



Indonesian Agricultural Industry Innovation to Create World Food Storage in 2045

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ABSTRACT

The issue of food safety and food security has become an international concern, given the increasing global food demand due to the food crisis caused by the Covid 19 pandemic. Indonesia is trying to become a global food supplier through the Indonesian government's vision of "World Food Barn 2045". This article uses the approach of the theoretical debate between Ester Boserup, Mark Nathan Cohen, Michael Lipton, Parker G. Marden, and Warren C. Robinson which states that there is a relationship between variables of food availability, changes in agricultural technology, and population growth in the world. The results of the author's research in this article assume that in handling the issue of the global food crisis it is necessary for each country to sustain the event, Indonesia seeks to sustain the global food crisis through the implementation of an "Integrated Agriculture System" that integrates the agricultural sector and the livestock sector.

INTRODUCTION

The Covid-19 pandemic has created world chaos and has had a negative impact on almost all sectors, not only disrupting national stability but also international stability. This incident has detailed lockdowns hurt the health system and various aspects of life in the international community, one of which is related to the decline in food availability in a country. The Covid 19 pandemic has affected the food sector through various mechanisms, ranging from disruption to the international trade system to a decline in domestic production and a decline in community power. The rapid spread of the Covid 19 virus and the high number of deaths have caused many countries to implement territorial restrictions both within the country and with other countries, which we know as lockdown (detikEdu, 2021). The impact of this lockdown has caused a food crisis. This can occur due to restrictions on trade routes by producer countries (exporters) to consumer countries (importers). A small example that we can observe is Vietnam which has restricted rice trade routes. Vietnam implemented a policy of stopping rice exports to meet its domestic needs. If this continues to happen and is followed by other food exporting countries, then cross-border food supplies will certainly be disrupted and will cause a food crisis for importing countries, one of which is Indonesia, which imports rice from Vietnam (Khudori, 2020).

Since the end of the Cold War, the process of globalization has entered various dimensions of life very quickly and on an increasing and expanding scale and has given rise to a compilation of the basic concept of "threat" in international relations. Through globalization, terms such as global violence and human security have become complex discussions. In the era of globalization, thinking related to security has a broader meaning and is non-military, in this case, it is associated with thinking about the concept of security for individuals known as the concept of human security. This concept of thought is based on two negative freedoms, namely freedom from fear and freedom from want, which have been part of the rights recognized by the UN since the inception of this international institution. Thus, human security includes various dimensions of security, one of which is food security. (Prof. Drs. Budi Winarno, 2014) Food security referred to here is the condition of food fulfillment in a country down to the individual level which can be seen from the availability of food that is sufficient in terms of quantity and quality, safe, nutritious, and evenly distributed.

The UN states that the food issue is a global issue, where this issue is considered important but is always underestimated by state and non-state actors even though the food issue is very vulnerable and at risk of transnational and international crime. The issue of food has a very strong relationship with humans, this can be seen from various phenomena such as food being one of the factors that can support the economy related to the food industry, where food is an important factor in the flow of globalization.

In terms of globalization, changes in the food system, increasing interconnectivity, mobility and transnational access to goods, people, and

information are intersecting with each other (Mc Donald, 2015). Thus, food is not a single entity but rather an interaction of systems, especially in humans.

FAO, which operates as the world food agency, has basically noted that food reserves are still safe even though the Covid 19 pandemic has disrupted the agricultural sector. In 2020, it was recorded that the world supply of cereals, including rice, which is the staple food of the Indonesian people, reached 850 million tons (Schmidhuber.2020). These reserves were determined by FAO as anticipation or preparation in the event of bad weather or natural disasters throughout 2020. Meanwhile, considering the impact of the pandemic which is increasingly chaotic and worsening the fate of the global agricultural sector, the main thing that must be done is to maintain food security for avoid a food crisis.

One of the global challenges facing food security today is the soaring population in the world and rising fuel prices which will certainly affect global food supplies. According to data from the World Bank, it is estimated that in 2050 the world population will increase to 9.7 billion from the previous 7.9 billion in 2021 (figure 1) (Suzuki, 2019). The question is how to be free from the food crisis. Of course, the world must make efforts to produce more food to free 9 billion people from hunger. Therefore, a food barn or what is usually called a Food Estate can be a solution as a supplier of food reserves and also as an anticipation if at any time a disaster occurs or an increase in the price of food needs that strangles the community. The aim of having a food barn is to increase the volume of food reserves and ensure access and sufficient food for the community. Apart from that, it can also help in developing productive economic businesses, especially in the food sector.

LITERATURE REVIEW

The global food barn is still a hot topic of discussion today because this will be an alternative for maintaining food security, where this has sparked a theoretical debate about the existence of the global food barn and food security itself. We need to know that food storage is a matter of debate because it is assessed from several angles, such as its impact on the economy of society and the country, its impact on ecology, and as an effort to maintain food security due to the crisis that is currently hitting every country. Therefore, the theoretical debate was put forward by Ester Boserup, Mark Nathan Cohen, Michael Lipton, Parker G. Marden, and Warren C. Robinson who said that there is a relationship between food availability variables, changes in agricultural technology due to developments over time, and world population growth. Therefore, this theoretical debate will be used as an analytical tool regarding global food storage and food security.

The first statement put forward by Ester Boserup (1981) was that current world conditions cannot be separated from world population growth and the very significant transformation of agricultural technology, where this context is the determinant of global food storage and food security. We need to know that Boserup said these two phenomena are interconnected. First, population growth influences changes in agricultural technology. Second, technological

transformation affects population growth. However, Boserup is more inclined towards the first phenomenon. The technology that Boserup means here is land management and how to maintain health. In contrast to Mark Nathan Cohen, Cohen's (1977) thinking starts from the beginning of agricultural activities based on archaeological data where Cohen's basic assumptions are the phenomena that cause agricultural activities in several regions of the world, and these events show similarities. Second, these similarities are not immediately accepted, but there are more factors than those that cause the emergence of agricultural activities. Cohen explained that agricultural activities actually began to exist 2 million years ago, when humans hunted and gathered the necessities of life, namely food. After that, neolithic changes occurred.

However, anthropologically, there is a change in agricultural activities due to two influences, namely the ideas of Malthus and Morgan (1977) which state that culture will become a model of agricultural activity, and the combination of these two influences explains the relationship between technology and population growth. In the sense that technology in this context is able to influence the environment on the survival of regional residents. In contrast to Michael Lipton's (1990) thoughts which are considered unclear and quite difficult to understand, Lipton's analysis starts from the role of institutions in the process of policies obtained by the state. According to Lipton, many agricultural research results do not find a positive relationship between population growth in poor rural areas and labor needs.

In the end, Lipton clarified the issue regarding the question stated by Boserup, namely whether institutional work procedures can be changed by policy. What we need to know is that there are 5 propositions put forward by Lipton. First, Malthus stated that the availability of food, improving the health of citizens or the level of wages, and ultimately also having to provide labor and unite the land so that it is suitable for use.

Basically, a decline in food and population pressure can occur if the availability of food for each person decreases and also the average wage level. Second, Malthus thought that postponing marriage could avoid misery. Third, the increase in food production with new technology is caused by population growth. Fourth, food availability is influenced by institutional factors. Fifth, there is no effect on increasing food availability in the long term. Lipton experienced difficulty in analyzing the relationship between food availability and population growth from these five propositions. Therefore, Lipton provides sharp criticism of areas whose population is increasing rapidly by asking whether the world's population explosion can be overcome by providing food? Lipton then sharply criticized Boserup's statement that changes in agricultural technology that could increase food availability could be realized through institutional strengthening.

Parker G. Marden's (1973) thinking is based on the green revolution from the perspective of population distribution, that population problems do not always intersect with food needs and existing resources, but cannot be separated from employment problems. Marden's thinking departs from the

green revolution which then explains this phenomenon, where the green revolution will not only increase agricultural production, but there will be an increase in population problems which can affect the way cities grow and experience an urbanization process. Marden concluded that urbanization occurred as an effort to seek additional income for the community due to the shift in rice harvesters caused by the use of superior rice seeds.

We need to know that Marden only focuses on growth in urban areas seen through the increasing flow of urbanization, where each individual responds differently to the urban atmosphere. This is the same as the thoughts of Warren C. Robinson (1973) who also explains the green revolution, where this is able to change the agricultural production procedures in developing countries so that they become developed countries because basically developed countries are able to implement the green revolution which is followed by change. technology. This cannot be separated from rapid population growth. Robinson experienced a dilemma in explaining the revolution because the green revolution was able to increase food availability and accelerate population growth. As stated by Malthus, agricultural technology can improve social welfare and population growth.

Robinson is neater in explaining the Green Revolution than Marden. Robinson departs from the experiences experienced by developing countries, such as high fertility rates which provide high pressure and has an impact on increasing returns from food crop production and labor requirements, as well as technological changes that will change a country's economic growth (Singgih, 2001). In this article, the opinions of these five thinkers will serve as a reference for analysis of the status quo of the food barn in Indonesia, the efforts made by the Indonesian government, or agricultural industry innovation in realizing the vision of becoming the world's food barn in 2045.

Third Level Heading

Indonesia's potential to become the world's food basket in 2045 can be assessed from Indonesia as an agricultural country, where this country, which was previously called the archipelago, has abundant natural resources that need to be managed well and sustainably. The world population currently reaches 7.9 billion people in 2021 and is predicted to increase by 9.7 billion in 2050. This means that food needs will also increase despite the world being hit by a climate crisis caused by fossil energy production which depletes natural resources. This is something that all countries in the world must pay attention to to maintain food security amidst the food and energy crisis. Therefore, Indonesia has a vision of becoming the world's food basket in 2045, which was initiated by the Minister of Agriculture Andi Amran Sulaiman, which was then continued by Mr. Syahrul Yasin Limpo to implement this vision. Indonesia's dream of realizing the World Food Storage in 2045 begins with the potential of its natural resources.

Indonesia has a land area of 1.3% of the world's land area, but this is not an obstacle to realizing this vision because Indonesia itself has 8500 types of fish, 500 types of mammals, 1500 types of birds, 2000 types of reptiles and

amphibians, 25,000 types of plants, 250,000 types of insects. The most important thing here is that Indonesia has 800 types of food crops that have the potential to be managed and able to become world food suppliers by 2045.

Indonesia has 100.7 million hectares of agricultural land, 24.5 million hectares of rice fields and 76.2 million hectares of dry crop land. We need to know that Indonesia is ranked in the world for its food commodities, namely pepper is ranked 1st, and rubber is ranked 2nd. Cocoa is ranked 3rd, black pepper is ranked 3rd, coffee is ranked 4th, grains are ranked 5th, tea is ranked 6th. Not only that, Indonesia still has other agricultural commodities, such as 110 types of spices, 40 types of beverage ingredients, 228 types of vegetables, 389 types of fruit, 75 types of fat, 26 types of nuts, and 77 types of carbohydrate sources. This will encourage Indonesia to be self-sufficient in food and become a food supplier in the future. Apart from the vast land area and large amount of food commodities, Indonesia, in realizing the world food barn in 2045, is implementing industrial innovation in the agricultural sector, such as the implementation of the Integrated Farming System. This innovation can encourage the realization of Indonesia's vision of becoming the "World Food Granary 2045" (Samanhudi, 2018).

METHODOLOGY

The research method used is qualitative-descriptive through a Secondary Data Analysis approach. This article uses secondary data analysis as a writing reference, namely by using data obtained from E-Books, journals, the Indonesian Ministry of Agriculture website, the Indonesian Ministry of Defense website, the official website of the Indonesian Minister of Administrative and Bureaucratic Reform, the official website of the South Sulawesi provincial government, the Detik.com website, the Rimbakita.com website, NGO websites (BBC Indonesia, Greenpeace Indonesia, CNN Indonesia), and others related to the title of this article, were then elaborated and processed systematically and analytically. The research method using a secondary data analysis approach is analysis of the condition of food storage in Indonesia and the integrated agricultural system in Indonesia.

Qualitative research is a way for researchers to write down data collected from various sources, then the results of the data analysis are presented in this article. Meanwhile, the descriptive approach aims to describe the conditions and situations that occur in food barns in Indonesia and the integrated agricultural system in Central Java (Ulya, 2021). Then, this article begins by discussing the status quo of food barns in Indonesia with case studies in the provinces of Central Kalimantan, South Sulawesi. And focus more on the Indonesian government's efforts to realize its vision (world food barn 2045) through the implementation of an integrated farming system, where this concept has been implemented in Pakuran Village and Rogodadi Village, Buayan sub-district, Kebumen Regency, Central Java province.

RESULTS AND DISCUSSION

Status Quo of the Food Granary Project in Indonesia (case study: Kalimantan Tengah dan Sulawesi Selatan)

The implications of the five theories put forward by Boserup, Cohen, Lipton, Marden, and Robinson have an impact on the presence of food barns in Indonesia, where the presence of food barns in Indonesia is to maintain food availability as an effort to maintain national and global food security. Apart from this, the food barn program is an effort to support the food needs of each individual due to increasing population growth. Not only that, there is a transformation of agricultural technology which will make food production easier when farmers previously used traditional tools.

The condition of food barns in Indonesia has become a public concern because society has just faced the Covid-19 pandemic. It has become a public concern because the government has made a policy of limiting all forms of activity, especially food production. The food barn program launched by the Indonesian government is included in the National Strategic Program (PSN) for 2020-2024, where the food barn project is being worked on by three ministries, namely the ministry of agriculture, the ministry of defense and the ministry of PUPR. The government's initial plan for this program was to use 190 thousand hectares of land in Central Kalimantan, 10 thousand hectares in East Kalimantan, 120 thousand hectares in West Kalimantan, 190 thousand hectares in Maluku, 1.9 million hectares in Papua (Sulaeman, 2020). Apart from these areas, there are areas in North Sumatra, East Java, South Sulawesi, and various other areas spread throughout the country. This program is an effort to maintain national and global food security. Construction of food barns began in 2020 in Central Kalimantan province and will continue to be developed until 2024 (Agriculture, FOOD ESTATE DEVELOPMENT BASED ON FARMERS' CORPORATIONS, 2022).

According to what Airlangga Hartato, Coordinating Minister for the Economy, said, the development of food storage in the Central Kalimantan region has reached 60 thousand hectares, where in 2020 the land area was only 30 thousand hectares, then it increased by 14 thousand hectares in 2021 and then there was an expansion of 16 thousand hectares (Putra, 2022). According to the Minister of Agriculture, Syahrul Yasin Limpo, the productivity of food estate projects in each region continues to increase (Damayanti, 2023). However, there is one area in the Central Kalimantan region that has received criticism because it has created new problems. BBC News Indonesia together with NGOs who searched the food storage area in Central Kalimantan, found 600 hectares of stalled cassava plantations in the village of Tewai Baru, Gunung Mas. And there are around 17 thousand hectares of rice fields planted with rice that have never been harvested.

As a result, one of the residents of Tewai Baru village, Named Rangkap, complained about the Food Estate program because around 4 hectares of his garden land used to plant cassava has now become barren due to crop failure, even though his land is often planted with peanuts, eggplant, rubber trees and

gourds. He felt disappointed with this program because there was no agreement between the government and Mr. Rangkap, suddenly dozens of heavy equipment entered the forest which was guarded by soldiers as a shield so that people would be afraid to protest (Indonesia B. N., 2023).

The cassava plantation land cultivated by the defense ministry has drawn resistance from various environmental institutions, one of which is Greenpeace, which stated that the food storage program in the Central Kalimantan region should be stopped because it only destroys forests and threatens biodiversity. According to Syahrul Fitra as a spokesperson for Greenpeace Indonesia, he stated that the project had released 61 thousand carbon into the air (INDONESIA, 2021). According to the Director of WALHI Central Kalimantan, Buya Herinata, the Food Estate program must be stopped immediately because the project continues to fail considering the history that occurred during the New Order era. And this project has experienced damage to forests and peatlands which can have an impact on socio-economic losses which not only increase poverty, but drain state finances. And return land rights and let farmers manage the project (Indonesia G., 2022).

Even though the food barn in the Gunung Mas area is considered to have failed in its management, South Sulawesi province has become a food barn area that is able to meet domestic needs and can be exported to other countries. Several areas in South Sulawesi which are production centers for corn commodities include Takalar, Jeneponto, Gowa, Bulukumba, Bantaeng, Pinrang, Wajo and Bone districts. South Sulawesi is able to become a corn production center because it is able to produce three times a year, namely February-April, July-August, November-December. In 2020, diesel corn production is estimated to reach 24.16 million tons (Yusmanto, 2020).

In 2021, spices as South Sulawesi's leading commodities such as coriander, candlenuts, cinnamon, etc. have been exported amounting to 1,488 tonnes with a value of 49.9 billion to several countries including the United States, Hong Kong, China, Japan, Russia, Italy, Canada, South Korea and France. This export release was attended by 14 export companies, namely PT. Sumber Guna Makassarnusa, CV. Aromata Anugrah Sultan, PT. Prima Indo Tuna, CV. Muna Agro Indonesia, CV. Adi Tirta, CV. Guna Bahari Indonesia, PT. Nuansa Cipta Magello, PT. Comextra majora, PT. Biru Laut Nusantara, PT. Prima Bahari Inti Sustainable, PT. Algae Marine Biota, PT. Bogotama Marinusa, PT. Dunia Marine Products, and CV. Mega Citra Karya. The Acting Governor of South Sulawesi said that apart from these export activities, the South Sulawesi rice commodity has experienced an overstock of 450 thousand tons, and has been distributed to 27 provinces in Indonesia (Diskominfo, Acting Governor of South Sulawesi Releases First Export of Various Superior Commodities from South Sulawesi Worth IDR 49.9 Billion, 2021).

Corn exports will resume to the Philippines in 2023, South Sulawesi has exported 6,150 tons of corn commodities to the Philippines worth 30.43 billion. The Governor of South Sulawesi said that this export could have a positive effect on the community's economy (Diskominfo, First in 2023, 6,150 South Sulawesi Corn Exported to the Philippines Worth IDR 30.43 Billion, 2023).

Therefore, the author believes that the food barn project in Gunung Mas, Central Kalimantan is not suitable to continue because there is no deeper observation before land clearing, and it can increase deforestation rates, and is not democratic in determining planting activities. Meanwhile, areas in food storage in South Sulawesi have a positive impact on domestic food needs and are able to meet the food needs of other countries through export activities. This is the beginning of realizing Indonesia's vision of becoming "the world's food basket in 2045".

Implementation of the Integrated Farming System towards the World Food Granary 2045

The Indonesian government continues to strive to realize its vision to become a food supplier for every country in the world through innovation in the agricultural industry, namely the implementation of an integrated farming system. Judging from the five thinkers above, they say that to increase food production in order to maintain food security due to the food crisis, changes in agricultural technology are needed as an effort to support food availability and be environmentally friendly. This is in accordance with the Indonesian government's innovation in implementing an integrated agricultural system. If analyzed using the assumption put forward by Lipton that an integrated agricultural system is a system that uses new technology that can increase food availability. With the increasing world population to date, Boserup believes that an integrated agricultural system is one way to support food availability which is followed by population growth.

This integrated agricultural system integrates several sectors, namely agriculture, livestock, fisheries, plantations and forestry which are managed simultaneously and provide mutual benefits to each other. This concept is also designed so as not to pollute the environment which will cause climate change, and can increase income, as well as being very efficient in food productivity. If this concept is analyzed using Robinson's thinking, increasing food production needs to be followed by technological change (Integrated Farming System). If explored further, the integrated agricultural system encourages people to recycle by using plants and animals as partners. Essentially, this concept will be harvested in a balanced manner by utilizing all existing energy potential.

The implementation of this integrated system helps utilize organic materials and absorb carbon more effectively compared to conventional agricultural systems that use chemical or nitrogen fertilizers. To be more effective and efficient in food production, this integrated concept should be in one area to make it easier and faster in food production, such as the agricultural sector (rice and corn), fisheries (catfish, tilapia and gourami), livestock (beef cattle), goats, etc.), plantations (sugar cane), horticulture (vegetables) are in one area. Why is that, so that the waste does not pollute the environment because it is used as energy in other sectors. For example, agricultural waste (rice straw, corn stems and leaves, soybean straw, sugar cane shoots, and peanuts) is used as animal feed, while animal waste (cows, goats, sheep, ducks) is used as organic fertilizer and bioenergy from feces. the animal). Apart from

that, the effectiveness of this production area will save more on transportation costs. This concept will save production costs by utilizing waste from other components.

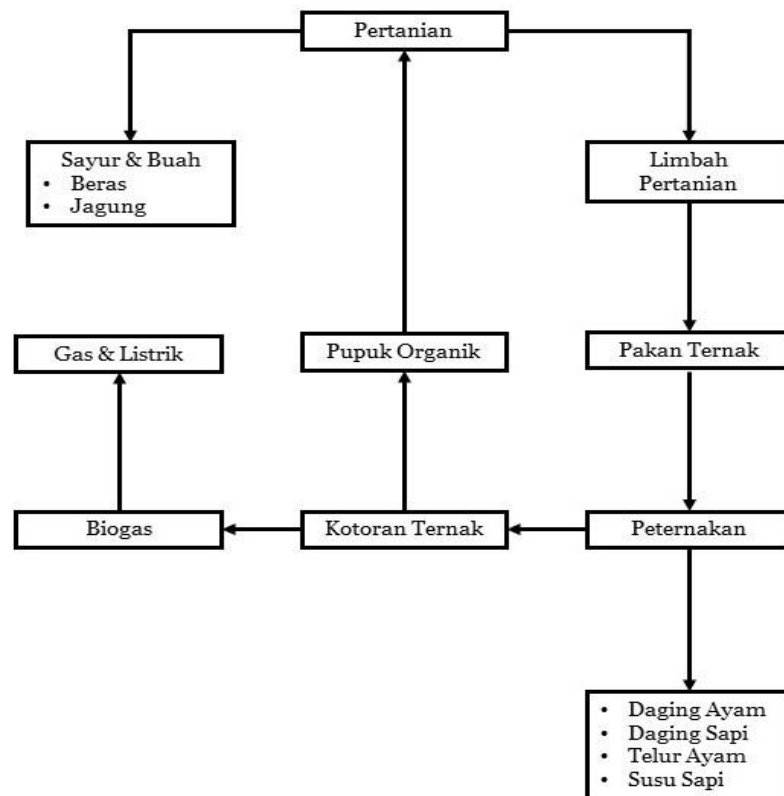
This integrated agricultural system concept is able to produce 5F (food, feed, fuel, fertilizer, and finance) which can benefit and improve the welfare of farmers:

1. Food: in the form of basic human needs such as rice, corn, beans, vegetables, soybeans, tomatoes, etc., from plantation products such as cinnamon, snake fruit, soursop, etc., from livestock products in the form of dairy cow's milk, meat, eggs, etc. , as well as from aquaculture products in the form of catfish, tilapia, gourami, etc.
2. Feed: including ruminant livestock feed such as cows, buffalo, goats, rabbits, etc. Poultry feed such as ducks, chickens, geese, muscovy ducks, pigeons, etc. Feed for cultivating freshwater fish such as consumption fish and ornamental fish. From the production of rice plants, rice will be produced and the waste can be used as ruminant feed, such as straw and kawul which are used as dry feed ingredients, while rice bran is used as a mixture of ruminant, fish and poultry feed ingredients.
3. Fuel: can produce energy from heat energy and animal feces to be used as bio gas by using a reactor for cooking needs. The result of bio gas is fertilizer which can be used as liquid fertilizer and compost. Meanwhile, rice husks are used for energy by burning them directly, then they become husk ash/charcoal which can be used as organic fertilizer.
4. Fertilizer: use of animal waste to make liquid and solid fertilizer.
5. Finance: food, feed, energy and fertilizer produced from an integrated agricultural system can increase agricultural income for those who implement it, and is more cost effective (Dr. Ir. Dwi Haryanta, 2018).

Despite the advantages of the integrated farming system, there are obstacles in implementing it, such as people needing to have knowledge about agriculture, fisheries and animal husbandry. Because this can help farmers use waste to be used as energy (Rimbakita, 2023).

The implementation of an integrated agricultural system can be seen in Pakuran Village and Rogodadi Village, Kec. Buayaan, Kab. Kebumen, Central Java, where the local community, especially farmers, integrates the agricultural and livestock sectors. Farmers integrate these two sectors because they have financial benefits, save costs, and are environmentally friendly.

Figure 1. Integration between Agriculture & Livestock



In the agricultural sector, farmers grow rice, corn, fruit and vegetables as basic human needs. The final results of harvesting food crops leave behind waste that can pollute the environment. However, straw waste originating from food crops, especially rice and corn, is used as animal feed through fermentation and ammonia.

In the livestock sector, farmers in Pakuran Village & Rogodadi Village use cows and chickens as pets because they can increase their finances by selling their meat and chicken eggs, as well as selling cow's milk. Then, the two livestock produce feces which can pollute the environment. However, farmers are equipped with the knowledge to use this waste as bio-energy. Animal waste can be used as bio gas through anaerobic fermentation (without oxygen) as a substitute for LPG which is a necessity for the family kitchen. Bio gas is also useful as a generator of electrical energy by fermentation through an airtight digesterization process. Then, the bio slurry or leftover dregs from household bio gas are used as organic fertilizer. and useful as organic fertilizer for food crops (UGM, 2021).

Challenges in Implementing Food Granary Projects in Indonesia

In an effort to realize the vision of a world food barn in 2045, of course we will be faced with various crucial issues related to this food barn project. According to BPS (Central Statistics Agency) data, there are two technical notes

which are the main challenges in realizing the vision of a world food barn in 2045, namely:

1. Carrying capacity of land resources and human resources (HR) in the agricultural sector (Farmers).

Based on the latest data from the Ministry of Agrarian Affairs and the National Defense Agency, the area of rice fields experienced a significant decline of up to 646 thousand hectares or 8 percent in the five years from 2013 to 2018. In line with the rapid transformation and development of the national economy over recent times, this is of course related to the conversion of agricultural land, especially rice fields, to non-agricultural use (housing, industrial areas, infrastructure projects, etc.). Along with the decrease in the area of rice fields, it seems that this can also be explained by a decrease in the carrying capacity of forest areas in supplying water needs for irrigation. According to BPS data, the area of land cover in forest areas decreased by 3.63 million hectares during the 2014-2017 period.

This was then supported by the increase in the number of farming households which then controlled agricultural land of less than 0.5 hectares from 14.25 million households (55.33%) in 2013 to 15.81 million households (58.07%) in 2018. In addition, according to the World Food and Agriculture Organization (FAO), it is estimated that 90 percent of farming households in 2018, reaching 27.22 million households, are smallholders who are only able to cultivate a land area of less than 2 hectares. This is what then results in farming being inefficient in meeting increasingly high food needs along with the increase in population.

This condition is further exacerbated by the profile of farmers which is dominated by the older age group with low education. Based on the results of the 2013 Agricultural Census and 2018 SUTAS, it shows that the number of older farmers dominates human resources in the agricultural sector. Not only that, most of these farmers also have low education and this certainly has a strong relationship in increasing agricultural productivity. This is one of the challenges that must be anticipated in realizing the world's food basket by 2045.

2. Projections of the national meat balance which will continue to decline over the next few years.

The national meat balance continues to decline accompanied by high demand which is not yet able to meet national meat needs, meaning that Indonesia is still very dependent on imported meat supplies. On the other hand, meat prices in the market have also soared. This will then become an obstacle in Indonesia's efforts to increase public protein consumption. Based on BPS projection results, it shows that the balance deficit for meat demand sourced from beef cattle, dairy cattle and buffalo will soar to 462.77 thousand tons in 2026. This is due to national meat production which is estimated at 453.79 thousand tons, unable to meet national meat demand which reached 916.56 thousand tons. In this way, it can be assumed that the per capita meat consumption figure reaches 3.19kg/year, with a mid-year population reaching 287.32 million people. This shows that only around 50 percent of total meat

consumption can be met and if this happens Indonesia will always depend on imported meat until 2045.

The two challenges above will be supporting factors for Indonesia to continue to depend on imported food in recent years. Therefore, the government plays a very important role in realizing the success of the vision of a world food barn in 2045 (Kadir, 2019).

Basically, the food barn project (Food Estate) has become one of the National Strategic Programs (PSN) recorded in PP. Number 109/2020, further discussed in the Job Creation Law, Head of Institution (Minister), to the Regions (Governor/ Regent) who is given the power to waive permits and non-permits both in access to facilities, data and information as well as all forms of services needed to realize this program. This means that, in this case, everything related to the procurement of land or land for the Food Estate program will be made easier, even land ownership of indigenous communities, forest areas and land belonging to local communities can be allocated to realize this program.

By looking at this, this will of course cause a problem considering that the role of farmers and the community in the food barn project area does not show siding with their interests. There are at least three reasons why this food barn project is considered to be problematic, namely: (1) Deforestation and environmental damage; (2) Conflict between local communities and corporations; (3) Land use issues. When viewed from a political economy perspective, basically food security is a fairly strong triangular relationship between government, corporations and society. Therefore, the government as the authority that manages resources will build relationships with various corporations so that investment can help domestic production activities and also provide benefits to local communities. However, what is currently worrying is the lack of people's role in the project so that what is visible is only the relationship between the state and the market (Ayu, 2022).

Solutions For Food Barns in Indonesia

In general, in this article the author proposes a solution that in the future Indonesia will face crucial challenges, namely the energy crisis and the global financial crisis which have started to enter the country. Even though we all know that Indonesia along with China and India are the three countries in the world that are experiencing positive growth, the impact on the unemployment rate due to the decline in the export market which has resulted in many layoffs will create new challenges and threats, namely threats to food security because considering the main problem of food security is poverty and hunger. Therefore, food barns can be a solution to this problem. However, considering that in realizing the vision of a world food barn, of course there are many challenges that must be faced, such as the carrying capacity of land resources and human resources in the agricultural sector which is still relatively low when seen from the education and age profile of farmers.

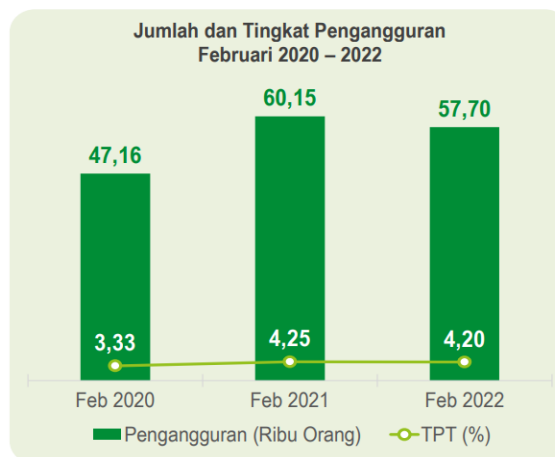
On the other hand, the need for meat protein is still a challenge in increasing food security in Indonesia. The solution offered by the author is that first, the government must develop the agricultural system in Indonesia. The

characteristic of Indonesian agriculture is small scale or meager. The emergence of Integrated Farming Systems can be a solution in developing and improving the viability of small sized farming operations in relation to larger ones. This farming system is a more integrated form of agriculture compared to cultivation on agricultural land in one area or alone (monoculture). An agricultural system that combines livestock and crop production or integrates fisheries and animal husbandry.

Second, improve irrigation facilities because remembering that good irrigation will increase farmers' productivity and welfare. Third, increasing education is an effective solution to increase human resource productivity in the agricultural sector, considering that the average farmer in Indonesia has a very low educational profile and a lack of knowledge of technology is also a challenge in realizing the vision of a food barn. Fourth, development of village-based agroindustry. This solution will open up job opportunities because it will absorb more workers, with value-added products. In this way, problems related to poverty and high unemployment can also be solved to avoid problems that can arise due to threats to food security. And if jobs are created in rural areas, migration to cities will also be reduced (Nainggolan, 2011).

In particular, the food barn project in Tewai Village, Gunung Mas, Central Kalimantan must be made so that the 600 ha of land does not just stop, the author's solution is for the government to make the land a productive industrial area for the construction of a Fertilizer Factory (Urea Fertilizer or NPK) as a supporting the world's food barns, efforts to facilitate the distribution of fertilizer for the management of food barns in Central Kalimantan and expanding employment opportunities for the people of Central Kalimantan. Based on the latest data, the unemployment rate in Central Kalimantan in 2022 is 57.70 thousand people, indicating the high unemployment rate in Central Kalimantan. So the development of a productive industrial area, in this case a fertilizer factory, can open up new job opportunities and increase regional income in Central Kalimantan province (Central, 2022).

Figure 2. Number and Level of Unemployment



Source: Central Kalimantan Provincial Statistics Agency

CONCLUSIONS AND RECOMMENDATIONS

The issue of food security has become one of the global challenges facing us today, where there is an increase in the world's population over time and is followed by an increase in fuel prices which also has an impact on global food supplies. It is estimated that in 2050 the world population will increase to 9.7 billion from the previous 7.9 billion in 2021. So it can be concluded that if the population continues to increase, the need for food will also increase amidst the climate crisis that is currently hitting the world. This is as a result of increasing fossil energy production. To free 9 billion people from the food crisis, preventive steps are needed to produce more food than current supplies. Therefore, Food Estate is considered to be an effective solution to make Indonesia a supplier of food reserves and also as an anticipation if at any time a disaster occurs or an increase in the price of food needs that strangles the community.

The aim of creating this food barn is to increase the volume of food reserves and ensure access to adequate food for the community. This is something that must be a serious concern for all countries in the world to maintain food security amidst the food and energy crisis. Therefore, Indonesia has a vision of becoming the world's food basket in 2045, which was initiated by the Minister of Agriculture Andi Amran Sulaiman, which was then continued by Mr. Syahrul Yasin Limpo to continue this vision. Apart from the vast land area and large amount of food commodities, Indonesia, in realizing the world food barn in 2045, is implementing industrial innovation in the agricultural sector, such as the implementation of the Integrated Farming System. This innovation encourages the realization of Indonesia's vision of becoming the "World Food Granary 2045".

The Integrated Farming System integrates several sectors, namely agriculture, animal husbandry, fisheries, plantations and forestry which are managed simultaneously and provide mutual benefits to each other. Bearing in mind that it is impossible or difficult for a country to be independent in meeting its needs, such as processing natural resources requires advanced technology. Likewise with industry which requires land and vice versa. Through this project, Indonesia seeks to provide both in order to create food independence and become a supplier of other countries' food needs (Purwandari, 2011). This concept is also designed so as not to pollute the environment which will cause climate change, and can increase income, as well as being very efficient in food productivity. The implementation of this integrated farming system helps utilize organic materials and absorb carbon more effectively when compared to conventional farming systems that use chemical or nitrogen fertilizers. Apart from that, the effectiveness of this production area will save more on transportation costs and also save on production costs due to the utilization of waste from other components.

The implementation of the Integrated Agricultural System has produced results in several areas, especially in Central Java, where the community is greatly helped by the integration of agriculture and livestock which can provide

financial benefits, is more cost effective and is also environmentally friendly. In the agricultural sector, waste straw from rice and corn which pollutes the environment can be used as animal feed. In the livestock sector, these farmers improve their finances by raising cattle to sell meat and milk and chickens to sell their eggs. Then, the manure from these two livestock animals can be used as bio energy. This livestock manure can be processed into biogas so that it can be used as a substitute for LPG in household kitchens. Apart from that, livestock manure can also be used as organic fertilizer. This biogas can also function as an electrical energy generator because its calorific value is quite high. Then, the waste from household biogas can be used as organic fertilizer which can be useful for food plants.

On the other hand, the failure of the food barn project in Tewai Village, Gunung Mas, Central Kalimantan with a land area of 600 ha which was considered to only damage the ecosystem and biodiversity could be converted to support the food barn. In this case the author offers a solution so that the government can manage this land into a productive industrial area for the construction of a Fertilizer Factory (Urea and NPK Fertilizer) which can be used by farmers to create food storage and can encourage the achievement of self-sufficiency and food independence. Apart from that, the construction of this productive industry will also open up new job opportunities, especially for the people of Central Kalimantan.

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