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Enhancing Farmers Capability through Agri Techno-Enterprise in Bukang Liwayway, Kibawe Bukidnon

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ABSTRACT

CMU is active and committed to addressing poverty and providing livelihood to secluded areas in Bukidnon. Bukang Liwayway, Kibawe, Bukidnon is under category B area of the Geographically Isolated and Disadvantaged Area or Conflict-affected/Vulnerable Area. The study was conducted to provide agricultural technical services needed by the farmers. Specifically, it aimed to describe the socio-demographic characteristics of the farmers, determine at least one potential business opportunity suitable in the locality, and enumerate farmers' problems. The data was gathered through personal interviews, survey questionnaires, secondary data, FGD, and Key Informant Interviews. Data were analyzed using descriptive statistics such as mean, percentage, and frequency counts.Results revealed that the farmers in Bukang Liwayway were female, catholic, middle-aged, Cebuano, had experience in farming, with average household, and with a monthly income of 5,548 pesos only, landowners, source of funds were lending institutions, with contact to extension agent and attended training and seminars. Farmers' technical training is needed in integrated pest management, oyster mushroom production, and agricultural enterprise and marketing. Mushroom production was established in the area in collaboration with the Barangay Council. Problems identified are the infestation of pests and diseases, which resulted in low farm harvest and higher prices of farm inputs but lower farm gate prices. The participants rated the overall conduct of the extension seminar and the training on Business Management as excellent. Farmers were satisfied with the training.

KEYWORDS: Capability building, Mushroom production, Community *Extension*

I. INTRODUCTION

Agricultural farming in the Philippines contributes to the National GDP. This sector employs 25% of Filipinos, serving as the primary source of income in the country in the rural areas (ILO, 2021). The agriculture sector is vital in achieving food security in the country as it produces crops like rice, corn, cassava, fruits, and vegetables, staples in Filipinos' diets (World Bank, 2020). Despite its importance, the sector encounters several problems and challenges, such as inadequate access to modern farming technologies, climate change, and

low productivity (Briones, 2021). By focusing on and addressing these concerns, the productivity of the agricultural sector can be enhanced, and the long-term viability of agri-farming in the Philippines is ensured through investing in agriculture infrastructure, education, and sustainable practices (Gonzales, 2022).

Agricultural farming is significant, specifically the production of fresh mushrooms, due to its economic potential, which provides extra income and helps achieve sustainable development goals on food security and applying sustainable practices (Gonzales et al., 2020). Mushroom production offers various nutritional benefits that improve the diet of the Filipino people (Dizon et al., 2021), low investment needed, and can be integrated into the existing agricultural system and rapid growth cycles, which makes it accessible to smallholder farmers (Baconguis& De Vera, 2019; Newton & Simos, 2024).

Capability-building training such as mushroom production, integrated pest management, and other livelihood projects allows farmers to start businesses to augment their income. It is defined as the process of strengthening, unleashing, and maintaining the ability of people in society to manage their lives. It has been one of the Food and Agriculture Office (FAO) mandates since its founding. It encourages developing nations like the Philippines to implement policies that will help foster food security through agriculture and rural development and reduce poverty (FAO, 2016). According to Sanchez (2010), agricultural entrepreneurship has an exceptional potential to help rural people with declining incomes due to a lack of business information needed for a start-up business. Thus, there is a need for comprehensive training programs that address these gaps while fostering entrepreneurship. According to Kearns (2020), IPM includes the management of pests in a sustainable manner and providing farmers with skills needed to improve agricultural productivity and profits. Capability Building is defined as the process of strengthening, unleashing, and maintaining the ability of people in society to manage their lives. It has been one of the Food and Agriculture Office (FAO) mandates since its founding. It encourages developing nations like the Philippines to implement policies that will help foster food security through agriculture and rural development and reduce poverty (FAO, 2016).

The conduct of hands-on training equipped the farmer's capabilities to improve crop productivity and agro-enterprise in Bukang Liwayway, Kibawe, and Bukidnon with more knowledge, skills, changes in practice, behavior, attitude, and application in Agriculture and Agri-enterprise management. A participatory approach, in extension, was utilized. The crucial role of the extension agent in this approach is to facilitate the identification of the problems that should come from the rural people. People will become aware of the reasons for the problems they are facing. Participatory Approach Approaches, in extension, refer to the principles organizations use, which help inform, stimulate, and guide the organization in achieving its mission and vision. The Participatory Extension approach is critical in delivering an extension program. It is best to involve farmers at all phases of the research process, from identifying the problems and needs through the preparation and planning phase to the execution and evaluation of the research and extension program.

The study aimed to develop farmers' capability in agriculture and agri-techno enterprises in Bukang Liwayway, Kibawe, and Bukidnon. Specifically, it aimed to identify the socio-demographic characteristics of the farmers in Bukang Liwayway, Kibawe, and Bukidnon; determine at least one potential business opportunity suitable in the community; train at least 20 farmer participants in mushroom production, Integrated pest management, and agri-

enterprise marketing; and identify problems faced by the farmers in Bukang Liwaywayway, Kibawe, Bukidnon.

II. METHODOLOGY

Locale of the Study

The locale was chosen based on the recommendation of Geographic Focus Areas for Inclusive Growth and Development, Northern Mindanao (GIDAS). Bukang Liwayway, Kibawe, Bukidnon is under category B, which means that the area is either Geographically Isolated and Disadvantaged Area or Conflict Affected/Vulnerable Area with more than 30% Poverty with 89.72 poverty incidence as of 2015. The Enhance Participatory Landscape Lifescape assessment (EPLLA) was conducted headed by Dr. Casas, and it was identified that the needs of the residents were to enhance the farmer's capability on mushroom production, Integrated pest management (IPM), Diversified farming, and Agri-enterprise.

The study was conducted at Bukang Liwayway, Kibawe Bukidnon. It is one of the barangays under the municipality of Kibawe, Bukidnon. It has a total population of 823 individuals, which represents 1.96% of the population of Kibawe. Bukang Liwayway is located on the Island of Mindanao, approximately 7.4936, 125.0242, at 531.2 feet above sea level. The primary crops cultivated by the farmers in Bukang Liwayway are corn and coconut(PhilAtlas, 2023). Figure 1 presents the map of Bukang Liwayway, Kibawe, Bukidnon.

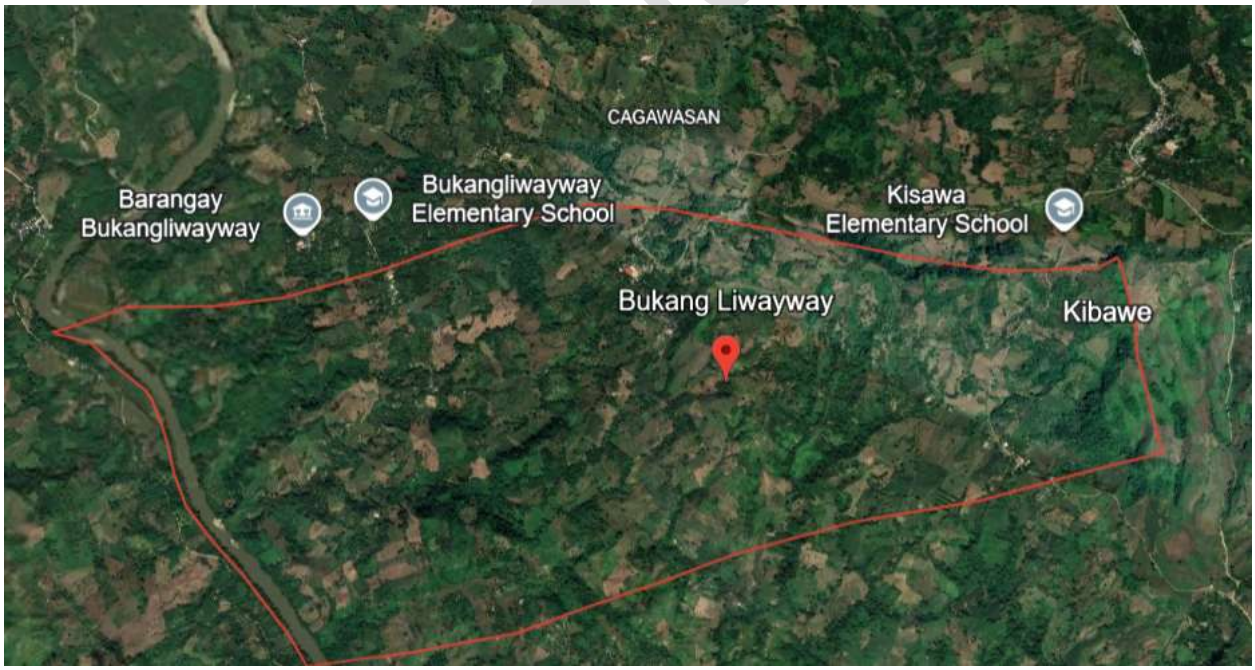

Figure 1.Map of Bukang Liwayway, Kibawe, Bukidnon Source:Google Earth

A focus group Discussion (FGD) was conducted by the researcher to confirm the needs of the farmers. Presenting this problem to the stakeholders would stimulate the group to express their views on possible solutions to the problems based on their essential needs. The

following questions were asked during the Focus group discussion: What are the problems related to agriculture, education, climate change, livelihood, and social services, and what are the reasons for these problems?

Participants of the study were the 23 farmers of Bukang Liwayway, Kibawe, Bukidnon. The study employed complete enumeration. This study utilized a mixed-method design. To achieve the objectives of the study. The research team created the questionnaire, which was then subjected to content validity by university experts, pilot tested, and subjected to Cronbach alpha for validity and reliability. Pilot testing was done to check the clarity of the questions, eliminate difficulties or ambiguities in the wording, and estimate the length of time it would take to complete the questionnaire (Cohen et al., 2000). A formal letter requesting permission was sent to the municipal mayor of Kibawe Bukidnon and the Barangay Captain of Bukang Liwayway, Kibawe, Bukidnon. Descriptive statistics such as frequency count, means, and percentage were used. Data were gathered through personal interviews using a survey questionnaire and analyzed using descriptive statistics such as mean, percentage, and frequency counts.

III. RESULTS & DISCUSSIONS

Farmer's Socio-Demographic Characteristic of Bukang Liwayway Kibawe, Bukidnon

The following section will discuss the farmers' socio-economic characteristics, including age, sex, income, Occupation, ethnic origin, religion, household size, years living in the barangay, household expenses, and crops planted. Age refers to the number of years of the respondents from the year of birth up to the time of the interview or the length of time that the respondents had lived at the time of the interview. Figure 3 shows the distribution of farmers according to age. Almost one-third (32%) of the farmers were 51 years old and above, and almost one-third (31%) were ages 41-50 years old. A little over one-fifth (37%) of the farmers aged 31-40. The oldest among the participants was 61 years old, and the youngest was 30, with a mean age of 48. This reveals that the farmers were middle-aged. This result is similar to the study of Ucang et al. (2022); Quijano-Pagutayao (2023); Soliven et al.(2024), who mentioned that the participants of the study in Bukidnon were generally middle-aged. This result was supported by PSA (2015), which reported that the average age of Filipino farmers was 57 years old. According to Mangubat (2003), as an individual grows into adulthood, his/her values, attitudes, percep tions, feelings, and needs change correspondingly. The younger the farmer, the greater the probability that he/she will accept the ideas.

Figure 2. Age distribution of farmers

Sex. It refers to whether the respondent is male or female. It was assessed by asking the respondents to choose between male and female. In terms of sex, more than one-half (60%) of the respondents were female, and 40 percent were male. This result is similar to that study of Esters (2007) and Quijano et al. (2020), who mentioned that more female respondents than male respondents were found in the study. Lingatong (2006) found out that men prefer those highly to work on farms more than women. Most women's activities and self-concept start to revolve around the home. Women exhibited a greater desire to stay in community development than men who were still inclined to teach compared to women who were attracted to it.

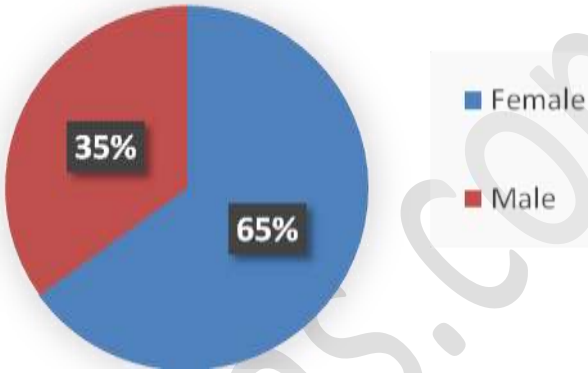

Figure 3. Distribution of the farmers according to sex

Religious Affiliation

Figure 4 shows the distribution of farmers according to religious affiliation. Most (85%) of the farmers were Roman Catholic, and less than one-tenth (8%) were Born Again Christians. This indicates that farmers belonged to different religious groups but were dominated by Roman Catholic believers. According to PSA (2010), Roman Catholicism was still the dominant religious affiliation in Mindanao, with 60.9 percent of the household population. Catholics in Northern Mindanao comprised 75.30%, while the Davao region had 76.69%. 76.69%.

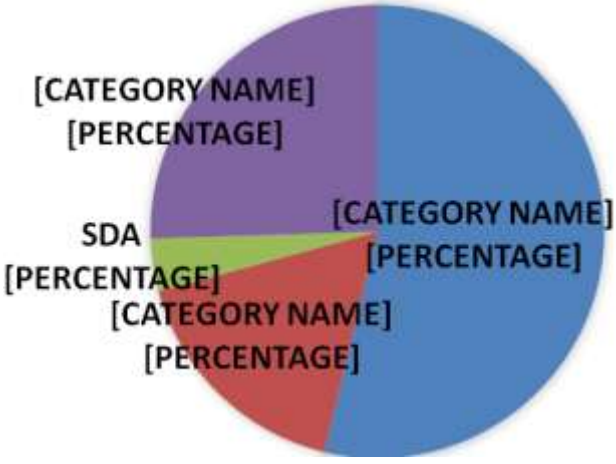

Figure 4. Distribution of farmers according to Religious Affiliation

Ethnic Origin

Figure 5 shows the distribution of farmers according to ethnic origin. Almost two-thirds (65%) of the farmers were Cebuano, and slightly more than one-fifth (21%) were Native. This means that the farmers have different ethnic origins, and many were migrants from the Visayas group of islands. This result is supported by (Reyes, 2019; Cruz et al., 2020). The Philippines is a country and an island inhabited by several ethnic groups. This result implies a significant presence of Cebuano in Kibawe, Bukidnon, and reflects the migration of farmers from Cebu to Mindanao Island, Philippines (Bautista, 2018).

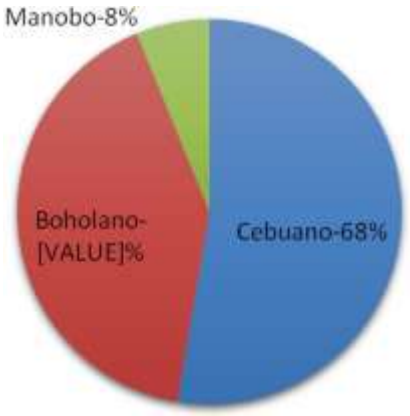

Figure 5. Distribution of farmers according to Ethnic Origin

Occupation

Figure 6 presents the Occupations of the farmers in Bukang Liwayway. The majority (62%) of the participants' Occupations were farmers, which means that participants rely on farming. According to Francisco (2017), Filipinos depend on agriculture as a source of their livelihood, and Mindanao has the highest number of people engaged in farming. This finding is in line with the study by the Manila Times (2013), which found that one of the significant sources of income for an average Filipino is farming.

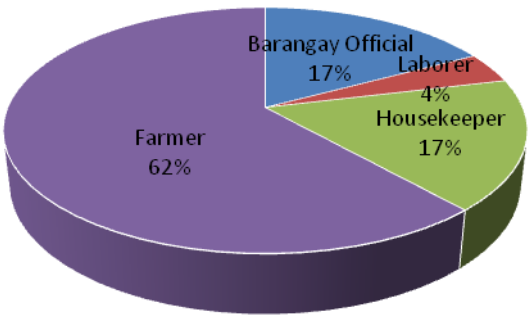

Figure 6. Distribution of farmers according to Occupation

Monthly Income

Monthly Family income is the estimated value of accumulated gross compensation a family gets for services rendered or sold in 2020. According to the (Philippine Statistics Authority [PSA], 2020), income refers to the farmer's total cash obtained, products, and services from various resources. It can be gleaned from Figure 5 that most farmers' income ranges between 1,000 and 5,000 pesos. The average monthly income of the farmers in Bukang Liwayway, Kibawe, Bukidnon is only 4,548 pesos. This indicates that most participants struggle to attain higher incomes (PhilRice, 2021). This implies that most of the farmers' average monthly income in Bukang Liwayway is below the national poverty threshold and highlights the economic challenges faced by agricultural workers in the region (Baclig, 2022). This result corroborates the study of FAC (2020), which reported that most farmers in the agricultural sector have a low-income level.

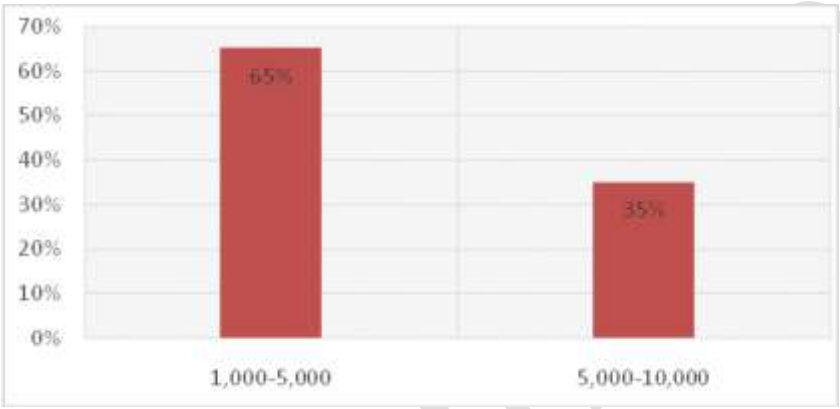

Figure 7. Distribution of Participants according to Monthly Income

Household Size, Tenurial Status, Years in Farming, Source of Information, Access to Credit

Household size. The average number of the farmer's household size was six (5). The most extensive household comprises ten (11) members, while the smallest comprises one (1). This result is the same as that of PSA (2016); the average household size in the Philippines is 4.4 persons, and five (5) household members are considered large. Large household sizes indicate enough human resources to operate a family farm, improving a family's agricultural production and household chores (Saliu et al., 2016). Small (2009) stated that large family sizes will demand greater household expenditures. The bigger the family, the more income is needed, but when the household size is already earning, the family can increase its income.

Tenurial statusrefers to land ownership tilled by the farmers utilized for agriculture. This was measured by asking the participants the total area allotted for agriculture. It can be seen in the table that most (11) of the farmers were the owners of the land that they were cultivating, with an average farm size of 1.51 hectares. Farm size is the piece of land used primarily for agricultural purposes to produce food to help achieve food security. Smaller farm sizes achieve lower rates of return than larger farms (Bellwood, 2007). These results suggest that a great bulk of the farmers have land used for agriculture and that the size of the land used for agriculture was generally small. In the Philippines, the mean area for farming in every household has considerably declined over time. Between 1960 and 1971, the mean farm size was 3.6 hectares. This sharply decreased to 2.8 hectares in 1980 and 2.2 hectares in 1991. The population has consistently increased while land area intended for agriculture has

decreased (Gultiano& Urich, 1998). According to the World Bank's Databank, the arable land in the Philippines increased from 4,901,000 hectares in 1961 to 5,590,000 hectares in 2014. However, with the increasing population and youth bulge in the Philippines, the arable land per capita declined from 0.18 hectares per person in 1961 to 0.05 hectares per capita in 2014.

Years in Farming.Experience is necessary in producing crops (Pereda, 2008). All of the participants reported that they had experience in farming. In general, the average years of farming experience were 19 years. These findings imply that most of the farmers in Bukang Liwayway were familiar with the farming industry as they were farmers with experience in the farming industry. This result corroborates the work of Abebo and Sekumade (2013) in their conclusion that respondents had experience in farming.

Source of Information. Farmers identified that their primary source of income is the government through the agricultural extension agent. Bachhav (2012) mentioned that relevant and timely information helps farmers' communities make the right decision to sustain the growth of agriculture activity in agriculture. He further noted that the farmers with no other information source tend to affect the perception of new technologies compared to those with multiple sources.

Access to Credit. The table below shows that farmers borrowed money from a lending institution, friends, and neighbors. According to Okurut et al. (2014), access to credit facilities increases farmers' income in the short run and enables them to establish and expand their farms. Credit also encourages farmers to use modern technologies.

Table 3. Farmer's Socio-economic Characteristic in terms of Tenurial Status, Average farm size, Years living in the barangay, source of water, and source of information

Socio-economic Characteristic Characteristics	
Tenurial Status	Owner
Average Farm Size	1.51 ha
Years in Farming	19 years
Household Size	Five members
Average Year living in the barangay	39.30 years
Source of Farm Water	Rainfed
Source of Information	Government/Agricultural Extension Agent
Access to credit	Lending, Friends, and Neighbor

Potential Business Enterprise and Training on Business Management and Entrepreneurial Skills

All(100%) of the participants identified mushroom production as a potential business enterprise. Figure 8 presents the mushroom production as a Potential Business. The figure shows the process of mushroom production and the steps needed to establish a house. The establishment of mushroom houses was fundamental for creating a controlled environment necessary for healthy and faster growth and development of fresh mushrooms. It includes the site selection, size, humidity, and ventilation considerations to encourage colonization of the fruiting bags (Farmbox Foods, 2021). Farmers were trained in the packaging of technology in Mushroom Production.

Furthermore, business management and entrepreneurial skills were introduced to farmers' topics on sales, expenses, and how they can turn their mushrooms into business. This includes emphasizing the importance of understanding sales and expenses in transforming mushroom production as a potential business and learning how to compute the market would ensure profitability (Cornell Small Farms, 2023; The Green Conspiracy, 2021). Training farmers with these skills can lead to a viable and successful mushroom enterprise (Pashudhan, 2024).

Fruiting Bags Prepared by the Farmers of Ukang Liwayway, Kibawe, BUkidnon

Sterilization of the Fruiting bags for 6-8hours before planting

Mr. Bambao Demonstrating proper way of Inoculating Mushroom Spawn

Farmer's Method Demonstration in Inoculating Mushroom

Figure 8. Mushroom as Potential Business Problems Encountered by the Farmers

Among the problems identified were the infestation of pests and diseases, which resulted in low farm harvests and higher farm input prices but lower farm gate prices. This implies that farmers face various problems in farming(Philippine Statistics Authority [PSA], 2020). The increasing costs of fertilizers and pesticides significantly affect farmers' productivity while the prices of agricultural products are low (Farm Weekly, 2022). According to PSA (2021) , farmers face a poverty incidence of 34.3 percent, a considerably higher figure than the national average of 21.6 percent. FAO (2020) reported that severe problems in the farming industry have likely contributed to the high poverty incidence among farmers, underscoring the need for targeted interventions to support agricultural sustainability and improve livelihoods.

Evaluation Result in the Seminar Workshop

The participants rated the overall conduct of the extension seminar as excellent, as shown in Table 5. Registration was rated 4.77; the content was 4.83; the venue was 4. 68, while resource speaker and food was 4. 70. Based on the result, the total mean of 4.77 shows that farmers perceived excellent in good use of allotted time and the content presented applied to my field (4.87); excellent in the program was well organized, content met stated objectives, Schedule was followed, the content met my needs and length of the lecture was adequate (4.83), excellent in staff were helpful and courteous (4.80); excellent in registration was fast and simple (4.77), excellent in Knowledgeable of the subject matter and the food/refreshments were healthy and delicious (4.70), excellent in the venue was accessible and comfortable, quality of presentation/delivery, responsive to questions and novelty and usefulness of topic (4.67). The training on Mushroom Production results in Bukang Liwayway, Kibawe, Bukidnon was excellent in their participation.

The excellent ratings indicate that the seminar effectively met the participants' expectations (Philippine Statistics Authority [PSA], 2021). Santos et al. (2020); Bautista (2019), mentioned that positive feedback and effective seminar content and organization were crucial for enhancing participant satisfaction and future engagement in similar programs, leading to the extension program's overall success. Lastly, the excellent rating also implies that the

seminar provided knowledgeable resource speakers who were experts in delivering their topics, which led to a higher retention rate and possible application of skills introduced during the training session (Gonzales, 2022).

Table 5. Evaluation of the Mushroom Production Training in Bukang Liwayway, Kibawe, Bukidnon

INDICATORS	WEIGHTED MEAN	QUALITATIVE DESCRIPTION
1. REGISTRATION (Registration was fast and simple)	4.77	Excellent
2. The staff was helpful and Courteous	4.80	Excellent
3. PROGRAM (program was well organized)	4.83	Excellent
4. Good use of allotted time	4.87	Excellent
5. Schedule was followed	4.83	Excellent
6. CONTENT (Content met stated objectives)	4.83	Excellent
7. The content met my needs	4.83	Excellent
8. The content presented applied to my field	4.87	Excellent
9. The length of the lecture was adequate	4.83	Excellent
10. VENUE (The venue was accessible and comfortable)	4.67	Excellent
11. RESOURCE SPEAKER (Knowledgeable of the subject matter)	4.70	Excellent
12. Quality of presentation/delivery	4.67	Excellent
13. Responsive to questions	4.67	Excellent
14. Novelty and usefulness of topic	4.67	Excellent
15. FOOD/REFRESHMENT (The food/refreshments are healthy and delicious)	4.70	Excellent
TOTAL MEAN	4.77	Excellent

Legend:

5	Excellent
4	Very Satisfactory
3	Satisfactory
2	Fair
1	Poor

Evaluation Result of the Training on Business Management in Bukang Liwayway,Kibawe, Bukidnon Based on the result, the total mean of 4.62 on the evaluation result of the training on Business Management in Bukang Liwayway, Kibawe, Bukidnon. It shows that farmers rated excellent in staff was helpful and courteous (4.74); excellent in the venue was accessible, comfortable, and knowledgeable of the subject matter (4.68); excellent in registration was fast and simple, quality of presentation/delivery, responsive to questions, novelty, and usefulness of topic and the food/refreshments were healthy and delicious (4.63). This result is similar to (Freshworks, 2024). participants found the food and refreshments to be healthy and delicious

Excellent in the program was well organized, made good use of the allotted time, no schedule was followed, the content met my needs, the content presented applied to my field, and the lecture length was adequate (4.58). The program was also praised for being well-organized, making good use of allotted time, and ensuring that the content met participants' needs which is applicable to their fields (Gonzales, 2022);(Cornell Small Farms, 2023).

The participants rated excellent in content met stated objectives (4.53), which reflects the overall positive impact of the training on the farmers' knowledge and skills (Santos et al., 2020; Freshworks, 2023).

Table 6. Evaluation of the Training on Business Management in Bukang Liwayway, Kibawe, Bukidnon

INDICATORS	WEIGHTED MEAN	QUALITATIVE DESCRIPTION
1. REGISTRATION (Registration was fast and simple)	4.63	Excellent
2. The staff was helpful and Courteous	4.74	Excellent
3. PROGRAM (The program was well organized)	4.58	Excellent
4. Good use of allotted time	4.58	Excellent
5. No Schedule was followed	4.58	Excellent
6. CONTENT (Content met stated objectives)	4.53	Excellent
7. The content met my needs	4.58	Excellent
8. The content presented applied to my field	4.58	Excellent
9. The length of the lecture was adequate	4.58	Excellent
10. VENUE (The venue was accessible and comfortable)	4.68	Excellent
11. RESOURCE SPEAKER (Knowledgeable of the subject matter)	4.68	Excellent
12. Quality of presentation/delivery	4.63	Excellent
13. Responsive to questions	4.63	Excellent
14. Novelty and usefulness of topic	4.63	Excellent
15. FOOD/REFRESHMENT (The food/refreshments are healthy and delicious)	4.63	Excellent
TOTAL MEAN	4.62	Excellent

Customer satisfaction

Customer satisfaction refers to the participants' satisfaction in response to the contentment of individuals about a particular product or service they have experienced (Zendesk, 2024). Based on the result, the total mean of 4.56 shows that the farmers rated outstanding for courtesy and kindness, prompt service, knowledge and confidence (4.58), outstanding in clarity of instruction and information, and office/workplace atmosphere (4.53). Customers express their satisfaction in many ways. Customer satisfaction can be defined as a consumer fulfilment response where consumers experience contentment with the product or service they have purchased or experienced.

The outstanding ratings of the participants imply that the farmers are satisfied with implementing the agricultural extension program. These results corroborate with those of the Philippine Statistics Authority [PSA] (2021) and Freshworks (2024), who reported showcasing the importance of service quality in agricultural extension programs. High customer satisfaction enhances loyalty and contributes to sustaining business success.

Table 7.FarmersCustomer Satisfaction

INDICATORS	WEIGHTED MEAN	QUALITATIVE DESCRIPTION
1. Courtesy and Kindness	4.58	Outstanding
2. Clarity of Instruction and Information	4.53	Outstanding
3. Promptness of Service	4.58	Outstanding
4. Knowledge and Confidence	4.58	Outstanding
5. Office/Workplace Atmosphere	4.53	Outstanding
TOTAL MEAN	4.56	Outstanding

IV. CONCLUSION

Farmers in Bukang Liwayway were female, catholic, generally middle-aged migrants from Cebu with a monthly income of 5,548 pesos, had an average household size, experienced farmers, tilling their own lands, source of credits were lending institutions, attended training and seminars with contact to extension worker.

Technical training on mushroom production, Integrated pest management, and agri-enterprise marketing was conducted. The farmers rated the training as excellent.

The problems met by the farmers were infestation of pests and diseases, high prices of inputs, and lower farm gate prices of farm produce. In order to reduce the cost of inputs, a cooperative /association can be established in the area to facilitate collective purchasing power and to increase bargaining power in selling farm produce. This strategy can facilitate a participatory approach to managing available resources for marketing and distribution purposes. Strategies such as composting and organic farming can be incorporated into the agricultural system to lessen the high prices of inputs.

Lastly, mushroom production is a viable and potential business and enterprise for Bukang Liwayway, Kibawe, Bukidnon farmers. The study should continue to establish an enterprise in the locality and provide training focusing on the applicable marketing strategy. The training should include branding, packaging, commercialization, and establishing a direct market to increase the mushroom demand.

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