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The Role of Millennial Farmers in Agricultural Advancement

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Abstract: Agriculture is one of the important sectors in the development and progress of a country. One of the main roles of millennial farmers in agricultural progress is utilizing modern technology. In the ever-evolving digital era, millennial farmers have an advantage in utilizing digital technology to obtain the latest knowledge and information. They can use the internet, social media, and agricultural apps to get information about fertilizer use, efficient farming techniques, and better pest control. millennial farmers can also act as agents of change in encouraging sustainable agriculture. The research method used in this research is descriptive qualitative research method. This research is also about the relationship between views, attitudes, and processes that have an influence on a community phenomenon that occurs today. This research also uses literature study. Data is taken in the form of primary data derived from journals, scientific articles, books, and other sources related to the research and secondary data derived from related agencies. The results showed that as technology continues to develop, challenges in agriculture can be overcome in a more effective and efficient way. Technological innovations in agriculture provide new hope for a more productive, sustainable and sustainable agricultural future. Millennial farmers with the implementation of sustainable agricultural practices play a very important role in maintaining the sustainability and future of agriculture, with innovation, technological knowledge, and understanding of the importance of the environment. The role of millennial farmers is crucial in developing agribusiness and product diversification. With passion, creativity, courage, and hard work, they are able to change the face of agriculture in Indonesia.

Keywords: Farmers, Millennials, Role

I. INTRODUCTION

Agriculture is one of the important sectors in the development and progress of a country. As an agrarian country, agriculture is the largest economic sector in Indonesia, both in terms of its workforce and its contribution to the formation of Gross Domestic Product (GDP). Based on the Central Bureau of Statistics, the number of individual agricultural businesses in 2023 was 29,342,202 units, down 7.45 percent from 31,705,295 units in 2013. Along with the rapid development of technology and social change, the role of millennial farmers is a key factor in facing challenges and advancing the agricultural sector. With their innovative spirit, youthfulness, and technological skills, they have great potential to make positive changes in the world of agriculture. Based on BPS data (2023), the number of millennial farmers aged 19-39 years is 6,183,009 people, or around 21.93 percent of farmers in Indonesia. The community considers agriculture to be synonymous with poverty, so most of the younger generation is reluctant to look at the agricultural sector as a livelihood (Haryanto, 2021).

According to Santoso (2019), millennial farmers are one of the government programs aimed at the younger generation to be interested in managing agriculture in a modern way. This program is also supported by other programs such as intensification programs, which increase land productivity by providing superior varieties and fertilizers, as well as innovations in cultivation technology from various subsectors. One of the main roles of millennial farmers in the advancement of agriculture is to utilize modern technology. In the ever-

evolving digital era, millennial farmers have the advantage of utilizing digital technology to obtain the latest knowledge and information. They can use the internet, social media, and agricultural apps to get information on fertilizer use, efficient farming techniques, and better pest control. As such, millennial farmers can increase the productivity and efficiency of their farms, and reduce the overuse of chemical pesticides and fertilizers. Promoting environmental balance with the concept of sustainable agriculture to millennials will be easier (Konyep, 2021).

Millennial farmers, consisting of generations born between 1980 and the early 2000s, have a crucial role in facing the challenges of the development of the agricultural sector. According to Purwanto, (2021) millennial farmers are farmers aged 19 to 39 who rely on technology and keep up with the times and have many opportunities compared to previous generations and of course also need government support. They have a good understanding of modern technology, especially in agriculture. In all aspects, including the use of technology-based farming systems, proper tillage, and the use of environmentally friendly organic fertilizers, millennial farmers are able to carry out their work with higher efficiency and effectiveness. But what is a threat now is the diminishing interest of the younger generation to farm or become a farmer. According to Losvitasari et al. (2017), there is a reduction in the number of young people interested in a career in agriculture. However, compared to other sectors such as tourism, the younger generation is more interested in the agricultural sector when agricultural activities are organized. Based on research by Salamah et al. (2021), this is also consistent with the results of Susilowati's research (2016) which states that there is an aging age of farmers, which is dominated by those over 40 years old. The future of Indonesian agriculture will be threatened if there is no balance with young farmers, this will lead to problems in the agrarian sector in Indonesia, especially in the fields of agriculture, food security and the economy.

In addition, millennial farmers can also act as agents of change in promoting sustainable agriculture. In an effort to meet society's demands for environmentally friendly and high-quality agricultural products, millennial farmers can implement sustainable practices of organic farming, agroforestry and soil conservation. With this approach, they can improve economic, environmental and social sustainability in agriculture. Millennial farmers can also expand the market for organic and local agricultural products through online networking and creative marketing, thereby increasing the income and sustainability of the agricultural sector.

On the other hand, millennial farmers also play an important role in overcoming problems such as urbanization, migration to cities, and the loss of the younger generation in agriculture. With an entrepreneurial spirit and innovative thinking, millennial farmers can present new opportunities in agriculture. They can develop technology-based farming businesses by utilizing hydroponics, aquaponics, and advanced irrigation systems. This will not only improve the living conditions of farmers, but also encourage the younger generation to get involved in agriculture and maintain the precious tradition.

II. RESEARCH METHODS

The research method used in this research is descriptive qualitative research method. The descriptive qualitative research method according to Zuchri, A., (2021) is a research method that uses precise interpretation to study problems that occur in society. This research is also about the relationship between views, attitudes, and processes that have an influence on a societal phenomenon that occurs today. This research also uses literature studies. Data is taken in the form of primary data derived from journals, scientific articles, books, and other sources related to research and secondary data derived from related agencies.

III. DISCUSSION

Technology Innovation in Agriculture

Agriculture is one of the most important sectors in our lives. Without agriculture, we would not have enough food to fulfill our daily needs. Therefore, technological innovation in agriculture is essential to increase productivity and efficiency in this sector.

In this digital era, technological developments have brought significant changes in various fields, including agriculture. Moreover, with the emergence of millennials who have a good understanding of

technology. Millennial farmers not only have a strong passion for innovation, but also use technology to improve their productivity in agriculture. Millennial farmers tend to be more open to the adoption of technologies such as the Internet of Things (IoT), drones, farming apps, and data management systems to improve farming efficiency and productivity.

Modern agriculture is not just about soil, sun, water and farmer age. In addition to this, according to Guo et al, a higher level of farmer education can help to increase agricultural productivity (Guo et al., 2015). Along with the development of technology, artisan farmers are able to utilize sophisticated tools to assist them in managing their agricultural businesses. One innovation that has been made by artisan farmers is the use of drones for agricultural monitoring. UAVs in agriculture are designed to conduct observations on a wider agricultural area so as to shorten time and reduce labor in monitoring and fertilizing (Khoirunnisa and Kurniawati, 2019). In addition to drones, technology has also brought automated irrigation systems that can manage water delivery intelligently and efficiently. The system is equipped with soil sensors that detect soil moisture levels and deliver water when necessary. By using this system, farmers can save water and avoid wastage, while plants still get enough moisture to grow well. According to Prastowo et al (2023), smart irrigation applications can increase the efficiency of drip irrigation in melon cultivation with a hydroponic system, namely saving water and nutrients by 6,500 mL of water / plant, or by 7.64% or equivalent to Rp183.00 / melon plant. With the application of smart irrigation, the productivity of irrigation water and nutrients is 20 g melon/L irrigation water. The trial of this smart irrigation application needs to be continued with an "on-demand" irrigation scheduling system, to obtain the highest irrigation efficiency and water productivity.

In addition, technology has also made it easier for farmers to manage their agricultural data. With dedicated apps and software, farmers can monitor and analyze data such as air temperature, humidity, and crop nutrient requirements in real-time. This data can help farmers make better decisions to increase productivity and optimize their yields. Technological innovations in agriculture not only provide benefits to farmers, but also have a positive impact on the environment. With the use of smart technology, the use of pesticides and fertilizers can be reduced as they can be applied precisely and only to the crops that need them. This helps reduce pollution and environmental damage due to the overuse of pesticides.

With the continuous development of technology, challenges in agriculture can be overcome in a more effective and efficient way. Technological innovations in agriculture provide new hope for a more productive, sustainable future for agriculture. We can see a bright future where farmers can achieve bountiful harvests, without compromising on environmental balance. As such, it is important for farmers, technology companies, and governments to continue to encourage and support technological innovation in agriculture. By working together, we can create better solutions to agricultural challenges and ensure food security for generations to come.

Implementation of Sustainable Agriculture Practices

The rapid development of technology and cultural progression today has brought about great changes, including in the agricultural sector. Millennial farmers, with their passion and innovation, have been happily implementing sustainable farming practices.

Millennial farmers are often more aware of the importance of sustainable agriculture and are turning to more environmentally-friendly practices, such as organic farming, agroforestry and the use of renewable energy. Sustainable agricultural practices are an agricultural philosophy that aims to maintain environmental balance and minimize negative impacts on nature. Millennial farmers understand how important it is to maintain the sustainability of natural resources if we are to achieve a better future. They realize that the future of our agriculture depends on nature conservation and its sustainability. According to Miarso (2023), it is time for us to start paying attention to agricultural systems that are commensurate both from the biophysical environment and the socio-economic environment. Although organic cultivation with all its aspects clearly provides benefits to smallholder agricultural development and environmental preservation, including conservation of land resources, its application is not easy and faces many obstacles.

One of the sustainable agricultural practices that millennial farmers employ is the use of organic fertilizers. They replace chemical fertilizers with organic sources, such as compost and agricultural waste. This

not only reduces environmental pollution, but also improves soil quality and increases agricultural yields. Millennial farmers also try cropping rotation techniques, where they plant different types of crops alternately in the same field. This helps maintain the balance of soil nutrients and reduces the risk of pests and plant diseases.

Millennial farmers are also increasingly adopting technology in their farming practices. They incorporate modern hardware and software to monitor crops, regulate irrigation, and optimize resource use. With the help of technology, they can identify agricultural problems earlier, improve production efficiency, and maximize profits. The application of technology in running a farming business in the hope of having great profits.

Millennial farmers are not only focused on individual profits, they are also aware of the importance of a good relationship between farmers and consumers. They are increasingly selling their products directly to consumers through local markets or more direct distribution channels. This allows millennial farmers to communicate directly with consumers, hear feedback, and build long-term, mutually beneficial relationships. Through this approach, millennial farmers can better market their products, foster consumer trust, and reduce dependence on middlemen. Millennial farmers with the implementation of sustainable agricultural practices play a very important role in maintaining the sustainability and future of agriculture. With their spirit of innovation, technological knowledge, and understanding of the importance of the environment, they bring hope and joy to our agricultural practices.

Agribusiness Development and Product Diversification

Agribusiness has become one of the most promising sectors in Indonesia, and millennial farmers play an important role in developing the potential of this business. In the past, there may not have been many who believed that the younger generation could be the main driver in the world of agriculture, but now the reality has changed. Diversification of agricultural products is one of the efforts to diversify the types of agricultural businesses or crops to avoid dependence on one agricultural product. According to Risky Ismail et al (2022) Diversification of coconut into copra derivative products has a positive and significant effect on the income of coconut farmers in Payunga Village, Batudaa District, Gorontalo Regency, Gorontalo Province with a Revenue Cost Ratio value of 4.26. So we know with the results of the R / C Ratio of 4.26 the diversification of coconut into copra derivative products is feasible to develop.

These millennial farmers have the passion, creativity and leadership to take agribusiness to the next level. They not only see agriculture as a means of livelihood, but also as an opportunity to create innovations and develop diverse products. In the world of millennial farmers, product diversification is the key to success. They do not only produce traditional crops such as rice, corn and vegetables, but also experiment with more unique and high-value products. For example, they develop organic farming, hydroponic farming or freshwater fish farming. They also try to blend natural ingredients into processed products such as herbal drinks, organic food and natural beauty products.

Millennial farmers also tend to adopt technology in their farming practices. They actively use mobile applications to monitor crop conditions, manage the use of fertilizers and pesticides, and monitor market prices. They also utilize social media and online platforms to market their products to various regions and even overseas. The courage and passion of these millennial farmers has broken the stereotype of agriculture as an unattractive and old-fashioned occupation. They are able to embrace the modern side and give a new color to the world of agribusiness. For them, farming is a lifestyle, not just a routine job.

In agribusiness development, millennial farmers also act as a link between production and consumers. They tend to be more sensitive to market trends and evolving consumer demands. They take advantage of this opportunity to create products that suit market tastes, such as organic product variants or products with halal labels. Not only that, millennial farmers are also active in collaborating with the government, research institutions and private companies to gain access to capital, training and other resources. They attend trainings on modern farming techniques, business management and marketing. Thus, they are better equipped to grow and compete in the global market. In an effort to expand their market, millennial farmers also participate in agricultural exhibitions, food festivals and traditional markets. They educate the public about the benefits of

their agricultural products and how to choose the best quality products. Through direct interaction with consumers, they build trust and interest in their products.

The role of millennial farmers is crucial in developing agribusiness and product diversification. With their passion, creativity, courage and hard work, they are changing the face of agriculture in Indonesia. They are not only producers, but also powerful innovators and marketers. By bringing agriculture to a higher level, they make agriculture an attractive field for the younger generation, and make a real contribution to meeting the country's food needs and economic development.

IV. CONCLUSIONS

1. With the continuous development of technology, challenges in agriculture can be overcome in a more effective and efficient way. Technological innovations in agriculture provide new hope for a more productive, sustainable and sustainable future for agriculture. It is important for farmers, technology companies and governments to continue to encourage and support technological innovation in agriculture. By working together, we can create better solutions to address agricultural challenges and ensure food security for generations to come.
2. Millennial farmers with the implementation of sustainable agricultural practices play a very important role in maintaining the sustainability and future of agriculture, with innovation, technological knowledge, and understanding of the importance of the environment.
3. The role of millennial farmers is crucial in developing agribusiness and product diversification. With passion, creativity, courage and hard work, they are able to change the face of agriculture in Indonesia.

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