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# ESTABLISHMENT OF COMMUNITY-BASED FARM ENTERPRISE: AN INTERVENTION ON COVID-19 CHALLENGES IN BUKIDNON, PHILIPPINES

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## Abstract

The challenges of the COVID-19 pandemic, particularly food security, pushed higher educational institutions to respond to the community's needs. Central Mindanao University (CMU) in the Philippines established community-based agricultural enterprises. Such an enterprise is innovative since it facilitates collaboration between CMU, Northern Mindanao Consortium for Agriculture, Aquatic and Natural Resources Research and Development (NOMCAARRD), and other stakeholders. This project aimed to establish farm enterprises using a community-based participatory approach. The project was implemented among one elementary school, one integrated school, and four People's Organizations in Bukidnon, Philippines. The project was implemented through the transfer of technologies to the beneficiaries. These technologies include mushroom production, pinakbet vegetable production, and vermicompost production. Market linkages, farm on-site and off-site consultation, farm capability building, training, partnerships with Local Government Units and private companies, and the provision of farm inputs and materials fueled the implementation. Aside from addressing Sustainable Development Goals, the project was seen as a catalyst to capacitate the community for food security and alternative sources of income. The beneficiaries could produce vegetables, mushrooms, and vermicompost and share them with their organization. For school beneficiaries, implementing the project is also deemed to encourage more students to engage in agricultural entrepreneurship in response to the declining enrollment trend in agriculture-related courses in the state universities and colleges in the Philippines.

## INTRODUCTION

The Covid-19 pandemic has hit the Philippines in different facets. Aside from health, the pandemic affected the Filipinos economically and in terms of food security. During the first half of 2021, 3.9 million more Filipinos were impoverished. This was attributed to lockdown measures, cuts in household consumption, and forced business closures (Keck, 2022). Micro and small enterprises were one of those that were hurt the most by the effects of the pandemic (Shinozaki & Rao, 2021). Specifically, the pandemic leads to the food supply chain disruption in demand and consumption (Palo et al., 2022). It affected the agriculture sector's economic performance. It was estimated to have an average of 3.11% or 29.58 million tons reduction in aggregate volume of agricultural production in the Southeast Asian region (Gregorio & Ancog, 2020)

Small farmers, micro-agribusinesses, and agricultural cooperatives were adversely affected at the grassroots level. In addition, farmers have difficulty accessing inputs and markets for their produce (The World Bank, 2020). Despite the government's interventions to stabilize the agricultural sector, food shortage was greatly experienced due to demand, supply, and consumption disruptions. This situation has led to an increase in the prices of food products, significantly affecting the quality of living of low-income households. The closure of some businesses also affected the service sector, which increased the country's unemployment rate. Thus, it increases the risk of food insecurity (Dili, 2022).

With this worst-case scenario during the pandemic, the Philippine farming and food system needs to be transformed to restore strong food value chains and increase the availability of affordable and nutritious food. This transformation can be done by providing better extension services and more investments in agribusiness start-ups (The World Bank, 2020). Investing in community-based enterprises has been identified as a way to contribute to rural communities. It is a people-centered business model where collaboration and partnership are fostered. It is deemed to alleviate poverty and resolve social issues (Habarabas, 2014). Individuals needing more resources and access to capital markets can resort to sharing resources and establishing a community-based enterprise. Scaling up community-based techniques has been made possible by bottom-up initiatives and the growing focus on locals and their expertise (Schipper et al., 2014). Moreover, a sustainable community-based agricultural system provides a tool for managing and protecting natural resources with a focus on technological development as it aspires to meet the challenges of ending hunger, advancing the environment, and promoting social sustainability (FAO, 2014). Communities can grow while progressively improving living circumstances and general standards through employing local resources, boosting transparency and equity in allocating development benefits, and adopting sustainable community-based activities.

This paper presents Central Mindanao University's experiences with technology transfer and innovation for establishing community-based farm enterprises. This project was an initiative and intervention geared towards attaining food sufficiency in Bukidnon to provide farmers, women, and school teachers in the province additional income during the pandemic through science and technology interventions to address the problem of food insufficiency and low-income levels.

## METHODOLOGY

This initiative involved university-based organizations, with Central Mindanao University as the implementer for community-based agricultural enterprises. The project was divided into two phases: (a) pre-implementation and (b) implementation. Coordination and networking activities, as well as beneficiary selection, were part of the pre-implementation phase. The implementation phase included baseline data collection and coordination, capability building, actual production, monitoring, and evaluation activities.

### Pre-Implementation Phase

First, assessments of the needs of underserved communities in Bukidnon that were hardest hit by the COVID-19 pandemic and have limited access to food were carried out. The main criterion for selecting the participant was the willingness to collaborate or partner with the academic community through signing a Memorandum of Agreement (MOA). These participants could be farmer organizations, schools, women's organizations, and other interested groups. A Focus Group Discussion (FGD) was conducted to determine their requirements, obstacles, available resources, and level of dedication to the undertaking. Site validation was also conducted. Then, the mature technology of Central Mindanao University was matched to the needs of the identified communities.

### Implementation Phase

During the project's implementation, a series of capacity-building activities were conducted. These activities included mentoring, seminars, training, and cross-benefit recipient visits. Beneficiaries of these activities were meant to acquire knowledge and expertise about the specific technology, thereby maximizing its utility. The technologies that were transferred include vermicomposting and vegetable and mushroom production. Then, locally based agricultural enterprises that utilize matured technologies and sustainable farming methods were established.

## RESULTS AND DISCUSSIONS

The project had 6 beneficiaries—4 people's organizations and 2 schools. These include the Mibantang Advocates for Sustainable Agriculture, Calaocalao Small Rice Farmers, Basecamp Empowered Womens, Balugto Hope Agroforestry Association Incorporated, Lapok Elementary School, and San Jose Integrated School. A total of 120 individuals participated in the project.

### Capability Building Activities

The project's development and transfer of Packages of Technology (POTs), such as mushroom cultivation and vermicompost production, have significantly increased beneficiaries' productivity and income, bolstering the agricultural sector's competitiveness and sustainability. These advancements have been complemented by creating 18 Information, Education, and Communication (IEC) materials, which serve as knowledge vessels, disseminating crucial information and fostering positive behavioral change among diverse stakeholders, including farmers, educators, and women. The copyrighting of ten IEC materials safeguards their integrity

and encourages investment in their development, ensuring reliability and consistency.

Moreover, the project's comprehensive training seminars and workshops have empowered beneficiaries with essential skills and knowledge, enabling them to navigate challenges during the COVID-19 pandemic. These initiatives have led to increased productivity and income, while the acquired knowledge and skills serve as enduring assets for the long-term sustainability of agri-based enterprises. This capacity building fosters self-reliance, bolsters self-confidence, and reduces dependency on external support, ultimately enhancing resilience, prosperity, and self-sufficiency within the communities served.

## Package of Technology (POT)

The practical implementation of the development and transfer of different Packages of Technology (POT) to the intended beneficiaries has already been accomplished. The technologies mentioned above comprise (1) mushroom cultivation, (2) vermicompost production, (3) vegetable production, and (4) Natural Farming Technology through the intervention of Good Agricultural Practices (GAP). The development and transmission of these productivity-enhancing technologies (POTs) have shown significant benefits since they have significantly increased the productivity and financial gains of the recipients. Implementing mushroom production technology has augmented the beneficiaries' revenue stream. In contrast, adopting vermicompost production technology has contributed to improving soil fertility and subsequent crop yields.

Through the distribution of these technologies, this project has improved the competitiveness and sustainability of the beneficiaries within their enterprises. Subsequently, this has contributed substantially to the holistic advancement of the agricultural sector.

## Information, Education, and Communication (IEC) Materials Development

Information, Education, and Communication (IEC) materials are foundational to the success of our project and embody critical significance. These materials serve as knowledge vessels, allowing us to effectively disseminate vital information and education to our diverse group of stakeholders, encompassing farmers, educators, and women. Through well-crafted IEC materials, we provide a structured and easily accessible means to impart insights on best practices, technology, and strategic market approaches. The Project Team has developed 18 IEC materials. Table 1 presents the list of IEC materials developed.

Table 1. List of IEC materials developed by the project

| No. | TITLE OF IEC MATERIAL | DESCRIPTION |
|---|---|---|
| 1. | “Talong” Giya sa Pag tanom | Guide on planting Eggplant |
| 2. | “Okra” Giya sa Pag tanom | Guide on Planting Lady’s Finger (Okra) |
| 3. | “Kalabasa” Giya sa Pag tanom | Guide on Planting Squash |
| 4. | “Sitaw” Giya sa Pag tanom | Guide on Planting String Beans |
| 5. | “Ampalaya” Giya sa Pag tanom | Guide on Planting Bitter Gourd (Amplaya) |
| 6. | Produksyon sa Paddy Straw Mushroom | Guide on Paddy Straw Mushroom Production |

| | | |
|---|---|---|
| 7. | VERMICOMPOSTING “Pamaagi sa paghimo sa vermicompost” | Guide on Vermicomposting |
| 8. | Values Formation (English Version) | Values formation is the process through which individuals develop their core beliefs and principles that guide their behavior and decision-making. |
| 9. | Values Formation (Bisaya Version) | |
| 10. | Organizational Management (English Version) | Organizational management refers to the systematic and strategic administration of resources, processes, and people within an organization to achieve its goals and objectives effectively and efficiently. |
| 11. | Organization Management (Bisaya Version) | Organizational management refers to the systematic and strategic administration of resources, processes, and people within an organization to achieve its goals and objectives effectively and efficiently. (Bisaya Version) |
| 12 | Marketing Strategies for Farm Enterprise | Marketing strategies for a farm enterprise are tailored plans and approaches to effectively promoting agricultural products and services to target markets. |

Notably, IEC materials are more than informational tools. They were produced and distributed to the beneficiaries as a guide on their production activities and their enterprise management. With the ability to convey compelling messages, these materials inspire stakeholders to adopt new agricultural practices or refine existing ones, ultimately leading to heightened productivity and income. Significantly, IEC materials enhance accessibility and inclusivity, ensuring that knowledge transfer reaches all segments of our target communities.

Throughout the project, ten (10) IEC materials have been successfully registered with the Intellectual Property Office of the Philippines (IPOPHL). These materials cover various agricultural and educational topics, from crop cultivation guidance to business management and sustainability practices. This diversity reflects the multifaceted approach to agricultural knowledge dissemination, empowering individuals and organizations to excel in the field.

## Trainings Conducted

Capability building is a cornerstone of our project's success, holding multifaceted significance. Firstly, it empowers diverse stakeholders, including farmers, fisherfolk, educators, and women, by equipping them with essential skills and knowledge. This newfound capacity enables them to navigate the challenges of the ongoing COVID-19 pandemic effectively. Furthermore, capability building is instrumental in driving income generation. By enhancing the abilities of these groups, the project team can optimize agricultural and business practices, resulting in increased productivity and income. Notably, the knowledge and skills acquired during these initiatives are not short-lived; they are enduring assets that ensure the long-term sustainability of agri-based enterprises. Moreover, this empowerment at the local level fosters self-reliance,

increased self-confidence, and reduced dependency on external support. In summary, capability building is a linchpin in our project's achievements, nurturing resilience, prosperity, and self-sufficiency in the communities we serve.

Training workshops on pinakbet vegetable production in the province are crucial for farmer beneficiaries for several reasons. Firstly, it imparts essential skills and knowledge, helping them grow vegetables efficiently. This empowers them to diversify their crops, improve food security, and generate additional income. Additionally, these workshops promote sustainable farming practices and introduce eco-friendly techniques that benefit the environment. Moreover, as the farmer-beneficiaries become proficient in Pinakbet vegetable production, they can contribute to the overall success of agricultural projects in Bukidnon by enhancing productivity and, in turn, increasing the socio-economic well-being of the local community. Eight (8) trainings were undertaken for pinakbet vegetable production. The training integrates participants' lectures, actual demonstrations, and experiential learning. These pinakbet vegetables include eggplant, string beans, water spinach (kangkong), lady's finger(okra), bitter gourd (ampalaya), and squash.

The training workshop on vermicomposting is vital for farmer-beneficiaries because it equips them with the knowledge and skills needed for efficient vermicomposting, which uses earthworms to turn organic waste into nutrient-rich compost. The significance of this lies in its ability to provide farmers with a low-cost, sustainable method for improving soil quality, increasing crop yields, and reducing the need for chemical fertilizers. Six (6) trainings were conducted for vermicomposting. Each organization was encouraged to use the waste materials in their community as substrates in the composting procedure. The organizations were taught the step-by-step process in production.

A training workshop on mushroom production was also conducted. The six organizations were brought to a well-established mushroom production site. Lecture, actual demonstration, and hands-on experience were the strategies used to capacitate the participants.

A training seminar on marketing strategies for farm enterprises is critical to beneficiaries. This seminar imparts essential knowledge and skills related to effective marketing, helping farmers reach broader markets and obtain better prices for their produce. The significance lies in its ability to enhance the economic viability of farming endeavors, boost income, and improve livelihoods. Farmers can tap into diverse marketing channels and build a more sustainable agricultural business by learning marketing strategies. This knowledge can significantly impact the progress of agricultural projects by strengthening the market presence of farmer beneficiaries, fostering economic growth, and contributing to the project's overall success, benefiting both the farmers and the local community. A total of six (6) training sessions on marketing strategies were conducted.

The conduct of seminars on organizational management is vital for farmers because they equip them with essential skills in effective leadership, teamwork, and decision-making, which are crucial to successfully managing agricultural cooperatives and organizations. The significance of this training lies in promoting efficient and transparent organizational structures, enhancing communication, and maximizing the impact of collective efforts. By imparting these management skills, the seminar can significantly impact the progress of agricultural projects by fostering well-organized and cohesive farmer groups, thereby contributing to the project's success and the local community's economic well-being. A total of six (6) training sessions on marketing strategies were conducted.

PhilGAP (Philippine Good Agricultural Practices) seminar was also conducted. This training imparts essential knowledge and skills for adhering to quality and safety standards in vegetable farming. The significance lies in enhancing the quality and safety of produce, thus

enabling access to larger and more profitable markets. By implementing PhilGAP principles and mastering basic vegetable production techniques, farmers can improve crop yields, income, and food safety. This training significantly impacts agricultural projects' progress by elevating produce's marketability, fostering economic growth, and contributing to the project's overall success, benefiting both the farmers and the local community.

Distribution of Farm Supplies and Inputs

Aside from the transfer of technical knowledge, the key to achieving a 7% increase in the beneficiaries' net income lies in the efficient distribution of farm supplies and tools. For vegetable production, farm inputs were provided to the beneficiaries. They received seeds, farm tools, farm supplies, and other valuable materials in crop production. Beneficiaries were provided with materials and supplies for mushroom production, including the substrate and spawn to grow. For vermicomposting, the beneficiaries were given live African Night Crawlers. These materials serve as the linchpin for enhancing the beneficiaries' productivity and enabling crop diversification, ultimately boosting their income.

Cost and Return Analysis

Table 2 shows the cost and return of Central Mindanao University for the six organization beneficiaries. Eggplant, lady's finger, bitter gourd, string beans, kangkong, and squash show total sales of Php 787,629.90. Mushrooms and vermicompost contribute Php 335, 962.50, and Php ₱ 106,000.00, respectively. The net income is Php ₱ 336,524.70. This translates to a Return on Expenses (ROE) of 74.6%. This implies that every Php100.00 expense on the project generated a profit of Php 74.6. The sales of the beneficiaries from their enterprise were given to them. It means that the beneficiaries' enterprises gained profit, which they can use to sustain their agri-enterprise operation.

Table 2. Cost and Return Analysis – Central Mindanao University (CMU)

| Commodity | Qty | Unit | Price (Php) | Total Sale (Php) | Production Cost (Php) | Net Income (Php) | Return on Expenses |
|---|---|---|---|---|---|---|---|
| Eggplant | 1,172 | kg | 40.00 | ₱ 46,882.40 | | | |
| Okra | 475 | kg | 40.00 | ₱ 18,992.40 | | | |
| Ampalaya | 497 | kg | 50.00 | ₱ 24,843.00 | | | |
| String Beans | 706 | kg | 40.00 | ₱ 28,224.00 | | | |
| Kangkong | 340 | kg | 30.00 | ₱ 10,187.10 | | | |
| Squash | 7,218 | kg | 30.00 | ₱ 216,538.50 | | | |
| | | | Sub-total: | ₱ 345,667.40 | (326,596.20) | 19,071.20 | |
| Mushroom | 1,343.85 | kg | 250.00 | ₱ 335,962.50 | (94,509.00) | 241,453.50 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Vermicompost | 424.00 | sacks | 250.00 | ₱ 106,000.00 | (30,000.00) | 76,000.00 | |
| Overall Total: | | | | ₱ 787,629.90 | (451,105.20) | 336,524.70 | 74.6% |

Evaluation and Monitoring

Several robust systems have been implemented in the context of monitoring and evaluating income growth among the project's farmer/fisherfolk beneficiaries. First and foremost, beneficiaries underwent comprehensive training in financial literacy, bookkeeping, and record-keeping for farm enterprises. This training equipped them with the knowledge and skills to document their financial activities throughout the project's implementation accurately. To ensure ongoing support and oversight, the project initiated a bi-monthly monitoring process in collaboration with the private partner East West Seed Company Inc. This monitoring took various forms, including face-to-face meetings, updates shared via Facebook, and phone calls. These regular interactions served a dual purpose: they allowed beneficiaries to seek clarification and assistance related to the project and facilitated data collection.

A dedicated Facebook group chat was established to streamline communication and data submission. Project staff created this platform where beneficiaries could conveniently share their monthly assessments and harvest data. This approach promoted ease of communication and ensured that data collection was consistent and accessible. Additionally, the project's technical staff developed an online database. This digital repository is a centralized hub for all project-related data, enhancing transparency and accessibility for beneficiaries and project staff. The Online Databank consolidates information vital for monitoring and evaluating income growth, making it readily available for analysis and reporting.

These integrated systems represent a proactive approach to monitoring and evaluation, reinforcing the project's commitment to empowering its beneficiaries and achieving sustainable income growth.

Challenges Encountered

The project encountered several challenges that affected both the farmers and their beneficiaries. First and foremost, weather conditions proved to be a significant obstacle. Unpredictable weather patterns and extreme conditions damaged crops and disrupted farming schedules, making it challenging for the farmers to maintain a steady production.

The infestation of mushrooms by rodents was a notable challenge, resulting in a lower harvest rate. This not only led to reduced yields but also increased the farmers' expenses for pest control measures. These challenges underscore the importance of addressing various factors to ensure the success and sustainability of agricultural projects in these areas.

Some organization beneficiaries need higher commitment and cooperation towards the community-based enterprise. Some members of their organization don't extend help in performing the enterprise's activities, which affects the effectiveness and efficiency of their organization.

## CONCLUSIONS

Establishing a community-based farm enterprise during the pandemic through the technology transfer intervention project of Central Mindanao University is feasible. It allowed people's organizations to consolidate resources and work together to provide food to their tables and have an additional source of income despite the restrictions and disruptions of the supply chain.

Central Mindanao University's technology transfer to its beneficiary organizations regarding vegetable, mushroom, and vermicompost production has provided the beneficiaries with the necessary knowledge and skills for sustainable farming. The combination of lecture, actual demonstration, and experiential learning made the capability building more effective. Aside from the technical knowledge and advisory services, the addition of capacity building on essential farm management, marketing, recording, and values formation assisted the farm enterprise to flourish even more.

Providing farm inputs to the beneficiaries is necessary since most need more capital to contribute to their farm enterprise. As a start-up, labor is the common contribution of the members of the organization. Close monitoring is also seen to play a big role in guiding start-up community-based farm enterprises to realize their targets and objectives.

## RECOMMENDATIONS

It is then recommended that the Local Government Units (LGU) replicate the technology transfer project to some of their constituents. This will help local communities have an adequate supply of food and an alternative source of household income. Collaborative efforts from the LGU and people in the community will foster improved quality of life in rural communities.

A combination of more experiential learning methods is recommended for adult learning. This facilitates faster learning and encourages the adoption of the introduced technologies. In the provision of inputs, it is recommended to provide only up to 50-60% of the needs of the beneficiaries. The beneficiaries should have a counterpart for their needs in the production to stimulate a sense of ownership and responsibility.

When organizing community-based farm enterprises, it is highly recommended that they monitor and evaluate their operations. This will aid in easy and fast troubleshooting of the organization's issues and problems. The monitoring will lead them to perform the necessary activities for their enterprise's smooth and continuous production. The evaluation will allow them to assess their organizational performance and decide on possible corrective measures or continuous improvement for their farm enterprise's profitability and sustainability.

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## Conflicts of Interest

The authors have disclosed no conflicts of interest.

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