conducted in Natid-asan, Barangay Casisang, Malaybalay City, Philippines. Barangay Casisang is an urban barangay with a population of 25,696 (2015 census). Various projects, such as adult literacy, have been implemented in Natid-asan with the DepEd-ALS. However, other issues such as poverty alleviation and food security have not been addressed in the barangay. The conceptualization of this program is intended to enhance food security through organic production. The barangay takes its asset from its existing facilities such as function hall, gardening area, computer laboratory, good leadership, and the willingness of the people to be trained.

The study used the quantitative descriptive method. An adapted questionnaire with a reliability coefficient of .823 was used to determine the small farmers' attitude and willingness towards adopting organic urban gardening.

The pre-evaluation and needs assessment data were gathered in March 2017 from 30 small-farmers in Natid-asan through individual survey questionnaire. Socio-economic characteristics, knowledge, and skills in organic gardening, attitude

towards and the willingness to adopt organic gardening were the focus of the semi-structured questionnaire. Frequencies and means were used to analyze data on community socio-economic profiles, and the knowledge and skills in organic gardening. SWOT analysis through the use of a literature review was done to determine the positive traits of the community that can be an advantage for them in the adoption of the project.

The attitude towards organic gardening of the community was gathered through a five-point Likert scale: strongly agree (5), agree (4), undecided (3), disagree (2), and strongly disagree (1). Eight positive statements about organic gardening were used to survey the respondent's extent of agreement on the subject matter.

The willingness to adopt the project was measured through a five-point Likert scale: very willing (5), willing (4), undecided (3), less willing (2), and absolutely not willing (1). Four questions were asked about the willingness of the respondents to adopt and participate in major activities of the project, i.e., yard gardening and training.

The short-term impact assessment was done in July 2019, two years after the project had started. All the 17 project implementers were enumerated in this assessment. The semi-structured questionnaire was partly based on the pre-evaluation form that also had three major parts: social sustainability, economic sustainability (cost-benefit analysis), and environmental sustainability. Frequencies, percentages, and means were used during data analysis. Moreover, the gathered data were compared to the baseline and pre-evaluation data to determine changes, especially in knowledge, skills, attitude, economic, and environmental aspect of the community.

Results and Discussions

Socio-Economic Profile of the Receiving Community.

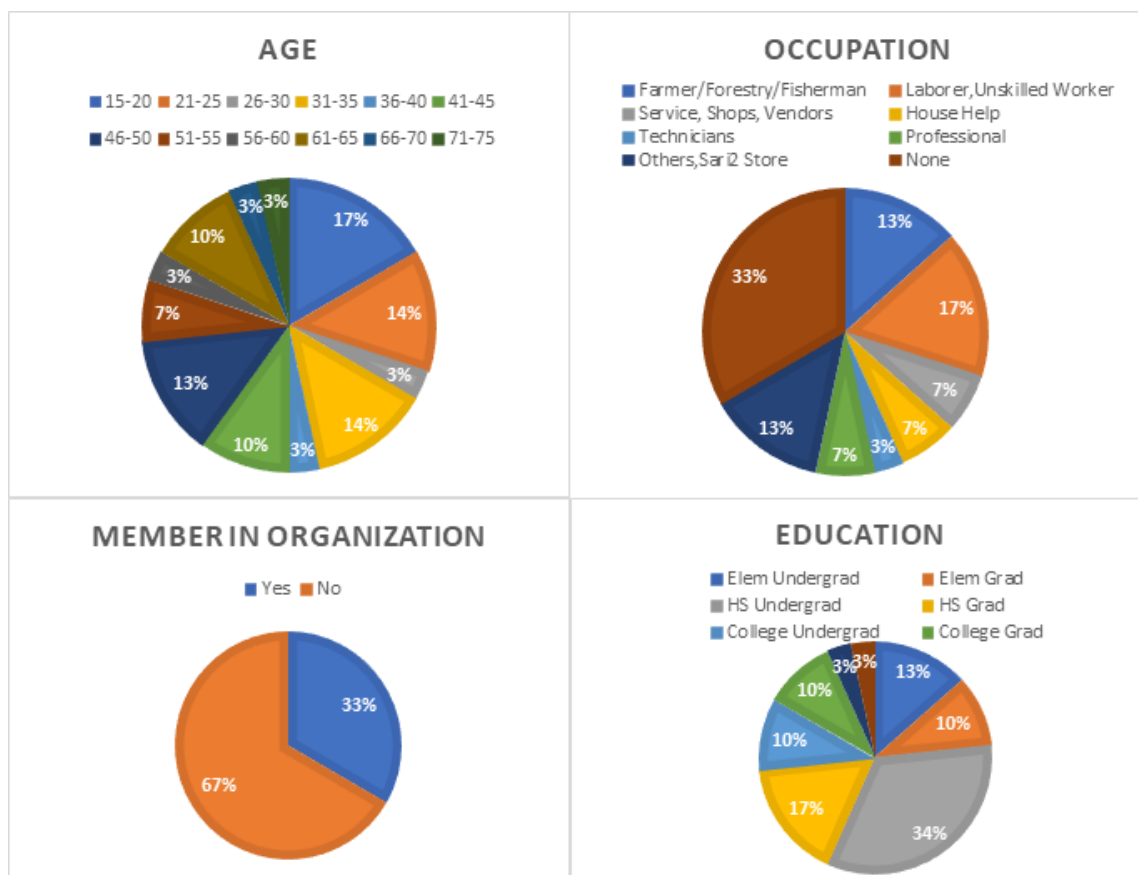
Social Profile. The study conducted pre-evaluation and needs assessment among community members (n=30) before the project implementation to acquire socio-economic characteristics and identification of training and organizational support needs necessary for a successful extension project implementation.

Figure 1 shows the social characteristics of respondents. In the community site, the largest fraction of the respondents were those aged 36-40 years old (17%), followed by 21-25 and 31-35 years old; each range was 14% of the total sample size. A few senior citizens, aged 60 and above, and youth, ages 20 and below, also comprised the minority of the respondents.

It appears that most of the respondents (33%) did not have a regular occupation; most of these were housewives. The majority or 34% of the respondents were high school undergraduates, followed by 17% high school graduates. Notably, 10% of the respondents finished college. These analyzed data indicated that respondents of the study were relatively middle-aged and had primary to secondary education.

Only 33% of the respondents who were members of the community organization were tied-up with the extension project. This characteristic implies interest among community members towards the project, even those without organization membership. Social capital is identified as pivotal in facilitating technology adoption. Some key points from the study of Adebisi et al. (2019) included factors affecting technology adoption decisions like the interpersonal relationship with a religious leader and the community tie-up with some

Figure 1. *Salient Features of the Selected Social Characteristics of Respondents*



affiliates in the field of agriculture motivated members to adopt organic farming. These became a means for which the community can be aware and be trained in organic farming.

Economic Profile. The average household size in the study site was five (5). Most of the respondents (54%) were from the low-income bracket. This is based on the Philippine poverty threshold estimated at 10,727 pesos average income per month for a family of five (Philippine Statistics Authority, 2018), the salient features of the economic characteristics of the respondents. The source of income was

mainly on farming (23%). However, 54% answered none, for they were housewives and did subsistent gardening.

The majority (37%) did not have sources of credit, an aspect that is considered a financial constraint to the sustainability of adoption. Source of credit can be made available to enable a farmer to adopt an innovation or contingency measures. However, it is also important that this borrowed fund can be invested for productive purposes (Berhanu, 2005).

A key economic status among respondents is house ownership (54%), while a few percentages were either living with their relatives as extended families

or renting. This attribute can be of great advantage for the households to establish gardens in their own areas. Secured land tenure is considered one of the factors leading to successful community gardening (Milburn & Vail, 2010).

Majority (47%) of the respondents had limited vacant lot area that could be utilized for gardening (less than 20m²), while only 13% have more than 60m² vacant lot for gardening. This implies the need of the community to learn techniques about optimizing limited spaces for urban gardening. Most of the respondents (47%) were not practicing organic gardening while the 33% have been adopting it. The remaining 20% were undecided. These data indicate the need for training on organic gardening addressing both the optimization

of available space and food security.

Overall, the socio-economic profile manifested that the community was feasible for urban gardening, given that there was a need for job and income among the community members. Also, active leadership, the availability of vacant yard spaces, and the ownership of their lot are positive attributes identified.

However, based on the results, practicing organic gardening was not common in the site, and some human capital aspects might be considered a challenge for the project implementation. These challenges, however, were addressed by the project proponent and collaborators during project design and development to ensure active member participation in the project in spite of the constraints.

Table 1

Extent of the Attitude of the Respondents towards Individual Statement on Organic Gardening (OG)

Statement	Mean	SD	Qualitative Description	Qualifying Statement
1. OG strengthens the use of indigenous knowledge.	4.50	0.68	Strongly Agree	Participants show a strong positive attitude towards OG.
2. OG conserves biodiversity/environment.	4.87	0.35	Strongly Agree	Participants show a strong positive attitude towards OG.
3. OG improves soil fertility.	4.86	0.35	Strongly Agree	Participants show a strong positive attitude towards OG.
4. OG reduces health risks for farmers.	4.70	0.53	Strongly Agree	Participants show a strong positive attitude towards OG.
5. OG products are safe and good for the health.	4.77	0.50	Strongly Agree	Participants show a strong positive attitude towards OG.
6. OG is easy to sustain.	4.70	0.60	Strongly Agree	Participants show a strong positive attitude towards OG.
7. OG increases farmers' income.	4.70	0.53	Strongly Agree	Participants show a strong positive attitude towards OG.
8. OG is efficient in adapting to climate change effects.	4.73	0.52	Strongly Agree	Participants show a strong positive attitude towards OG.
Overall	4.73	0.51	Strongly Agree	Participants show a strong positive attitude towards OG.

Legend:

Scale	Score Range	Qualitative Description	Qualifying Statement
5	4.21-5.00	Strongly Agree	Participants show a strong positive attitude towards OG.
4	3.41-4.20	Agree	Participants show positive attitude towards OG.
3	2.61-3.40	Undecided	Participants are not sure of their attitude towards OG.
2	1.81-2.60	Disagree	Participants show a negative attitude towards OG.
1	1.00-1.80	Strongly Disagree	Participants show a strong negative attitude towards OG.

Table 2*Willingness of Participants to Engage in Organic Gardening (OG)*

Statements	Mean	SD	Qualitative Description	Qualifying Statement
Are you willing to accept the implementation of organic urban gardening in community households?	4.97	0.18	Very willing	Participants are very committed to engage OA.
Are you willing to adopt the technology in your yard garden?	4.80	0.61	Very willing	Participants are very committed to engage OA.
Are you willing to learn how to use the internet to sell your produce?	4.87	0.43	Very willing	Participants are very committed to engage OA.
If not, are you willing to let your children be trained for computer skills?	4.83	0.47	Very willing	Participants are very committed to engage OA.
Overall	4.87	0.42	Very willing	Participants are very committed to engage OA.

Legend

Scale	Score Range	Qualitative Description	Qualifying Statement
5	4.21-5.00	Very willing	Participants are very committed to engage OA.
4	3.41-4.20	Willing	Participants are committed to engage OA.
3	2.61-3.40	Undecided	Participants are not sure to engage OA.
2	1.81-2.60	Less willing	Participants are slightly not committed to engage OA.
1	1.00-1.80	Absolutely not willing	Participants are strongly not committed to engage OA.

Knowledge and Skills of Receiving Community. Sixty-three percent (63%) of respondents have attended three or less trainings related to organic gardening. Most of these trainings were provided by the Department of Agriculture and the City Agriculture. From this percentage, only 38% experienced cross-farm visits to enrich learning on organic gardening. In the study of Landicho et al. (2019), cross-farm visit is a vehicle for promoting workable technologies that the farmers can adopt and where they can find practical and first-hand information and awareness.

Small Farmers' Attitude and Willingness towards Adopting Organic Urban Gardening

Table 1 shows the five-point Likert scale ratings for the statement to measure the attitude of the respondents towards organic gardening/SFG. This evaluation consisted of eight (8) positive statements.

The majority of the respondents had a positive attitude (i.e., agreed or strongly agreed) towards organic gardening. The mean extent of attitude is 4.73 or strongly agree. This means that respondents showed a strong positive attitude towards OG.

The respondents' willingness to engage in organic gardening (OG) was assessed using a four-point rating scale. The data are presented in Table 2. The mean willingness is 4.87 (very willing). This means that respondents were very committed to engage in OG. This suggests a very good social capital in the implementation of the project in the area.

The willingness level of the respondents can be attributed to the positive attitude they have for organic gardening. In the study of Herath et al. (2013), farmers' attitudes and perceptions are among the major reasons that led them to adopt organic farming. Also, the study explained that knowledge about organic farming and

extension worker contacts have greatly influenced motivation towards adopting organic farming. Further involvement of a third party, such as the government or an NGO to assist organic growers, could also ensure adaptability.

Table 3
SWOT Analysis of the Community Characteristics

Strengths	Weaknesses
Able age groups	Low-income bracket
Organization membership	Low job employment
Active community leadership	Low knowledge
Available vacant lot (big and small)	Low skills
Lot/home ownership	Lack of source of credit
Positive attitude towards organic gardening	Low organization membership
Willing ness of participants to engage in the project	
Opportunities	Threats
increase food availability through organic urban gardening	Lack of financial resources may be a constraint to the adoption.
Increase income through gardening	Low organic membership may be a constraint to bonding social capital
Climate resiliency due to food security	

The results on the respondents’ degree of attitude and willingness show that the community generally exhibited a positive characteristic for the adaptability of the extension project. Salient community features include the need for income, availability of space, lot ownership, active community leadership, positive attitude towards organic agriculture/gardening, and the high willingness to adopt the project. Hence, the community has the potential for technology adoption based from the SWOT analysis results (Table 3). Their strengths could be enhanced while their weaknesses

could actually be transformed into opportunities for capability-development trainings in organic urban gardening and climate change awareness.

The pre-evaluation results served as basis for improving the project design and development, especially identifying the training needs in the community. A series of trainings on organic urban gardening or square-foot gardening was conducted. Additionally, e-marketing, financial literacy and climate change awareness were conducted from 2017 to 2018. Stakeholders’ consultation was also held to address implementation problems. The project members conducted an evaluation for the best implementers in the second quarter of 2018 to give due appreciation to successful adopters and a form of encouragement to the other members.

Short-Term Sustainability Impacts of the Project

This section shows the results and findings of the short-term impact assessment conducted in July 2019. The goal of the project was primarily on food security and climate resiliency. The impact assessment was anchored on these goals along with other vital sustainability indicators adopted from Haywood et al. (2009).

Social Impacts

Knowledge. The mean self-assessed level of knowledge in the community has increased from 2.75 during the pre-evaluation to 4.35 after project implementation. Among the three terms in Table 4, knowledge on climate change adaptation (CCA) has the highest mean score (4.80). The project conducted a seminar-workshop on CCA on April 2018 to increase awareness on climate change and encourage the community to take action for CCA through organic agriculture/gardening, the main goal of

Table 4*Distribution of Self-assessed Knowledge Level of Respondents on Organic Gardening*

Self-assessed knowledge on:	Before Project Implementation				After Project Implementation			
	Mean	SD	Qualitative Description	Qualifying Statement	Mean	SD	Qualitative Description	Qualifying Statement
Organic gardening	2.70	1.42	Undecided	Participants are not sure of their knowledge towards OA.	4.18	0.76	I know this well	Participants have knowledge and understanding towards OA.
Climate change	2.87	1.46	Undecided	Participants are not sure of their knowledge towards OA.	4.07	0.66	I know this well	Participants have knowledge and understanding towards OA.
Climate change adaptation	2.69	1.37	Undecided	Participants are not sure of their knowledge towards OA.	4.80	0.81	I know and understand this very well	Participants have high knowledge and understanding towards OA.
Overall Mean	2.75	1.41	Undecided	Participants are not sure of their knowledge towards OA.	4.35	0.74	I know and understand this very well	Participants have high knowledge and understanding towards OA.

Legend:

Scale	Score Range	Qualitative Description	Qualifying Statement
5	4.21-5.00	I know and understand this very well.	Participants have high knowledge and understanding towards OA.
4	3.41-4.20	I know this well.	Participants have knowledge and understanding towards OA.
3	2.61-3.40	Undecided	Participants are not sure of their knowledge and understanding towards OA.
1	1.00-1.80	I do not know this yet.	Participants have poor knowledge and understanding towards OA.

the project. Knowledge is an important primary asset in human capital in order for individuals to perform a specific task and is vitally important for an organization's success (Crook et al., 2011)

Respondents were also highly active in the participation of various trainings related to the project. Among the respondents, 59% attended three (3) trainings, and 41%, among others, attended four to six trainings since the implementation of the Bukidnon State University project. These data revealed that project proponent provided more trainings to enhance and develop the skill of the respondents on organic gardening to improve their way of life and promote, healthy living through their produce.

Skills. Results show that 100% of the participants affirmed that they had applied

all the skills that they have learned through the implementation of this project.

All of the respondents (100%) affirmed that in the implementation of this project, all of them were using climate-resilient crops or short-cycle crops. These climate-resilient crops identified by the respondents include *kangkong*, *pechay*, string beans, eggplant, and *kamunggay*. These kinds of crops are harvested in a short time. Also, by using these kinds of crops, they could easily manage and control pests without using pesticides and help them to have good harvest.

One hundred percent (100%) of the respondents of this project were practicing diversified farming. Through the project, the respondents have learned how to utilize their small area by having a variety of crops, livestock, poultry, and fishpond. They

have learned strategies from the training and seminars they have attended and by visiting other organic gardens and farms. One hundred percent (100%) changed cropping patterns based on the on-set of rainy seasons. Changing the cropping pattern could break the attack of pests, and other diseases among plants to have a good harvest. Additionally, changing the cropping pattern could produce high demand products/crops to be able to have a sufficient supply of vegetables that is easily available.

One hundred percent (100%) among the respondents used integrated pest management. Also, by using this technique the respondents could be able to maximize the use of non-chemical methods of pest control. These methods of control reduce pollution and other undesirable side effects of insecticides. Due to this method, the farmers could be able to have a good harvest at the same time reduce the harm to the environment.

Environmental Impacts of Organic Gardening.

The respondents gave their perception and attitude towards environmental changes due to the project implementation. Ninety-four percent (94%) answered that they observed positive environmental changes after the project implementation, while 6% did not have the observations. Most of the respondents checked two-three items that they observed. The frequency counts of the observed changes are presented in Table 5. Increased green spaces is the top observable environmental change based on the survey.

The environment or the natural capital provides life sustaining goods and services

to the community. One objective of the project was to enhance this aspect through organic gardening and/or diversified farming. As stated in the previous discussion, 100% of the respondents were practicing diversified farming. In addition, it also lessens the negative impact of the changing weather patterns due to climate change. This environmental change in effect has improved their gardens and produce, consequently ensuring food security and resiliency in the household.

Table 5

Positive Environmental Changes Observed due to Project Implementation

Changes observed	Frequency (n)
1. Increased green spaces	14
2. Improve aesthetics	12
3. Increased productivity	13
4. Increased number of plant species/crops in the area	15

Quantifiable Benefits. As reflected in Table 6, within three months, most of the respondents had sales between 2000 pesos and below. This indicates that the sales of their produce were not profitable. However, this is expected considering the primary use of their produce is for household consumption.

The paper of Langellotto (2019) emphasized that the economic value of vegetable gardening has a positive net return to gardeners since the worth of the home-produced products is higher compared to the input costs. Similarly, according to Galhena, Freed, and Maredia (2013), the gardens have persistently endured the test of time and continue to play an important role in providing food and income for the family.

Table 6

Frequency and Percentage Counts of Sales of the Respondents in Organic Gardening

Range	Frequency	Percentage
2,000 and below	11	64
2001- 4000	1	6
4001- 6000	2	12
6001- 8000	0	0
8001-10,000	0	0
10,001-12,000	2	12
12,001 and above	1	6
Total	17	100

Based on Table 7, the respondents sell their home-grown produced vegetables to the market that amounted to a mean value of 4,196.10 pesos within three months. The highest sales amounted to 11,900 pesos, and the lowest was 100. This implies that organic gardening has a positive economic impact on the lives of the participants. This shows further that growing one's food saves expenses from buying in the market.

Table 7

Mean of the Benefits Received from the Project

Benefits	Mean Benefit per month
Sales from produce	4,196.12
Vegetable household consumption	740.06
Total Benefits	Php 4,936.18
Cost-Benefit Analysis	Php 3,936.05

The households had an estimated monthly consumption of home-grown vegetables of 740.06 pesos. Instead of spending money to buy vegetables from the market, respondents considered this amount as part of their savings. Aside from the money saved, the households consumed

fresh vegetables free from harmful chemicals like pesticides and commercial fertilizers.

Over-all Findings and Lessons from the Impact Assessment

All of the respondents (100%) agreed that there was positive socio-economic change due to the project. Contributory factors to the change were identified by the respondents during the survey as shown in Table 8.

Table 8

Contributory Factors to the Socio-economic Change

Factors	Frequency	Rank
BukSU Extension project	14	1
NCCC Inc., Leadership	12	2
SFG & Organic gardening	11	3
Technical Support	8	4
Others	2	5

BukSU extension project was considered as the primary contributing factor of this change; the study, however, likewise shows other factors that contributed to this change. This includes private agencies including NCCC Inc., leadership, and technical support.

All of the participants were able to produce vegetables primarily used for household consumption. Portions of the produce were sold and/or given to their neighbors. This project did not only provide the extra income, but it also improved the bonding social capital among the members of the family and the community as well.

Training and seminars conducted were considered by most of the respondents as what they like most. SFG and organic gardening, technical support, among others were identified as highly important.

The respondents were likewise a recipient of various technology and planting material from the above-named agencies of government, which was very useful considering that they were still in the initial stage of the implementation. Accordingly, all of these were used by the community during the succeeding stages of implementation of the said project.

However, if there was one thing the respondents would like to improve about the project it was the timeliness of scheduled activities. There were some cases where scheduled events were postponed in later dates due to funding concerns by the project proponent. The project was externally funded by an agency.

On the other hand, they acknowledged the provision of inputs by the proponent and collaborators as a vital aspect to start-up the project along with the free training-seminars provided.

Its community leaders were noted to be very active facilitators of the project. Their presence in every activity encouraged respondents to attend the same. It was also through these leaders that the proponents of this project were able to successfully organize the community, which was the pre-activity of the project.

Balance between leadership and management determines effectiveness and success, contributing to the benefit of the local community and to sustainable urban development. However, leadership cannot exist and influence without followership as much as leadership cannot be shared without the will of the community (Burtscher, 2010). Since the project pre-evaluation, the community was already identified for its receptiveness to the project. In addition, the community showed positive attitude towards the project adoption. Hence, the success of the project during the project

implementation was due to their concerted efforts of many groups.

According to the majority, the most challenging aspect about adapting the project was the materials needed for start-up, including fertilizers, and planting equipment. During implementation, pest management and produce thieves were the problems. Some problems were beyond the control of the proponent and adopters but stakeholders' consultation with the presence of technical experts in agriculture was done to address pest management.

To ensure that the respondents would involve themselves despite the lack of finances on the side of the adopters, the proponent together with collaborators provided some start-up materials like seeds and vermicast.

For them, the best lesson they learned through the project was learning to garden organically, that is, without the use of chemical fertilizers. Other learnings included financial literacy and garden diversification.

The project outcomes caused positive changes in human and social capital, economic, and the environmental sustainability specifically on food security and climate resiliency. The project impacts showed that with organic garden establishment, food produce is not only provided but also the long-term benefits in the human and social capital, economic and the natural capital within the community.

Based on the experiences with the proponents, the community suggested the following for future project scaling-up: regular visit/meeting from the proponent, more training/seminars, visitations and meetings, and establishment of a communal garden.

These suggestions can serve as bases for future scaling-up of the project to a

wider scope of community members or increasing the number of communities or urban barangays for adoption, with Natidasan as the model community.

Conclusion

A selection of socio-economic traits from the results of the pre-evaluation in the community such as organization membership, community leadership, lot ownership, and the need for income are good characteristics or opportunities for project adoption. It can be concluded that the receiving community has a highly favorable attitude and willingness to adopt organic urban gardening for climate resiliency. Furthermore, the attitude-behavior relationship theory of Herath and Wijekoon, (2014) confirmed the positive manifestation of the respondents in their eagerness in the practice of organic urban gardening.

From the results of the short-term impact assessment, it can be concluded that the community gained sustainability impacts due to the implementation of organic urban gardening or square-foot gardening for food security and climate resiliency. The social and economic capital in the community were enhanced through various approaches the project used. Consequently, through the project adoption, positive environmental changes were observed in the community.

Recommendation

The study results would serve as bases for future extension project design and development, implementation and evaluation. Specifically, the study recommends the following:

1. It is recommended that the project may be scaled-up to increase the number of

community adopters and/or to enhance the acquired knowledge and skills on organic gardening among the community adopters in Malaybalay City, taking into consideration the community modeling lessons for improvement of project design and development.

2. The identified positive attributes that led to technology adoption may be considered in the selection of adopters for future project scaling-up; and
3. A policy forum with stakeholders may be done to ensure the community gardening continues even after the end of the project.

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