THE APPLICATION OF DIGITAL AND GREEN ECONOMY TO KOPDAYA MINANG THE MUSHROOM FARMERS

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Abstract

People who live in the Industry Era 4.0 are required not to be technology illiterate, including mushroom farmers in Padang. The purpose of this activity is to encourage mushroom farmers' knowledge not only in applying digital economy technology for marketing but also in utilizing Oyster Mushroom waste as a potential economic resource to be marketed. The target of this program is one of mushroom farmer communities that is called Kopdaya Minang. The approaches that have been treated are: 1) Socialization; 2) Training; and 3) Assistance and Evaluation of the related knowledge and skills. Transferring knowledge and training on processed Oyster Mushrooms and digital product marketing (Digital Economy) have been given to the target community. Moreover, it is continued by providing knowledge and training on utilization of Oyster Mushroom cultivation waste as plant fertilizer and animal feed (Green Economy). After training and assistance, the results of this program show mushroom farmers' knowledge and skills are improved by 79,8%. At last, there are three processed mushroom products (Crispy Mushrooms, Nuggets and Rendang) and three mushroom waste utilization products (fuel and fertilizers briquettes, and organic fertilizers) that have been produced. Farmer groups are also given knowledge about processed mushrooms that have the potential to be marketed. The organic fertilizers have better quality than National Standard.

Keywords *digital economy, green economy, mushroom, food, waste*

A. Introduction

Sungai Lareh Lubuk Minturun Village is a Nagari village located in Koto Tangah District, Padang City, West Sumatra, with an area of ± 1,108 Ha and consisting of 13 RWs and 58 RTs with an area that is still quite strategic. The Kopdaya Minang Farmer Group is a number of farmers who have been cultivating White Oyster Mushrooms since 2016. Group members have 6000 until 15,000 baglogs, and produce 2 kg until 25 kg of fresh mushrooms every day. The implementation of mushroom cultivation is still carried out traditionally, and there has been no touch of appropriate technology to support maximum production, including processing fresh mushrooms into potential food, digital marketing, and utilization of mushroom baglog waste after having production. Meanwhile, if fresh oyster mushrooms are processed and marketed online or using a digital economy, it will save time for mushroom farmers and expand marketing. Then, the utilization of waste will reduce environmental pollution and increase benefits so as to support a green economy.

The application of digital economy to the Kopdaya Minang Farmers group is implemented in the form of digital promotion or marketing, including marketing of processed mushroom products(crispy mushrooms, meatballs and nuggets) which can increase farmers' income. To prevent environmental pollution due to quite large amount of baglog waste that is thrown in the trash, the farmer group is also given skills to utilize the waste into commodities that have economic value in supporting the green economy concept.

B. Literature Review and Hypothesis Development

Empowerment is an effort to make people, groups or communities become more empowered, so they are able to manage their interests independently. Creating the independent community and developing the potentials owned by the community, the community is not only the recipient of the results but also the the active participants involved in development activities, so independence can be realized in the community. The community should be given the opportunity to understand for themselves about the ins and outs of development, foster a sense of ownership from the community and reduce the community's a priori sense to develop development programs or movements. These community institutions also play a role as a forum for fostering entrepreneurship and partnerships (Suyono, 2015).

The 21st century agriculture for developing countries must be able to create an agricultural system that has high productivity but with low cost input. Agricultural development as an integral part of regional development will increase the investment in the agricultural business sector that is in harmony with the socio-economic conditions of the region, land suitability and market potential. There are five benefits in implementing digital farming: 1) Adoption, use and adaptation of digital agriculture; 2) The impact of digital agriculture on farmers and their jobs; 3) Power, ownership, and ethics in the digitalization of agricultural production systems and marketing chains; 4) Digitalization and agricultural knowledge and innovation systems; and 5) Digital agricultural economic management for production systems and marketing chains (Klerkx et al., 2022).

The digital economy is related to economic and commercial activities that use digital technology and communication using electronic devices (Tu Y & R, 2022). It also includes economic activities such as e-commerce, digital marketing, digital financial services, digital content production (Hu F et al., 2022). The digital economy generates the power of digital economic interaction in business interactions. This economic system is known as a major contributor to economic growth. Moreover, it is always developing in several countries and

providing important things in digital technology, because it is always developing and improving (Guo et al., 2023). Advances in technology and electronic communication have driven the global economy towards digitalization, and the role of the digital economy in advancing global digitalization is very important. Its impact is expected to continue to increase in the coming years (Xia et al., 2024).

The previous results of the researchers' research produce the functional food with oyster mushroom ingredients enriched with duck meat as a source of protein, and moringa leaves as a source of bioactive substances, especially antioxidants. The processed results of Oyster Mushroom Food have been registered as Copyright with Registration Number EC00202352590. One of the processed products that is taught is Mushroom Nuggets, because it is low fat and high fiber (Suhaemi, Hidayati, et al., 2022). Hence, this food has great potential to be marketed to people who really avoid high fat meat foods (Saragih, 2015). Mushroom processing is a potential food, it really helps mushroom farmers to increase their income (Fitriady, 2011). Processing mushrooms into crispy mushrooms, nuggets and meatballs can be used as functional food, and an additional food for toddlers (Suhaemi, Annisa, et al., 2022)

Green economy is generally related to sustainable development. Sustainable development means that current development does not reduce the ability of future generations to build and meet their living needs. Green economy is an idea that aims to improve equality and social welfare of society, while significantly reducing the risk of environmental damage (Razaq, 2023). Green economy is economic development that prioritizes environmental sustainability, provides short-term and long-term benefits (sustainable), reduces inequality for current and future generations (Firmansyah, 2022). Today, the sustainability of nature in all parts of the world is very worrying. All forms of pollution and damage can occur and are caused by various reasons that mostly come from human activities. Therefore, with the existence of a green economy, it is hoped that it can overcome these problems, such as the use of mushroom baglog waste so as not to pollute the environment (Razaq, 2023).

There are many benefits that can be taken from oyster mushroom cultivation, not only it can be oyster mushroom cultivation business, but also mushroom baglog waste can be used as a mushroom planting medium. The baglog waste has a nutritional content needed by plants to improve soil nutrients. In addition, the composition of the waste consists of nutritional contents such as P 0.7%, K), 02%, total N 0.6% and C-organic 49.00%, so it is useful for increasing soil fertility (Sulaiman 2011). By having these compositions, mushroom media waste has the potential to be reprocessed into organic compost fertilizer (Hunaepi et al., 2018).

C. Research Method

The application of digital economy and green economy has been given to the 20 members of Kopdaya Minang Farmers Group. To improve the knowledge and skills of the Kopdaya MinangMushroom Farmers Group in Padang City, the following approaches were taken (Novia et al., 2018): Socialization, Training, Evaluation, and Mentoring .

It is hoped that the skills resulting from this activity can be continuously transmitted among the community, so the sustainable development is created (Suhaemi et al., 2020).

Community members who participated in each stage were surveyed to describe the implementation of each activity result. The survey results were analyzed descriptively, based on the percentage of activity participants who succeeded according to the given criteria. The activity implementation team along with students monitored and evaluated the results of the activity every week. Mentoring was carried out for all target participants, so the knowledge and skills of farmer group members increased according to the target.

D. Discussion

1. Socialization

The socialization of the program is specifically for the processing of fresh oyster mushrooms, through study tours to mushroom farmer groups that are better at processing mushrooms in Payakumbuh City, West Sumatera. It is also attended by extension workers from Payakumbuh City (Picture 1).

The benefits of the study are to increase the motivation of farmer group members in processing oyster mushrooms into various types of food that can be sold, either directly or through social media / digital systems.

Picture 1. Comparative study to the Payolinyam mushroom farmer group in Payakumbuh City, West Sumatra.

2. Training

The training activities are carried out in 3 stages. The first stage is the training in processing fresh oyster mushrooms that are Nuggets, crisps and meatballs. Then, the second stage is the training in the utilization of mushroom baglog waste or the application of a green economy. The last is the training in the use of social or digital media as a means of marketing or the application of a digital economy.

The first training is the mushroom-based food processing. It can help farmers can utilize their mushrooms when production is abundant as processed food that has the potential to be marketed (Picture 2). In this training, farmer groups are taught to process oyster mushrooms into nuggets, crisps and meatballs (Picture 3). As training resource persons, practitioners from the crispy mushroom industry and students were invited. Furthermore, training participants were also introduced to knowledge about product packaging, so it is attractive to consumers.

Picture 2. Training on the use of mushrooms as potential food products.

The second stage of training is the utilization of mushroom baglog waste or the application of green economy as organic fertilizer, fuel briquettes and planting media briquettes (Pictures 4 and 5). The processed briquettes as a substitute for firewood or charcoal are very useful because they are more durable when burned and do not produce smoke when burned. It is because organic waste has great potential to be used as Biobriquettes to replace charcoal or firewood (Ramadhan & Jelita, 2023).

Picture 3. Potential processed food products made from white oyster mushrooms.

Picture 4. Training on the utilization of mushroom baglog waste that was previously thrown away in the trash

Picture 5. Training results in the form of fuel briquettes, organic fertilizer, and planting media.

Including fuel briquettes, organic fertilizer and planting media briquettes were also produced from the training. The results of laboratory analysis showed that the N, P and K content of the fertilizer made from mushroom baglog waste produced a higher NPK content than the standard

organic fertilizer as seen in Table 1. To make organic fertilizer from mushroom baglog waste, livestock manure, EM4, and molasses were added, then fermented for 3 weeks by stirring again, so it was evenly distributed every week.

Table 1. N, P, and K content of mushroom baglog waste fertilizer

Element	Compost fertilizer standardization (%)[a]	Baglog waste organic fertilizer (%) [b]
Nitrogen	0,40	0,60
Phosphor	0,10	0,58
Potassium	0,20	0,77

Source: [a]BSNI (2004)
[b]The analysis result of Baristrand Padang (2024)

The third stage is online product marketing training for farmer group assistants by the student team. In this training, it is expected that student assistants can become facilitators in marketing fresh mushroom products, mushroom bags and mushroom products online (Picture 6). In this training, resource persons from MSMEs who are part of the Padang City Cooperative and MSME Service were presented. Students were also motivated to be able to create interesting mushroom processing ideas to market, so the oyster mushroom farmer group will be helped if their fresh oyster mushroom productions are abundant and do not run out in the traditional market.

Picture 6. Digital-based marketing training for white oyster mushroom products and processing

and symbolic handover of mushroom processing equipment

Picture 7. The transition from offline sales to online supports the digital economy

3. Evaluation and Mentoring

Mentoring of this activity is carried out by evaluating the results of socialization and training in several ways:

1. Conducting pre-tests and post-tests with 15 numbers of questions for each parameters (Table 2)
2. Evaluating the results of the use of digital technology by participants by conducting surveys and mentoring by students as part of Merdeka Belajar Kampus Merdeka.
3. Conducting publications in the online mass media and social media.

Table 2. Results of Test the implementation of Training Technology stages 1, 2 and 3 with 4 parameters

No	Parameter	Respondents	Avarage Pretest	Average Post test	Increased the knowledge and skill (%)
1	Mushroom Processing Knowledge	20	3.05	14.95	79.6
2	Mushroom Processing Nutrition Knowledge	20	2.7	14.9	81.9
3	Mushroom Waste Utilization Training	20	4.3	14.95	71.2
4	Digital Marketing Training	20	1.95	14.45	86.5
	Mean				79,8

E. Conclusion

The application of digital economy and green economy in Jamur Kopdaya Minang farmer group has increased the knowledge and skills of group members by 79,8%. Farmers can utilize digital marketing

and mushroom cultivation waste significantly, thus supporting the digital economy and the application of green economy in their business activities. The organic fertilizers have better quality than National Standard.

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