

**IMPROVEMENT IN THE KNOWLEDGE OF
FARMERS ON SELECTED AGRI-TECHNOLOGIES:
PRELIMINARY INITIATIVES FOR FOOD
SUFFICIENCY DURING THE COVID-19 PANDEMIC
IN BUKIDNON, PHILIPPINES**

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Abstract

The COVID-19 pandemic has negatively affected the agricultural supply chain, threatening small farmers' food security and income. With this, Central Mindanao University initiated extension initiatives to train farmers on mushroom and vermicompost production. This study assessed the improvement in farmers' knowledge of mushroom production and vermicompost production in selected farmer groups in Bukidnon, Philippines. The study used a quasi-experimental research design following the one-group pretest-posttest design. The study was conducted on four farmer organizations with 70 participants located in the municipalities of Quezon, Maramag, Don Carlos, and Talakag in Bukidnon. A separate test questionnaire was developed for mushroom and vermicompost production pretest and posttest. A t-test was used in the analysis. Findings revealed that farmer respondents already have moderate knowledge of mushroom and vermicompost production. However, after the extension interventions were given to them, there was a significant increase in their knowledge level in both agri-technologies (p -value=0.000). Thus, the training on mushroom and vermicompost production effectively improved farmers' knowledge. These initiatives can be replicated in other areas to increase the number of beneficiaries using a combination of extension methodologies. Regular and continuous monitoring can be done to ensure high adoption of agri-technologies for food sufficiency.

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INTRODUCTION

The global COVID-19 pandemic has had a significant impact on the agricultural sector. The demand, supply, and flow of agricultural commodities were disrupted. This situation has led to a food shortage in the country (Dili, 2022). It is estimated to have a 3.11% or 29.58 million tons decrease in the aggregate volume of agricultural production in Southeast Asia (Gregorio & Rico, 2020). In addition, the increase in food prices severely impacted the living standards of low-income households (Dili, 2022). It was identified that smallholder farmers experienced an increase in food insecurity (Durano et al., 2024).

To help local communities during the height of the pandemic, Central Mindanao University (CMU) conducted extension initiatives for selected farmers' organizations. This initiative includes seminars, lectures, training, method demonstrations, and field visits on mushroom and vermicompost production. These extension methodologies are identified to be effective (Derogongan & Jamel, 2019). These two agri-technologies are two of CMU's matured technologies that are ready for transfer to the community. Aside from contributing to the augmentation of food supply, mushroom production is seen as a profitable venture that aids in resolving poverty due to its low set-up cost, high price margin, and quick returns. Mushroom production is considered easy, fast, and economical, which will suit poor and landless farmers (Chang et al., 2014). On the other hand, vermicompost production is also considered a profitable venture for social enterprises that could generate high-income (Acabal, 2022). These extension interventions are seen to resolve the challenges among farmers on food insecurity and low income. The extension interventions served as a preliminary step in ensuring food sufficiency and an increase in farmers' incomes. This study attempted to gauge the improvement of the farmer-beneficiaries knowledge level on mushroom and vermicompost production before and after the interventions.

Objectives

The study assessed the improvement in farmers' knowledge level of mushroom and vermicompost production in selected farmer groups in Bukidnon, Philippines.

Scope and Limitations

This study was conducted in 2022-2023 during the COVID-19 pandemic. It covered only four (4) farmer groups/organizations in four (4) areas in Bukidnon. These areas include Mibantang, Quezon; Calaocalao, Don Carlos; Basecamp, Maramag; and Lapok, Talakag. There were only ten questions each in mushroom and vermicompost production questionnaires.

Hypothesis of the Study

Ho₁: There is no significant difference in the farmers' knowledge of mushroom production after the training.

Ho₂: There is no significant difference in the farmers' knowledge of vermicompost production after the training.

METHODOLOGY

Central Mindanao University conducted a series of extension teaching methods for four farmers' organizations on its matured agri-technologies. These extension strategies include seminars, training, lectures, method demonstrations, and field visits. These technologies include mushroom production and vermicompost production. This was conducted during the COVID-19 pandemic from 2022 to 2023. The project's objective is to increase farmers' food supply for food sufficiency amidst the crisis. Faculty members from the College of Agriculture served as resource persons during the training series. The training lasted one day per farmer group beneficiary for the vermicompost production and another day for all beneficiaries for the mushroom production.

The study used a quasi-experimental research design following the one-group pretest-posttest design. The study was conducted on four farmer groups in four Bukidnon areas. These areas include the municipalities of Quezon, Maramag, Don Carlos, and Talakag. Primary data was obtained from the questionnaires administered to 70 farmers who attended the training conducted by Central Mindanao University, particularly on mushroom and vermicompost production. Separate questionnaires were used for the two topics. Each set of questionnaires has 10-item multiple-choice questions. The t-test is a parametric test for determining the difference between the means of two paired measurements. This was used to determine the difference in the knowledge level of farmers before and after the training series using $\alpha=0.05$. The level of knowledge was described using the following scale:

Score	Description
0-2	Very Low Knowledge
3-4	Low Knowledge
5-6	Moderate Knowledge
7-8	High Knowledge
9-10	Very High Knowledge

RESULTS AND DISCUSSIONS

Table 1 shows the knowledge level of farmers who attended the extension interventions on mushroom production before and after the intervention. These interventions include lectures, method demonstrations, and hands-on training. Results revealed that out of 10 items multiple-choice questions, the average score was 6.41 during the pretest on mushroom production. This result implies that the farmers already have prior knowledge of mushroom production. This knowledge is characterized to be moderate. After the intervention, the average score in the posttest was 8.74. This knowledge is characterized to be high. This result shows an increase in farmers' knowledge of mushroom production. The scores' distribution for the pretest and posttest are characterized as close to normal. The mean value and median for both pretest and posttest are close.

Table 1. Paired sample statistics on mushroom production

		Mean	Median	N	Std. Deviation	Std. Error Mean
Pair 1	PreTest	6.4143	6	70	1.58336	.18925
	PostTest	8.7429	9	70	1.07253	.12819

Table 2 compares the knowledge level of farmers who attended the extension interventions on mushroom production before and after the intervention. The result of the paired t-test shows that the p-value of 0.000 confirms a highly significant difference between the pretest and posttest, not because of chance but because of real difference. This means the pretest score is statistically different from the posttest score. With the large t-value, there is a substantial increase in scores in the posttest. This could mean that the extension interventions for mushroom production increased the farmers' knowledge. This result conforms to the study of Ganie et al. (2024) on rural women in India, where 90% of the participants showed improvement in their knowledge after the women received training on mushroom production. This suggests that targeted training programs effectively enhance farmers' understanding and skills related to mushroom production. Combining extension strategies is vital in increasing farmers' knowledge (Derogongan & Jamel, 2019).

Table 2. Effect of extension interventions on the knowledge level of mushroom production

		95% Confidence Interval of the Difference							
		Mean	Std. Dev.	Std. Error Mean	Lower	Upper	T	df	Sig. (2 tailed)
Pair 1	MPretest-MPostTest	2.32857	1.11279	.13300	2.06324	2.59391	17.508	69	.000

Table 3 shows the knowledge level of farmers who attended the extension interventions on vermicompost production before and after the intervention. These interventions include seminars and lectures. Results revealed that during the pretest on vermicompost production, out of 10 items multiple-choice questions, the average score was 6.35. This result shows that farmers already have background knowledge of vermicompost production. This knowledge is characterized to be moderate. After the intervention, the average score in the posttest was 8.68. This knowledge is characterized to be high. This result shows an increase in farmers' knowledge of vermicompost production. On the other hand, both pretest and posttest are characterized as having a close to normal distribution. The mean value and median for both pretest and posttest are close.

Table 3. Paired sample statistics on vermicompost production

		Mean	Median	N	Std. Deviation	Std. Error Mean
Pair 1	PreTest	6.3571	6	70	1.56997	.18765
	PostTest	8.6857	9	70	1.02918	.12301

Table 4 compares the knowledge level of farmers who attended the extension interventions on mushroom production before and after the intervention. The result of the paired t-test shows that with the p-value of 0.000, there is a highly significant difference between the pretest and posttest, not because of chance but by real difference. This means the pretest score is statistically different from the posttest score. With the large t-value, there is a substantial increase in scores in the

posttest. This could imply that the extension interventions for vermicompost production were effective in increasing farmers' knowledge. This result aligns with the study's findings among farmers who underwent training on vermicompost in Bihar State, India. The study indicated that after the farmers underwent three trainings on vermicomposting, over 50% had a moderate level of adoption of the vermicompost technology (Prakash et al., 2024). A combination of training, seminars, and other extension modalities can lead to an increase in the knowledge level of farmers.

Table 4. Effect of extension interventions on knowledge level of vermicompost production

		95% Confidence Interval of the Difference							
		Mean	Std. Dev.	Std. Error Mean	Lower	Upper	T	df	Sig. (2 tailed)
Pair 1	VPretest- VPostTest	2.32857	0.95889	.11461	2.09993	2.55721	20.318	69	.000

Based on the statistical results, there is sufficient evidence to reject the H_{01} . This implies that there is a significant statistical difference in the knowledge level of farmers on mushroom production before and after the extension interventions. In addition, there is also sufficient evidence to reject the H_{02} . This implies that there is a significant statistical difference in the knowledge level of farmers on vermicompost production before and after the extension interventions.

Table 5. Hypothesis testing results

Hypothesis	Decision
H_{01} : There is no significant difference in the farmers' knowledge of mushroom production after the training	Reject null hypothesis
H_{02} : There is no significant difference in the farmers' knowledge of mushroom production after the training	Reject null hypothesis

CONCLUSION

The extension interventions carried out by Central Mindanao University effectively improved the self-assessed knowledge levels of farmers in selected areas of Bukidnon, Philippines, regarding the production of mushrooms and vermicompost. The knowledge levels significantly increased between the pretest and posttest results, suggesting that these training programs effectively gave farmers the know-how and resources they needed to implement these agri-technologies, which in turn increased food production and had positive economic effects.

RECOMMENDATIONS

It is recommended that extension interventions be expanded to other areas in Bukidnon to allow more farmers to learn about mushroom and vermicompost production. Regular and continuous monitoring should be conducted to ensure a high adoption rate and to apply what they have learned from the training. Diversification of training methods like hands-on workshops, technology-based learning, lectures, and the like will be ideal to accommodate different learning styles.

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Conflicts of Interest

The author has disclosed no conflicts of interest.

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