

Driving Factors of the Rapid Development of Millennial Farmers in Malang Raya

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Abstract The agricultural sector labor crisis is increasing worldwide, including in developing countries like Indonesia. In this situation, the trend of agricultural prestige also declines. Generally, becoming an agricultural or agribusiness actor is not the primary choice for young people, including those in rural areas. Information technology growth, including social media and other online platforms, is happening simultaneously. Young people have become key players in this world of social media, developing their identities in alignment with their passions and opportunities. With a social entrepreneurship approach, will examine how millennial farmers grow and develop. Research is necessary to typology the rapid growth of millennial farmers by identifying the various driving factors. In this study, a qualitative research approach is employed, and the applied analysis method is descriptive analysis. Sample selection was conducted using purposive sampling and snowball sampling. The approach method used in this research is the life history method and thematic analysis. The results of this study show that there are three drivers behind the rapid development of millennial farmers in the Malang Raya region: adequate natural resources, specific interests, and trial and error. From these findings, it can be recommended that resources and specific interests, supported by technology, will determine the success of Indonesian Millennial Farmers. Research needs to be carried out regarding the development of indicators to measure the sustainability of development in each typology. Assess the environmental, economic, and social sustainability of different types of millennial farmers to inform future sustainable agriculture

strategies.

Keywords Millennial Farmer, Rural Development, Social Entrepreneurship

1. Introduction

The global labor shortage in the agricultural sector is growing, affecting countries across the world, including developing nations such as Indonesia. One of the contributing factors to this crisis is the decline in the agricultural sector's contribution to the Gross Domestic Product (GDP). In the 1990s, the agricultural sector's GDP experienced a decrease of 17.9% in 1993 to 19.6% in 1999 (in constant 1993 prices). From 2000 to 2006, the share of the agricultural sector's GDP declined to around 15%, while the industrial sector's share increased from about 27% to 28%. However, despite this, the agricultural sector still provides significant employment opportunities, with an employment rate reaching 69.677% and absorbing 3.75% of the workforce in the agricultural labor market. The increasing production in the agricultural sector will also have an impact on the growth of the agricultural sector's national income by 59.23% and investment by 26.93% in the agricultural product market [1].

The decline in the agricultural sector's contribution to the GDP has led to a decrease in the exchange value and value-added of the agricultural sector, making it less competitive. The value-added components of the agricultural sector typically include processes that enhance

the product's value from the point of production to consumption. This can encompass activities such as processing, packaging, and distribution, as well as innovations and improvements that increase the overall value of agricultural products in the market. The agribusiness system in Indonesia also plays a role in this issue, as farmers often face two economic exploitation forces. On the input supply side related to the market, farmers confront monopsonistic power for certain crucial inputs such as fertilizers. From BPS data, after the increase in fuel prices in October 2005, the Farmer's Exchange Rate (NTP) decreased by 2.39 percent. In December 2005, the NTP reached 97.94, meaning the price index farmers had to pay was higher than the price index they received. In other words, this figure indicates that farmers lost competitiveness and their income decreased [2].

In this situation, the trend of agricultural prestige also declines. Generally, becoming an agricultural or agribusiness actor is not the primary choice for young people, including those in rural areas. Involvement in agriculture or agribusiness is often out of necessity. Nonetheless, many young practitioners have developed beyond their initial choices during their journey [3]. Nevertheless, the decisions of young people to choose farming or agribusiness involve a decision-making process through several stages, as explained by Gibbons, et al. [4].

In the agricultural sector, a labor crisis can threaten the sustainability of this sector due to its vital role in food provision. Various factors contribute to the decline in the young labor force's interest in joining the agricultural sector, as indicated by Susilowati [5]. One of these factors is the perception that the agricultural sector is considered less prestigious and incapable of providing adequate rewards due to the relatively small land ownership in farming efforts. In the postmodern society of today, the perspectives and lifestyles of the young labor force have changed, which also affects their interest in joining the agricultural sector. The crisis of young farmers in the agricultural sector and the dominance of older farmers can have serious implications for sustainable agricultural sector development, including agricultural productivity, market competitiveness, and rural economic capacity, and it can jeopardize food security and the sustainability of the agricultural sector. Therefore, the government is paying special attention to farmer regeneration to address this issue.

Information technology growth, including social media and other online platforms, is happening simultaneously. Young people have become key players in this world of social media, developing their identities in alignment with their passions and opportunities. Among these identities, the profession of farming has regained appreciation through social media. Millennial farmers effectively utilize social media to venture into the agricultural field. Especially in the current era dominated by digital information, where human life and entrepreneurship patterns are changing, technology-driven agriculture is a

fitting choice for the millennial generation [6].

The youth seek identity and the government collaborates in implementing policies. This initiative aligns with the G20 Ministerial Declaration on Agriculture in 2011 and the International Year of Youth 2011, which emphasize the crucial role of young people in addressing crises and recognize them as critical partners. Young women and farmers need to be given opportunities to actively engage in decision-making at the local, national, and global levels [5].

With a social entrepreneurship approach, we will examine how millennial farmers grow and develop. Research is necessary to typology the rapid growth of millennial farmers by identifying the various driving factors. Entrepreneurship research has been employed to analyze social service initiatives, agricultural financing, small-scale farmers, and gender empowerment. However, studies related to entrepreneurship intersecting with the youth are scarce. Therefore, this research is crucial to fill the gap in existing research.

2. Materials and Methods

2.1. Research Location

The research is conducted in the Malang Raya region. The considerations underlying this location selection stem from the fact that Malang is a central hub for agriculture in East Java, has a high concentration of agricultural entrepreneurs, is a focal point for government assistance programs, has proximity to Surabaya leading to a wide market, and boasts a diverse landscape spanning from lowlands to highlands.

2.2. Respondent of the Study

The respondent selection technique was employed to gather the necessary information and knowledge. Respondents were chosen based on their environmental conditions and understanding of the researched issues. Sample selection was conducted using purposive sampling, which involves searching for millennial farmers aged 19-39 in the Malang Raya region through Google searches using keywords like "millennial farmers", "young farmers", "progressive farmers", and "successful farmers". A total of seven respondents were obtained using this technique. Subsequently, the snowball sampling method was employed, which refers to a sample selection technique that starts with a small number of samples and gradually expands like a snowball, as described by Sugiyono [7]. The informants for snowball sampling were 30 people. The researcher chose the snowball sampling technique because, after obtaining data from several respondents, there were still data gaps necessary for the study, requiring additional information from other respondents to complete the dataset.

2.3. Data Collection

Data collection was carried out through observation, in-depth interviews, as well as historical documents and records. Observation involves systematic observation of the research subject carried out in a structured manner by designing what, when, and where will be observed. In-depth interviews, on the other hand, are an interview technique used to gather in-depth data. The interview questions are prepared based on an interview guide, yet they can be developed with new questions to delve deeper into information, as described by Moleong [8]. Furthermore, this research also utilizes historical documents and records as additional data sources to obtain a more comprehensive understanding of the conditions and developments of millennial farmers in the Malang Raya region. The utilization of diverse data collection methods aims to produce accurate and reliable data.

2.4. Data Analysis

In this study, a qualitative research approach is employed, and the applied analysis method is descriptive analysis. The purpose of this analysis is to provide a depiction aligned with the research issues and objectives. According to Sugiyono [7], descriptive analysis is used to accurately describe the collected data without the intent of drawing general conclusions or generalizations.

The approach method used in this research is the life history method. According to Koentjaraningrat [9], the life history method is a way to collect data in-depth and explore the life experiences of informants. This approach is conducted through interviews and conversations, to generate detailed descriptions and complex analyses of an individual's life or life experiences as a whole or in specific aspects through narrative storytelling.

The thematic analysis method is used to analyze data to identify patterns or themes from the data collected by the researcher [10]. This method is highly effective in qualitative research for discovering patterns in the studied phenomenon and explaining the extent to which the phenomenon occurs from the researcher's perspective [11]. In this research, the stages of qualitative data analysis refer to the stages of research [8], which include reading or studying the data, marking keywords and ideas in the data, studying keywords to find themes, establishing a coding system, and conducting thematic analysis.

3. Result and Discussion

3.1. Indonesian Millennial Farmers (IMF): An Overview

1970s

The Green Revolution in the 1970s focused on efforts to develop and improve the agricultural sector through

mass guidance programs (bimas), mass intensification (inmas), and activities through farmer groups like special farmers in improving their agricultural productivity, were introduced, for example, in terms of institutions, extension services, credit, marketing, and cooperatives, with the hope of improving farmers' quality of life [12].

According to Pambudy [13], the contribution of the agricultural sector's output to the Gross Domestic Product (GDP) during the Green Revolution was 50%, making it the largest sector in terms of employment (around 70% of the population). Government-led agencies like BULOG played a significant role in stabilizing food prices through procurement and distribution programs [14].

The development of communication technology in Indonesia in the 1970s was marked by significant progress. One notable achievement was Indonesia's ownership of communication satellites in the 1970s, which allowed for the improvement of domestic telecommunications infrastructure and connectivity. This development in communication technology was crucial in expanding access to telecommunication services and facilitating economic growth and development in Indonesia [15].

1980s

The 1980s saw many government policies being issued due to the oil boom [16]. One crucial policy in the 1980s was the agricultural extension program, aimed at increasing the knowledge and skills of farmers in agriculture. The growth of the agricultural sector during this period was also quite promising.

During the 1980s, the Indonesian government received support from the World Bank for various development initiatives, including communication technology. This support likely extended to the agricultural sector, facilitating agricultural knowledge and best practices dissemination to rural areas through improved communication infrastructure [17]. Economic reform in the 1980s led to a shift towards market-oriented policies. Agricultural marketing became more market-oriented, with increased involvement of the private sector—this period aimed to boost agricultural exports and product diversification [18].

1990s

In the 1990s, the government's attention began to shift towards the industrial and service sectors as Indonesia underwent economic transformation from an agrarian nation to an industrial one. This reduced the agricultural sector's role in the country's economic structure. Economic conditions like these caused the agricultural sector's contribution to decline. However, during the 1997/1998 economic crisis, it became evident that the agricultural sector had relatively high resilience to economic shocks compared to other sectors, which helped stabilize the government and the country. Government policies for young farmers in the agricultural sector

remained limited and unchanged, causing many young people to shift to the industrial sector.

The 1990s marked a period of sustained growth in communication technology, with advancements in Information and Communication Technology (ICT). These technologies would be increasingly used to enhance agricultural productivity. Access to ICT likely enabled farmers to access market information, agricultural advice, and real-time weather information, contributing to agricultural development [19]. The continuing agricultural reform in the 1990s included deregulation and trade liberalization. This era witnessed the emergence of supermarkets and modern retail networks, transforming the landscape of agricultural product marketing [20].

Communication technology in the agricultural sector was still limited during the 1990s, with many farmers having only partial access to telephones and fax machines for transactions and marketing. Some farmers might have also used radios to access market information and weather conditions. However, access to technology, especially for young farmers in rural areas and young farmers, was limited regarding marketing technology. Many farmers sold their harvest through middlemen or intermediaries.

2000s

From 2000 to 2006, the agricultural sector's share of GDP was even lower, around 15%, while the industrial sector's share increased from about 27% to 28%. Based on the data, it can be seen that the agricultural sector was able to drive an increase in agricultural employment opportunities by reaching 69,677%, with a workforce of 3.75% in the agricultural labor market [1]. Regarding the workforce, from the 2010s onwards, Indonesia entered a demographic bonus era, where the productive-age population outnumbered the non-productive age group [21]. According to the Ministry of Women's Empowerment and Child Protection and the Central Bureau of Statistics, Millennial Farmers, as defined in Minister of Agriculture Regulation No. 04 and No. 09 of 2019 concerning Guidelines for the Human Resources Development Movement in Agriculture Towards the World's Food Barn in 2045, are farmers aged 19-39 and farmers who are adaptive to digital technology. Based on this definition, Millennial Farmers are young people or the younger generation in agriculture. Millennial farmers or young people are those born in the range of 1980-2000 [22].

The government is making efforts to assist young farmers by providing the necessary support to help them develop and sustain their careers in agriculture. Ensuring the right to food and food security through farmer regeneration has been a focus in Indonesia to ensure the regeneration process of farmers runs effectively. According to Anwarudin [23], regulations have been issued in Indonesia to facilitate farmer regeneration, such as Minister of Agriculture Regulation No.

07/Permentan/OT.140/1/2013 of 2013, which provides guidelines for farmer regeneration through the formation of youth farmers and fisherman groups (taruna tani), Saka Taruna Bumi (Scouts), exchange programs for young farmers abroad, Integrated Pest Management (IPM) Field Schools, and internship programs. Other regulations for farmer regeneration are also being developed by the Ministry of Agriculture, such as the Growth/Development of Young Agricultural Entrepreneurs (PWMP). Additionally, the YESS Program is designed to create young rural entrepreneurs and competent agricultural workers. Through the Youth Entrepreneurship and Employment Support Service (YESS) Program, the Ministry of Agriculture is creating resilient and high-quality millennial entrepreneurs.

The emergence of millennial farmers initiated by the Ministry of Agriculture is one alternative to accelerate farmer regeneration. Agriculture among millennials is synonymous with the use of technology to optimize production. Communication technology has advanced rapidly and brought significant changes to the agricultural sector from the 2010s to the present. Technological advancements over the last decade, such as increased internet availability in rural areas and improved online transaction software, can assist farmers in selling agricultural products directly to consumers over the internet [24].

Information and communication technology has changed the rules of competition by reducing organizational costs throughout the value chain and accelerating the search for buyers and sellers, especially for information related to commercial activities [25]. Marketing technology nowadays utilizes digital technology like e-commerce, social media, and online marketing platforms to simplify the marketing of agricultural products and expand market reach, making it attractive to millennial farmers. Digital marketing can help farmers break long marketing chains, giving them higher bargaining power.

The detailed aspects of the driving forces of change for Indonesian Millennial Farmers from the 1970s to 2020 are depicted in Table 1.

Table 1. Drivers of Change for Indonesian Millennial Farmers from the 1970s to 2020

Drivers of Change	Years			
	70s	80s	90s-2000s	2000s-present
Government Policies	x	xxxx	xxx	xxxx
Economic Growth	xxxx	xxxx	xx	xxx
Communication Technology	x	xx	xxx	xxxx
Marketing Technology	x	xx	xx	xxx

Source: Documents, History (2023)

3.2. Indonesian Millennial Farmer and Rural Development

Indonesian Millennial Farmers play a crucial role in rural development. Various efforts are made to empower millennial farmers through programs and initiatives aimed at enhancing their skills, knowledge, and access to resources [26]. The government also plays a vital role in increasing millennial farmers' involvement in agriculture. Various policies and programs are designed to support young farmers and rural development [27].

Millennial farmers contribute to the transformation of rural areas by introducing modern farming practices and technologies. This not only increases agricultural productivity but also improves the livelihoods of rural communities [28]. Millennial leaders emerge as change-makers in rural development. Their innovative approaches and leadership skills drive positive changes in rural areas.

The era of disruptive innovation, as stated by Christensen, et al. [29] is closely related to the use of information technology, information system management, digitization, and the utilization of big data, which can facilitate speed, effectiveness, and efficiency in transactions without significant barriers related to social status, geography, and time. Disruptive innovation is also occurring extensively in agriculture and rural development. Social media has become an effective tool for Millennial Farmers to use in their entrepreneurial endeavors, especially in the digital information age that demands new patterns of entrepreneurship. Technology-based farming is highly suitable for today's millennial generation [6].

Poppe K. [30] demonstrates that one form of disruptive innovation in agriculture and rural areas is marked by the disruption of information and communication technology (Disruptive ICT). This trend in recent years has led to the utilization of ICT through various formulas, including (a) Mobile/Cloud Computing - smartphones, wearables, including sensors, (b) Internet of Things (IoT) - everything connected to the internet (virtualization, M2M, autonomous devices), (c) Location-based monitoring - satellite and remote sensing technology, geo-information, drones, etc., (d) Social media - Facebook, Twitter, Wiki, etc., and (e) Big Data - Web of Data, Linked Open Data.

The era of the information revolution, supported by information technology developments such as Twitter, Facebook, email, and more, provides opportunities for young people in rural areas to access various information through the virtual world. Exploring the online world is one way for young people in rural areas to keep up with global developments and explore new opportunities. The extensive use of ICT media in supporting the process and effectiveness of agricultural and rural development is expected to address the gap in technology utilization for disseminating agricultural information.

3.3. Typology Indonesian Millennial Farmers (IMF)

Agriculture is a crucial sector of the Indonesian economy. However, as time goes by, the generation of Indonesian farmers is also changing. Currently, there is a growing number of young farmers who are entering the world of agriculture, especially in this millennial era. As a generation that has grown amidst rapid technological advancements and social changes, millennial farmers in Indonesia have unique characteristics distinct from previous generations of farmers, warranting the need for typology. This typology can provide insights into how Indonesian millennial farmers are adapting to the challenges and opportunities faced in the agricultural sector today, as presented in Table 2.

Table 2. Typology Indonesian Millennial Farmers (IMF)

Category	Dominant Level			
	×	××	×××	××××
Background of Farmers' Families			×××	
Level of Education of Farmers			×××	
Participated Communities			×××	
Confidence in the Profession as Farmers			×××	
Contribution to Family Financial/ Economic Aspects				××××
Optimism about the profession/business sustainability			×××	

Source: In-depth Interview with Millennial Farmers (2023)

The family environment is the first social environment for millennial farmers, just like it was for farmers from previous generations. The family plays a significant role in shaping the values, knowledge, and skills necessary in agriculture. As millennial farmers, they grow and develop within a family environment that is usually engaged in farming or has experience in the agricultural sector. Families can provide a deep understanding of traditional farming practices, land management, cultivation techniques, and the selection of appropriate plant varieties.

The family serves as a place where millennial farmers receive consideration, support, and socialization. The family background of millennial farmers varies in terms of dominance levels, as the majority of respondents come from families already engaged in farming as a means of livelihood. They create various innovations to develop existing businesses. The level of acceptance and motivation from their families is mostly very supportive of their efforts, as conveyed by NBP.

The family strongly supports this effort, cultivating a family-owned land of 15 hectares, with some specifically used for field laboratories.

However, it's important to note that not all millennial farmers grow up in a farming family environment. Some might be the first generation in their families to decide to engage in agriculture. In cases like that, they can seek support and knowledge from other sources such as agricultural training, farmer communities, or agricultural organizations.

Furthermore, the family environment can also provide inspiration and motivation for millennial farmers to engage in agriculture. They can serve as examples and role models, teaching values such as hard work, perseverance, and responsibility in running agricultural businesses. Family can also be a source of emotional and financial support for millennial farmers. They provide capital assistance, share successful and unsuccessful experiences, and offer valuable advice and guidance in facing challenges in the agricultural sector.

The high formal education of millennial farmers can reduce concerns about their responsiveness to market demands for agricultural products. This is because millennial farmers can think rationally and broadly, enabling them to produce and maintain product quality according to market demands, identify market opportunities, explore relevant innovations, and effectively share this knowledge with their fellow farmers. Based on the interview results, it is evident that the level of formal education among the informants is quite diverse. Some have attained Master's degrees or bachelor's degrees, and there are even those who have completed high school or vocational school, and there is a trend that their formal education does not necessarily align with the field of agriculture.

The role of communities is highly significant for millennial farmers as communities can serve as sources of support, knowledge, and collaboration. Most respondents are already part of communities that support their endeavors. However, some informants are not part of any community. As stated by one informant, NBP, who is a member of the "Seasonless Orange Community" (Jertanmus).

Farming communities provide a platform where millennial farmers can share knowledge, experiences, and best agriculture practices. They can exchange information about cultivation techniques, pest and disease control, resource management, or successful crop variety selection. This exchange of knowledge enriches the insights of millennial farmers and helps them enhance their skills in agriculture.

Millennial farmers' perceptions of self-confidence in their profession as farmers tend to vary, depending on various factors. Some millennial farmers have high self-confidence in their profession, while others may feel less certain. In terms of respondents' perceptions of

self-confidence in their profession as farmers, it is high, as expressed by one of the respondents, DR.

As an alumnus of the Faculty of Agriculture at Brawijaya University, I am concerned that many of my friends prefer to work in institutions and state-owned enterprises rather than engage in agriculture. We need successors for the farming industry. If even agricultural undergraduate students do not pursue farming, then who will eventually engage in agriculture?

The perception of millennial farmers regarding self-confidence in their profession as farmers is an individual matter and is influenced by various factors. In many cases, the higher the understanding, knowledge, support, and strong experience millennial farmers have in agriculture, the higher their level of self-confidence in their profession.

The perception of millennial farmers regarding their contribution to family finances/economy is high. The transformation of agriculture has an impact on the economic environment, and the ease of obtaining inputs and marketing outputs increases the interest of young farmers in engaging in agricultural activities. One reason why millennial farmers have a positive perception of their contribution to family finances/economy is that agriculture is the main source of income for many millennial farmers. Through their agricultural endeavors, they can generate significant income to meet family economic needs, such as daily expenses, children's education, healthcare, and long-term investments.

The perception of millennial farmers regarding their contribution to business/sustainability is high, as they expand their businesses. They are aware that their contribution to agricultural operations has a significant impact, both on their business sustainability and in the broader context of agricultural sustainability. Millennial farmers also recognize that sustainable agricultural practices are key to economic sustainability. By implementing efficient and sustainable practices, they can increase productivity, reduce production costs, and enhance competitiveness. Additionally, they are also seeking opportunities for product diversification and value addition that can enhance the economic sustainability of their agricultural businesses.

Millennial farmers are often regarded as agents of change in agriculture. They actively adopt innovations, technologies, and new approaches in their agricultural endeavors. By mastering modern technology, utilizing data and analytics, and seeking innovative solutions to agricultural challenges, they play a role in driving positive changes in the agricultural industry and contributing to business sustainability. The positive perception of millennial farmers regarding their contribution to business and agricultural sustainability provides encouragement and motivation for them to continue developing and implementing sustainable practices in their agricultural

businesses.

Adequate natural resources

One crucial factor in the success of millennial farmers is the availability of resources that support their agricultural endeavors. The land is the main asset in agricultural activities. Based on the interview results, it can be understood that most millennial farmers have agricultural land, either through inheritance or personal purchase. This is reflected in the statement of one of our interviewees, DLI.

I have personal land for business that covers an area of 5000m², while I also lease land that spans 1.2 hectares.

If viewed from the research results, the drivers of millennial farmer development in the Malang Raya region can be typologies, including adequate natural resources. The availability and sustainability of natural resources have significant implications for agricultural practices and food production, which directly affect the livelihoods of millennial farmers. Support from families and the tendency of millennial farmers to have agricultural land for cultivation led them to choose farming as a profession. The level of acceptance and motivation from the families of millennial farmers mostly strongly supports their efforts. Many millennial farmers have a strong interest in succeeding in their family's agricultural legacy, as described by Effendy [31].

Millennial farmers view agriculture not only as a means of subsistence but also as an entrepreneurial opportunity. They become interested in farming when they realize the potential efficient utilization of available natural resources for profitable agricultural ventures, as described by Wirrdiana, et al. [33]. Highlighting the importance of food security and the need for a new generation of farmers, some millennial generations choose farming as their first career choice when they understand the vital role of agriculture in harnessing natural resources to produce food. Millennial farmers are aware of environmental concerns related to the limitations of natural resources, such as water and fertile land, which has increased their awareness of sustainable farming practices [34].

Millennial farmers realize that environmentally friendly and resource-efficient approaches can lead to increased economic performance, market opportunities, and long-term profitability. They are more inclined to explore and invest in practices that align with sustainability goals and consumer demand for environmentally conscious products [35]. The perception of the agricultural sector among young people plays a vital role in their decision to pursue farming as a career. By highlighting the importance of natural resources in agriculture and emphasizing sustainable practices, the attractiveness of agriculture as a worthwhile and beneficial profession can be increased. Efforts to educate and introduce innovative technology to young farmers can further motivate them to enter and

contribute to the agricultural sector [36].

Specific interests

Millennial farmers tend to have a spirit of independence and a specific interest in becoming entrepreneurs. They desire to have control over their work and view agriculture as an opportunity to develop a sustainable business. Many millennial farmers are a generation that grew up in urban environments or had different educational backgrounds compared to previous generations of farmers. This can spark new interests in agriculture driven by the desire to cultivate a closer connection with nature and apply modern technological knowledge, as expressed by one of the respondents, DLI.

I chose to pursue a career as a farmer because I have a specific interest in flowers. Initially, I was looking to explore innovations in urban gardening, and it turns out that my choice led me to kokedama.

Another driver for millennial farmers is their specific interests. These interests play a crucial role as millennials align their farming practices with their passions, creating innovative agricultural ventures. By embracing these motivators, millennial farmers are shaping the future of agriculture with their unique perspectives, skills, and aspirations. For example, millennials with a strong interest in sustainable agriculture may focus on organic farming, aiming to reduce the ecological footprint of farming and promote practices in harmony with nature [32].

Another motivator for millennial farmers is the desire to make a positive social impact. They are interested in reconnecting with the local community, supporting local food systems, and promoting food justice. Millennials often engage in community-supported agriculture (CSA), farmers' markets, and other direct-to-consumer models, fostering stronger relationships between farmers and consumers [37]. Millennials have a strong entrepreneurial mindset and are interested in pursuing business opportunities.

Trial and error

Starting a farming business as a "trial and error" approach allows millennial farmers to develop new ideas and experiment with agricultural methods or techniques that are not yet common. In the effort to find solutions to challenges faced in agriculture, they may explore alternative approaches, new technologies, or uncommon sustainable practices. These experiments often serve as the foundation for innovation and creativity in the agricultural sector. One of the informants, MEP, mentioned this.

Initially, this chili commodity was very profitable, but not long after, the chili plants were attacked by uncontrollable pests. Then I thought of trying another commodity, which is cultivating cabbage plants.

Trial and error are considered significant drivers of the rapid development of millennial farmers. Like other generations, millennial farmers face various challenges and uncertainties in agriculture. Through trial and error, they engage in the process of experimentation, learning, and adaptation to overcome these challenges and find innovative solutions. Through trial and error, millennial farmers gain practical knowledge by actively participating in farming practices and experiencing the outcomes firsthand. Through this iterative process, they learn what works and what doesn't, enabling them to make more informed decisions in the future [38].

Millennial farmers grew up in the digital era and are more likely to adopt and utilize technological advancements in agriculture. They are more likely to explore and experiment with new digital tools, precision agricultural technologies, and data-driven approaches. Their willingness to embrace technology contributes to rapid development and improved farming practices [39]. The Internet and digital platforms provide millennial farmers with easy access to a wealth of information and resources. They can leverage online platforms, forums, social media, and agricultural websites to gather knowledge, learn from other's experiences, and stay up-to-date with the latest farming practices. Access to this information enables them to implement innovative techniques and improve their farming methods [37].

Millennial farmers are often actively involved in networks. Many millennial farmers demonstrate an entrepreneurial mindset and are open to taking risks and exploring new opportunities. They are more likely to adopt innovative farming practices, diversify their agricultural activities, and explore alternative market channels. This entrepreneurial spirit encourages them to experiment, adapt, and continually seek improvements in their farming operations.

Social entrepreneurship is a way to ensure that communities can build self-sufficiency for future development and improvement of their social and economic lives. Social entrepreneurs can create solutions to social issues by prioritizing sustainability [40]. In many cases, social entrepreneurs create sustainable solutions to social problems. One example is Nanda Budi Prayuga, who innovated "Jertanmus" (Year-round Oranges) and established a community to engage the younger generation in farming to develop their village.

Millennial farmers in the Malang Raya region emphasize innovation, creativity, collaboration, network development, and identifying new opportunities. They are not always solely focused on profit or financial gain but have noble goals for social missions. This aligns with the theory of social entrepreneurship, as described by Santosa [41] where social entrepreneurs are change agents capable of pursuing the goal of transforming and improving social values while identifying various opportunities for improvement. Therefore, social entrepreneurship can be undertaken by any individual within society, including

millennial farmers in the Malang Raya area.

4. Conclusions

In conclusion, there are three drivers behind the rapid development of millennial farmers in the Malang Raya region: 1) Adequate natural resources, adequate natural resources provide the foundation for millennial farmers to cultivate their specific interests in agriculture; 2) Specific interests, these specific interests then drive them to experiment and try new things and 3) Trial and error, try new things, leading to rapid growth in their agricultural endeavors. These three factors are interconnected and mutually reinforcing.

By understanding and leveraging the existing natural resources, pursuing their specific interests, and embracing a spirit of experimentation, millennial farmers in Malang Raya can become significant drivers in the development of innovative, sustainable, and successful agriculture in the future. From these findings, it can be recommended that resources and specific interests, supported by technology, will determine the success of Indonesian Millennial Farmers.

Collaboration between the government, educational institutions, agricultural organizations, and local communities will be key to creating an environment that supports and facilitates the growth of millennial farmers and strengthens the agricultural sector in the Malang Raya region.

Research needs to be carried out regarding the development of indicators to measure the sustainability of development in each typology. Assess the environmental, economic, and social sustainability of different types of millennial farmers to inform future sustainable agriculture strategies.

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