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Mushroom Technology: Sustainable Livelihood Opportunity for Recoletos Social Outreach - Handumanan

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ABSTRACT

Sustainability of livelihood has become a challenge faced by many unemployed individuals as adverse effects of climate change have taken a toll on humans' daily life. Mushroom has been proven to be resilient to climate change and is a potential source of revenue. Introducing mushroom technology to a community as a potential sustainable livelihood is a way of addressing economic and climate issues. This descriptive study sought to know the extent of awareness of beneficiaries regarding climate change, technology transfer, and government services focusing on climate change. Also, major concepts shared by the beneficiaries regarding climate change and mushroom technology were identified. Focus group discussions and survey questionnaires were utilized in gathering the needed data. Results showed that the respondents are very aware of climate change, technology transfer, mushrooms, and government services concerning climate change. Nevertheless, despite being aware of mushrooms, results reveal that the respondents are not really aware of mushroom growing and processing and are willing to engage in this possible livelihood opportunity.

Keywords

mushroom, technology transfer, climate change, mixed-method, content analysis, RESOURCE- Handumanan

INTRODUCTION

The concept of livelihood speaks of making a living through resources such as knowledge, finances, social relationships, and their connection with the community's economic and socio-cultural characteristics (Islam & Ryan, 2016). Moreover, Morse and McNamara (2013) state that it is not just a means of survival but also provides resources wherein people may improve and enjoy their lives. A livelihood is sustainable when it can cope with and recuperate from the stresses and can also either sustain or improve its abilities and assets without having the natural resource base deteriorate its effectiveness in the future (Serrat, 2017). In other words, it can be a way of making a link between a person's daily life and sustaining all this into the future without harming others' prospects along the way (Morse & McNamara, 2013).

Recent years have significantly shown how climate change has affected people and the environment, especially in disasters and extreme weather events (IPCC, 2009). Nevertheless, the Intergovernmental Panel on Climate Change (IPCC) states that the

harmony among scientific views present that the Earth's climate is being influenced by human activities (McCarthy, 2001).

This global phenomenon is an environmental issue that threatens to overturn recent progress in economic growth. It has also affected the fulfillment of human potential, and livelihood opportunities gradually reduce, which disempowers individuals and the community (Verner, 2010).

Thus, many efforts across the globe push for climate-resilient technologies. Advancing agriculture also means fostering climate-resilient options through specific adaptation and mitigation strategies using available technologies and building capacity of stakeholders (Venkateswarlu, Kumar, Dixit and Srinivasrao, 2011).

In a compilation of technological options in India, Venkateswarlu, Kumar, Dixit, and Srinivasrao (2011) recommended mushroom production as a climate-resilient livelihood innovation. Mushrooms are climate-resistant and easy to grow, wherein it can be considered an eco-friendly alternative to carbon and resource-intensive animal protein. Ghiras Al Nahda, a non-profit humanitarian organization in Turkey, considers mushrooms a solution that may give the people more control over their food supply (Ho, 2020).

For centuries, mushrooms are being embraced for medical use, but it was only later that their potential as health potentiators and elicitors of the immune system had been known (Lakhanpal & Rana, 2005). Moreover, growing mushrooms is not labor- intensive and does not require an immense amount of space or land. So, since mushroom production requires minimal physical and financial inputs and resources, it can make a beneficial contribution to sustainable livelihoods (Marshall & Tan-Nair, 2009).

Technology transfer indicates a process of channeling a specific technology from one party to another party's adoption. The technology implied is not limited to a product, but can be a process or body of knowledge. In other words, it can be either tangible or intangible items. Moreover, the receiving party will use technology and turn it into new products, processes, and applications (Willis & Ashworth, 2002; Diebold & Vetro, 2014).

The Recoletos Social Outreach Center (RESOURCE) – Handumanan is the University of Negros Occidental's adopted community – Recoletos since 1992. As of 2019, the community has 129 households with a total population of 586 individuals (RHFI Family Survey Results, 2019). According to the survey conducted by VALUE Negros in 2018, livelihood is among the highest results answered by the RESOURCE beneficiaries. With this data, two-day training on mushroom technology and a Mushroom Farm Visit was organized by the Research and Development Office (RDO), in collaboration with the University Community Development Office (UCDO), VALUE Negros, and Office of the Provincial Agriculturist, was conducted last November 25-26, 2019, and December 27, 2019, respectively. The community also built their own Mushroom Growing House within the La Salud Farm last February 2020, with the support of the UNO-R IS students.

This study is in line with two of the University's 11-point Research Agenda, WISE, and FARMS. WISE, or Weatherproof Innovations for Sustainability of the Environment, aims to advance individuals' knowledge and skills that may equip and empower them to engage in addressing ecological concerns. FARMS or Food and Agricultural Resource Management Studies aim to conduct research geared towards addressing issues concerning hunger and increasing economic productivity.

This study sought to know the extent of awareness of beneficiaries about climate change, technology transfer, and government services focusing on climate change. Also, significant concepts shared by the beneficiaries regarding climate change and mushroom technology were identified. Moreover,

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the transfer of mushroom technology from an institution to a community was elaborated.

In general, mushrooms are an edible fungus with several nutrients, such as potassium, vitamin D, selenium, riboflavin, fiber, and proteins, which are essential to the human body. Moreover, it is low in fat, calories, sodium, and is also cholesterol-free. Mushrooms are also known for their healing capacities and properties, which have reported beneficial effects on some diseases' health and treatment (Ware, 2019; Chaterjee & Patel, 2016). There is an estimated if 140,000 mushroom species on the Earth, yet about only 10% are known. Mushrooms with potential benefits to humans among the undiscovered and unexamined species may be at 5% (Hawksworth, 2001).

Throughout Europe, America, Asia, and even Africa, mushrooms are found in the markets. Its somehow interesting taste and culinary properties, whether eaten alone or in combination with other food, make it famous worldwide (Imtiaj & Rahman, 2008). In developing countries like China and India, mushroom cultivation has great scope because besides only affordable and available raw materials being utilized, marketing and better purchasing power are needed (APCAEM, n.d.). Mushroom cultivation is also quickly expanding in countries like Brazil because of mushrooms' culinary and medicinal value (Dias, 2010).

According to Kadhila (2020), growing mushrooms is both a potential business and an opportunity to transform society beyond climate change benefits. This revenue source may empower people through the provision of access to healthy food and employment opportunities while transforming available resources that are unfortunately considered by many as waste, surging food and nutrition, attending to fundamental social and ecological issues.

The Zero Emissions Research and Initiatives (ZERI) Project is directed towards providing affordable and viable options to generate income that may contribute to poverty reduction in Namibia's rural and peri-urban communities, encouraging citizens to engage in mushroom farming and consumption. The said project aims to transfer scientific technology and skills relevant to mushroom farming to the Namibian communities for them to become self-reliant. Moreover, intensifying public awareness regarding mushrooms' benefits is essential because they grow relatively fast and are easy to grow. Nevertheless, the lack of teamwork among community members and feeble commitment toward the project are some of the challenges experienced by the citizens of Namibia (Kadhila, 2020).

According to Imtiaj and Rahman (2008), mushroom cultivation is among the most popular income-generating activities in Bangladesh. Mushroom products are considered nutritious for children and older people, and as a result of its high economic value in the country, the citizens may also earn income from the production. In some areas, farmers have adopted the technology in a simple and affordable manner to invest small scale but have benefited directly.

In the Philippines, growing mushrooms is economically feasible because of low production cost and abundance of cheap substrates from agro-wastes and high demand, which will be cost-effective for mushroom growers. The assessment of mushroom production in specific parts of the Philippines was sought by Change et al. (2014) in their study, wherein they have concluded that supporting the mushroom industry is crucial in building up the rural economy and increasing employment and income opportunities.

Through technological advances, mushroom cultivation may be done under controlled conditions, which assures production throughout the year. However, there is a restriction for mushroom cultivation without environmental controls to months with mild temperatures (Chang & Miles, 2004). Using modern cultivation houses with

controlled environments, which is mostly utilized by developing countries, entails high production costs. Thus, different cultivation house models have been designed, in which models are made based on the local producers' investment capacity (Oei, 2003). Nevertheless, growing mushrooms is part of an industry that requires precision and calls for adherence to precise procedures to avoid substantially reduced mushroom crop yield. It is both a science and art, wherein it is developed through research and perfected through practical experience (APCAEM, n.d.).

METHODOLOGY

This study utilized a descriptive research design and mixed-method research to assess and understand the technology transfer initiative. Descriptive research defines and interprets, wherein the following factors are being taken into consideration: existing relationship, prevailing practice, beliefs, attitudes, processes taking place, effects that are felt, or developing trends (Calderon & Gonzales, 2010). Mixed- method research combines quantitative and qualitative approaches (Gay, Mills, & Airasian, 2009), wherein it includes at least one quantitative strand and one qualitative strand. A strand refers to a part of a study that involves the basic processes of conducting both quantitative and qualitative data, specifically presenting a research question, collecting and analyzing data, and interpreting the results (Cresswell & Plano Clark, 2011).

The qualitative research phase identified the significant concepts of the beneficiaries' engagement with the new technology as well as the awareness of climate change. Meanwhile, the quantitative research phase aimed to obtain data that would be enough to assess the extent of awareness of the beneficiaries in the aspects of climate change, technology transfer, and mushrooms.

This study's subjects were the 15 beneficiaries of RESOURCE – Handumanan who were willing to engage in mushroom production as a possible livelihood. The respondents were included based on whoever in the community voluntarily wanted to join and are of legal age.

In collecting the study's necessary data, a letter was sent to Rev. Fr. Ronel Gealon, RHFI President, asking for his approval for the research and training to be conducted at RESOURCE-Handumanan. The researchers also tapped the University Community Development Office through Ms. Maribel Gonzales, MSW, and RHFI through the community's social worker, Aaron Kim Gil, RSW, for the livelihood training and actual conduct of the study.

Focus group discussions (FGDs) were also carried out in order to determine the motivation, capacities, and perspectives of the beneficiaries. A Focus Group Discussion (FGD) is a data collection process that involves an in-depth discussion of a topic among a small group of people. It is mainly characterized by the interaction between a moderator and the group, as well as the interaction between the members (Eeuwijk & Angehrn, 2017; Wong, 2008). The FGDs were conducted before and after the mushroom training.

Recordings of the FGDs were transcribed and qualitatively coded to identify shared concepts. A Likert-type survey questionnaire was also utilized, wherein within each category, items were given a score between one and four.

To address ethical issues, the researchers secured the respondents' informed consent and emphasized that their participation in this study would be voluntary; they were briefed that they have the right to either participate or withdraw from the study if they find the setting uncomfortable. They were also assured of any information gathered from them to be treated with utmost confidentiality, wherein no information that discloses their identity would be

released or published without their specific consent to the disclosure and except when it is imperatively necessary. The materials that contained raw and electronic information derived from them would be disposed of by shredding of utilized research instruments and deleting recordings after completing the study.

Statistical tools were used to interpret the quantitative data in this study, specifically mean and standard deviation, mainly to assess the respondents' awareness of climate change, technology transfer, and government services focusing on climate change. Moreover, content analysis was used to determine the respondents' collective and individual views regarding their awareness of the areas mentioned earlier.

RESULTS, DISCUSSION, AND IMPLICATIONS

The results show that the respondents, as a whole, are very aware all the areas of concerns [M=3.2, SD=0.7], wherein they have a very high awareness of climate change [M=4, SD=1], technology transfer [M=3, SD=1], and government services concerning climate change [M=3, SD=0].

Nevertheless, results reveal that the respondents do not have sufficient knowledge of mushroom technology growing [M=2.22, SD=1.88] and mushroom processing [M=1.89, SD=0.87].

The focus group discussion analysis showed that the respondents shared that the climate nowadays is far from before, wherein they claim that the climate has worsened now. There were three to four concrete phrases from different respondents that asserted the comparison between the climate before and nowadays. Moreover, respondents also claim that climate change results from human activities, citing experiences, and ideas as to what specific activities affect the climate. This claim is in agreement with the IPCC statement that was mentioned by McCarthy (2001) regarding climate change being partly the result of human activities.

The results also show that they are aware of how climate change has affected the community. They shared relevant experiences, both personal and vicarious, that showed how they are aware of climate change's drastic effects, from mentioning how farmers' livelihood being affected to how they directly feel the change like the scorching heat.

In terms of livelihood, commitment was highlighted. The responses indicate that sustainability has been the issue ever since despite the livelihood programs given to the community. There are also claims that the disposal of products and marketing of products are some things they have been struggling with in sustaining their livelihoods. In addition, they also insist that a factor as to why their livelihood fails to sustain is because of the community's lack of patronization or support as well as the uncooperative attitudes of some members. Furthermore, responses indicate that if only there is support for the programs/activities, wherein the people are focused and committed, their livelihood may probably be sustained. This proves that their circumstance is just like that of the Zambian communities that the ZERO Project sponsor because support, whether by patronization or participation, is also related to teamwork and commitment.

As for the topic of mushroom technology as a possible livelihood, responses show that the respondents are knowledgeable of mushrooms. Also, responses indicate that there is enthusiasm in engaging with the said technology as they pitch in possible ideas for the marketing of products. Moreover, they are hoping that engaging with this technology will somehow be successful and acknowledged that there should be commitment among themselves to bring forth this vision. There is an acknowledgment of the need to help the community, wherein there is a collective responsibility and a "we" feeling present during the sharing.

In terms of programs by the government that are in line with the goal to combat climate change, many have shared their sentiments on the inconvenient and ineffective garbage collection and waste segregation procedure by the city's garbage truck because, according to them, the garbage being collected is not being separated and are thrown into the city's dumpsite, which is in Felisa, the neighboring barangay of Handumanan. Furthermore, almost all the respondents acknowledged the need for concrete action toward combatting climate change, as well as the need to address the issue of proper waste disposal. Suggestions as to how the community can make decompose biodegradable garbage to mitigate the effects of pollution were brought to the table.

Thus, the mushroom technology transfer training was conducted as a response to their need for livelihood that was confirmed during the survey and their willingness to engage in mushroom production and processing as a possible IGP.

The results of the second FGD, which was conducted after the training, highlighted their willingness and enthusiasm to engage in mushroom production and processing despite the results of the survey that generally showed that they have insufficient knowledge of mushroom growing and processing. Generally, responses show that they perceive the mushroom livelihood as an opportunity for a sustainable income-generating project.

CONCLUSION AND RECOMMENDATIONS

In general, there is a high level of awareness among the respondents regarding climate change, mushrooms, technology transfer, and governmental programs directed towards combatting climate change. Despite not having sufficient knowledge of mushroom processing, there is enthusiasm when considering mushroom growing and processing as an income-generating activity in RESOURCE. However, just like other communities, people's commitment toward a particular livelihood is a significant factor that may determine its sustainability. Thus, it can be concluded that there is a need to address the beneficiaries' issue concerning commitment and participation.

Integrating both the quantitative and qualitative results of the study, awareness of the things around us is an advantage of our perspective and future decisions in life.

Based on the obtained conclusions, the following recommendations are made. For the RESOURCE Beneficiaries, the researchers would like to recommend to address the need to participate and get involved in the programs and activities of the community, wherein each beneficiary may exercise his/her right to participate and bring out the best in him/her. For the RESOURCE Administration, the researchers respectfully recommend that there be thorough monitoring and a process of making detailed reports regarding the progress of a given activity or program. Moreover, it is suggested that the administration may formulate a program that may enable the beneficiaries to realize the need for commitment and community participation. For the Department of Agriculture and other National Agencies, it is suggested that there may be a strong collaborative initiative between the said agencies and the academe in the conduct of related research studies among the different needy communities for the formulation of effective action plans that may address their concerns.

For the UNO-R community, it is recommended that outreach activities/projects in RESOURCE-Handumanan, as well as other communities, be research-based in order to assess the need of the community, sustainability of possible IGPs, and success of activities. With a factual basis, outreach activities may be formulated in a way that may directly address the need of the community and may ensure

its sustainability and success.

For future researchers, further activities and research-based aspects are recommended to be done to explain why the RESOURCE community has not had a sustainable livelihood for the past years by tracing the livelihood programs undertaken by the community as well as the reason as to why the programs were not sustained. This may help not only other researchers but also the community in seeing the bigger picture.

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