

Millennial Smart Farming: Integrated Agricultural Technology Innovation in Increasing Export Value of Agricultural Products to Young Farmers in Gobleg Village, Buleleng Regency

I Made Wimas Candranegara¹, Supranoto², I Wayan Mirta³

¹Administrative Science Doctoral Program Students, Universitas Jember
(email: wimascandranegara3491@gmail.com)

²Lecture in Administrative Science Department Universitas Jember

³Lecture in Public Administration Department, Universitas Warmadewa

Abstract

Problems in the food sector have always been a concern in every country. The government always strives to meet people's food needs and maintain food security, including through empowering farmers, encouraging millennial farmers, increasing productivity and using technology. The Millennial Smartfarming Program is an ecosystem for millennial empowerment through fostering and developing a digital agricultural ecosystem from upstream to downstream and increasing village financial inclusion. The program's objectives are to implement smart agriculture by implementing agricultural digitization with the Internet of Things (IoT), to form an agricultural ecosystem by opening market access to farmers, to strengthening millennial farmer institutions. The focus of this research is on young farmers in Gobleg Village, Buleleng Regency, considering that most of the people in this village depend on the agricultural sector. The urgency in this research is that currently the interest of the younger generation in agriculture is very minimal, inversely proportional to the extent of agricultural land in Gobleg Village, Buleleng Regency. The research method used is a qualitative research method with a focus on the millennial Smart Farming program. The results of this study are that there are already several successful millennial farmers, including the Self-help Agricultural and Rural Training Center [P4S] Keren Young Farmers [PMK] Gobleg Village, Buleleng Regency who have succeeded in exporting local agricultural products to foreign countries.

Keywords:

Innovation; integrated agriculture; millennial farmers

Introduction

Agriculture in a broad sense is human activity to obtain results derived from plants and animals which was originally achieved by deliberately perfecting all the possibilities that nature has given to breed these plants and or animals (Van Aarsten, 1953). Understanding Agriculture in a narrow sense is all biophysical aspects related to efforts to improve plant cultivation to obtain maximum physical production (Sumantri, 1980).

Indonesia is an agrarian country where most of the population lives in rural areas with a livelihood as farmers. Indonesians generally consume agricultural products for their staple food. Agriculture in Indonesia needs to increase its production as much as possible towards food self-sufficiency, however, the challenge to achieve this is very large because of the increasingly narrow agricultural area, climate deviation, development of other commodities, technology that is not yet modern, and this one problem is a What often disturbs the hearts of farmers are pests and diseases that attack the cultivated plants. The results of rice production in Indonesia have not been able to meet the target community needs because there are several areas in Indonesia that are still experiencing hunger (Agriculture Sector Review Indonesia, 2003).

The area of agriculture in Indonesia is getting narrower, this is the biggest challenge that must be faced today, however, there is a way that can be done to anticipate it, namely by developing the agricultural sector. Development is a process of social change with broad participation in a society that is intended for social and material progress (including greater freedom, justice and other valued qualities) for the majority of the people through the greater control they gain over their environment (Rogers, 2007). 1994).

Agricultural development in Indonesia is considered important from the overall national development. Several things that underlie agricultural development in Indonesia have an important role, among others; the potential of natural resources is large and diverse, the share of national income is quite large, the large share of national exports, the large population of Indonesia who depend on this sector for their lives, its role in providing food for the community and becoming the basis of growth in rural areas. Indonesia's agricultural potential is great, but in reality, most of our farmers are still poor. This indicates that the government in the past not only did not empower farmers but also the entire agricultural sector.

Along with the development of the era, Indonesian agriculture can no longer rely on the system used as in the previous year, it is necessary to update both from the aspect of fertilizers, products and also exports that are held. This requires digitalization, especially in the world of exporting Indonesian agricultural products.

With the role of agricultural technology, it is hoped that it will be able to improve the quality of agricultural products, as well as make it easier for agricultural sector managers to

get optimal work results. However, agricultural technology in some areas may still not be suitable to be applied as a whole, because it still has to consider several factors such as natural conditions, experts operating the equipment, and community knowledge about agricultural technology tools.

Agricultural technology innovation plays an important role in increasing agricultural productivity, given that increasing production through land expansion (extensification) is difficult to implement in Indonesia, amidst the widespread conversion of productive agricultural land to non-agriculture. According to data from the Central Statistics Agency (BPS) in the period 1983-1993 there has been a land use change covering an area of 935,000 hectares, consisting of 425,000 hectares of paddy fields and another 510,000 hectares of non-rice fields or an average of 40,000 hectares per year.

Progress and development in any field cannot be separated from technological progress, the agricultural revolution is driven by the invention of machines and new ways in agriculture. If there is no change in technology, agricultural development will stop. Production stops, the increase can even decrease due to declining soil fertility or increasing damage by pests and diseases that are still rampant.

This raises several problems in the agricultural sector. The first problem that occurs is capital, the second is the increasingly difficult land, the third is modern agricultural technology, the fourth is the fertilizer problem, and the last is the marketing problem. Therefore, it is considered necessary to develop soft skills for farmers in the area to be able to overcome these problems. In this case, the role of the younger generation is highly expected to continue to advance the agricultural sector, but there are many problems that the younger generation is more interested in the world of offices, rather than being farmers. This is the most important problem so that the younger generation has a great interest in improving agriculture in order to create optimal employment opportunities.

The Millennial Smartfarming Program is an ecosystem for millennial empowerment through fostering and developing a digital agricultural ecosystem (IoT) from upstream to downstream and increasing Village Financial Inclusion. This program aims to implement smart agriculture by implementing agricultural digitization with the Internet of Things (IoT), forming an agricultural ecosystem by opening market access to farmers, so that farmers' income is guaranteed and optimizes banking financial inclusion in villages, and strengthens

millennial farmer institutions carried out by various stakeholders. Weather sensor applications and tools are made by a national startup company. Before the digital farming system was widely used by millennial farmers, the startup initiated the Smart Farming 4.0 concept which became the first winner of the Hermes Award for the Startup category at the Hannover Messe 2020.

The Smart Farming 4.0 concept provides a way out for farmers in facing the challenges of climate change. The trick is to use sensors and applications, which provide information that can help farmers increase agricultural production, including reducing the use of fertilizers and water.

This concept is the basis for creating a mobile application based on agricultural technology to help record farming systems, select cultivation guidelines, as well as good agricultural handling and processing. Improving agricultural efficiency more easily and efficiently but can produce maximum harvests, besides that farmers can also easily get access to the right partners and markets.

Based on the description of the background of the problem above, the problem in this study can be formulated as follows, namely How is Millennial Smart Farming Implementation: Integrated Agricultural Technology Innovation in Increasing the Export Value of Agricultural Products.

Millennial Smart Farming

Millennial Smart Farming is an ecosystem for millennial empowerment through fostering and developing a digital agricultural ecosystem (IoT) from upstream to downstream and increasing village financial inclusion. This program aims to implement smart agriculture by implementing agricultural digitization with the Internet of Things (IoT), forming an agricultural ecosystem by opening market access to farmers, so that farmers' income is guaranteed and optimizes banking financial inclusion in villages, and strengthens millennial farmer institutions carried out by various stakeholders. (Limanseto, 2021). Digitalization is an indicator that an agriculture has implemented smart farming methods such as monitoring weather, temperature, humidity, which can be monitored via smart phones (RM, 2021).

Inovation

Innovation is a creative choice, arrangement and set of new human and material resources or using unique ways that will result in increased achievement of the expected goals (Fa'izah, 2021). There are several characteristics of innovation including:

1. New, meaning that the idea is completely pure and has never been used by anyone.
2. Distinctive, meaning that all adoptions practiced in new places will bring out their own characteristics.
3. Planned, meaning that innovation is carried out through a process that is carefully prepared, clear, unhurried and has been planned in advance.
4. Have a clear goal.

Meanwhile, according to Law no. 19 of 2002, innovation is research, development and or engineering activities carried out with the aim of developing practical applications of new scientific values and contexts, or new ways to apply existing science and technology into products or production processes.

Based on some of the opinions above, it can be concluded that the notion of innovation is a creative development so that the implementation of new knowledge can bring more optimal benefits.

Technology

Technology is a collection of tools, rules and procedures which are the application of scientific knowledge to a particular job under conditions that allow repetition.

According to Merriam Webster, technology is an application of practical knowledge, especially in a particular field; how to complete a task primarily by using technical processes, methods, or knowledge; as well as special aspects of certain business fields.

Based on some of the opinions above, it can be concluded that the notion of technology is a collection of practical applications from various fields with implementation occurring repeatedly.

Integrated Agriculture in Increasing Agricultural Export Value

Integrated agriculture is an agricultural system with efforts to utilize the linkages between plantation/food/horticultural crops, livestock and fisheries, to obtain agro-ecosystems that support agricultural production (habitat stability), economic improvement and conservation of natural resources. The principle in integrated agriculture is that it is

located in one area/spread, the waste of an activity is an input for other activities, maintains the balance of the ecosystem, and encourages habitat conservation (applying organic agriculture/sustainable agriculture) (Hapsoh).

Export value is the value of all goods and services traded abroad which is determined by foreign demand. According to the Central Bureau of Statistics, export assessment refers to the value of Free On Board (FOB) and is expressed in US Dollars (USD). In export activities, Indonesia is a member of the South-South Cooperation, which is a form of cooperation between developing countries in solving problems. Indonesia has a long-term economic interest in 2005-2025, namely a comparative advantage in the agricultural sector to be able to meet the import needs of these countries. Through the context of this cooperation, it can increase the potential of new export markets for agricultural products in Indonesia.

In 2020, which was the first year Indonesia was hit by the Covid-19 pandemic, the agricultural sector was one of the sectors that was able to withstand the impact of the pandemic and showed an increase in the value of agricultural exports. In 2019, agricultural exports reached IDR 390.16 trillion and increased by 15.79 percent in 2020 to reach IDR 451.8 trillion. The increase in agricultural exports certainly has an impact on the welfare of farmers. The increase is also an effort of the Ministry of Agriculture (Kementan) in boosting the value of exports in order to contribute greatly to national economic growth. Looking deeper, based on data released by BPS on June 24, 2019, the value of agricultural exports rose 25.19 percent compared to the previous year or worth US\$ 0.32 billion.

According to the Head of the Ministry of Agriculture's Public Relations and Public Information Bureau, Kuntoro Boga Andri, in encouraging exports, one of the policies issued by the Ministry of Agriculture is to simplify export licensing with a short processing time, which is around 3 hours. The implementation of the policy is the implementation of an inline inspection service system that supports the development of agricultural areas based on comparative and competitive advantages. The system regulates plantation registration, packaging house certificates, and quality development between exporters, farmers and Agricultural Attaches as market intelligence.

The development of export commodities in the agricultural sector has been instructed by President Jokowi to his staff so that the People's Business Credit (KUR) distribution scheme can be perfected and there is an increase in added value and the growth of the agricultural

sector in Indonesia. The Head of State reaffirmed that the agricultural sector has a major contribution to economic growth in Indonesia. Therefore, it is necessary to strengthen assistance for farmers in the use of technology to increase farmer productivity.

Methods

In this study, researchers used the method of literature study which was strengthened by qualitative methods, namely interviews. As the main research method, namely the Literature Study method, the researcher conducts a State of the art analysis by taking several examples of previous research as a guide or example for current research. The data collection method in this study was taken from the data source, which means the data source in this study is the subject from which the data can be obtained. If the researcher uses documentation, then the document or note is the source of the data, while the contents of the record of the research subject or research variable.

Result and Discussion

Based on the description above, it has been stated that the problem that will be answered in this research is How is the Implementation of Millennial Smart Farming: Integrated Agricultural Technology Innovation in Increasing the Export Value of Agricultural Products. Considering the method used in this research is a literature study and strengthened by qualitative methods. The informants proposed are people who have relevance to the problems studied, namely the participation of the participants themselves so that the informants obtained in the field are relevant and related to what is needed. Data analysis is qualitative and descriptive in nature, in the sense that the data obtained are analyzed and the results are in the form of descriptive phenomena. In other words, the analysis describes and describes the data obtained as the actual condition.

The following are the results of the researcher's analysis related to Millennial Smart Farming technology innovations:

1. Millennial Smart Farming Technology Innovation is held as a form of implementation of millennial empowerment through fostering and developing a digital agricultural ecosystem (IoT) from upstream to downstream and increasing village financial inclusion. This program is implemented for young farmers in Gobleg Village, Buleleng, Bali. In its

- implementation, this innovation is strongly supported by the local community, MSMEs and also other creative economy business actors.
2. In addition to seeing this, the implementation of Millennial Smart Farming also uses a smart farming machine designed by several Udayana University students who do street vendors in Gobleg Village, Buleleng, Bali. This really helps the community there in increasing the development of smart farming.
 3. This technological innovation is expected to help the agricultural aspect to survive and develop and rise from adversity that occurred while strengthening the application of the Smart Farming 4.0 concept. So that the agricultural sector can be productive again and the export value of agricultural products can increase again. Participants who are members of this community are also required to be creative and innovative in carrying out the activities carried out during the empowerment of this technological innovation.
 4. Regarding the clarity and consistency of goals, according to the Millennial Smart Agricultural Technology Innovation community participants, that this technological innovation prioritizes the empowerment of the younger generation and the development of integrated agriculture. And also according to them, this activity has a very high possibility to restore Bali's economy for the better.
 5. The human resources involved in this innovation all get good feedback for themselves, because the participating communities and the innovation driving committee carry out an innovation evaluation agenda every 3 months to find out what things are not optimal in order to improve optimization. of innovation. this technology.

Conclusions and Recommendations

The conclusion in this research is that the narrowing of agricultural land in Indonesia is the biggest challenge today, but there are ways that can be done to anticipate it, namely by developing the agricultural sector. Agricultural development in Indonesia has an important role, among others; the potential of natural resources is large and diverse, the share of national income is quite large, the share of national exports is large, the large population of Indonesia who depends on this sector for their lives, its role in providing food for the community and becoming the basis of growth in rural areas. Progress and development in any field cannot be separated from technological advances, the agricultural revolution is driven by the invention

of machines and new ways of agriculture. This program aims to implement smart agriculture by implementing digitalized agriculture with the Internet of Things (IoT), forming an agricultural ecosystem by opening market access to farmers, so that farmers' income is guaranteed and optimizes banking financial inclusion in villages, as well as strengthening millennial farmer institutions carried out by various stakeholders. With the role of agricultural technology, it is expected to be able to improve the quality of agricultural products, as well as facilitate agricultural sector managers to obtain optimal work results.

The suggestions in this study are:

1. The government continues to support programs and communities aimed at reviving agriculture in Indonesia.
2. Provide education and socialization to farmers about the application of smart agriculture in order to increase the value of agricultural exports.
3. Adding smart agricultural machines to support agricultural development in Indonesia, especially Gobleg Village.

References

- Addina. (2021, Maret 24). *Pengertian Inovasi menurut para ahli*. Retrieved from merdeka.com: <https://m.merdeka.com/trending/pengertian-inovasi-menurut-para-ahli-kln.html>
- Adhi. (2021, Agustus 25). *Tingkatkan Nilai Tambah Sektor Pertanian dengan Ekspor dan Penyempurnaan Skema Penyaluran KUR*. Retrieved from Kominfo: <https://kominfo.go.id/content/detail/36586/tingkatkan-nilai-tambah-sektor-pertanian-dengan-ekspor-dan-penyempurnaan-skema-penyakuran-kur/0/berita>
- Anonim. (2021, Agustus 14). *Peningkatan Ekspor Pertanian Turut Dongkrak Kesejahteraan Petani*. Retrieved from Presiden RI: <https://www.presidenri.go.id/siaran-pers/peningkatan-ekspor-pertanian-turut-dongkrak-kesejahteraan-petani/>
- Firdaus, M. (2017). Analisis Faktor-faktor Ekspor Produk Pertanian Indonesia ke Negara kurang Berkembang. *Jurnal Agribisnis Indonesia*, 62-62.
- Lakitan, B. (2019). Strategi Jalur Ganda dalam Pemajuan Pertanian Indonesia: Memfasilitasi Generasi Millennial dan Menyejahterakan Petani Kecil. *Jurnal Agrikultural*, 3-4.
- Revika, R. (2020). Smart Farming 4.0 Mewujudkan Pertanian Indonesia Maju, Mandiri dan Modern. *Jurnal Agro Ekonomi*, 138-139.