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The Food Security Management Based on the Perspective of Cakti Food Barn Theory in East Java, Indonesia

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ABSTRACT
The era of the COVID-19 pandemic also had an impact on food availability, such as the decline in agricultural commodities and the crises of food. East Java is a region that is vulnerable and resistant to food availability. This research aims to depict food security management based on the perspective of Cakti Food Barn Theory in East Java, Indonesia. This method using This research uses a comparative literature review coming from various sources with descriptive analytic data types. The result shows that the requirements of the Cakti food barn consist of the availability of large buildings, a management information system to detect food availability, special forces from military and police elements, availability of agricultural experts and the application of gotong royong (good collaboration). The Cakti Food Barn Theory would apply to the villages. It consists of 10 barns such as Food Barn, Water Barn, Energy Barn, Fisheries and Cattle Barn, Health Barn, Religion and Beliefs Barn, Education barn, Economic and employment barn, Administration, security, and law barn, and also Investment barn. Furthermore, the key of the Cakti Food Barn is collaboration from various stakeholders.

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INTRODUCTION

The era of the COVID-19 pandemic also had an impact on food availability. In the era of the Covid-19 pandemic, the disruption faced by farmers has become increasingly intense, causing serious disruption to the food supply chain (Barman *et al*, 2021). Ironically, some agricultural commodity prices have decreased due to decreased market demand (Rajput *et al*, 2021). Reduced community activities, especially in the agricultural sector, have caused the demand for food to also decrease (Gregorioa and Ancog, 2020). Apart from that, many culinary sectors have been affected, causing the demand for agricultural products to decrease drastically (Nicola *et al*, 2020). Apart from the effects of the pandemic, the decline in agricultural output was also caused by war (Mugizi and Matsumoto, 2021).

The war conflict that occurred between Russia and Ukraine also triggered food scarcity. According Ben Hassen and El Bilali (2022) and Jagtap *et al* (2022), as the largest wheat exporting country in the world, of course this prolonged conflict has had a negative impact on the exporting countries. Avisha *et al* (2023) stated that in 2021, Indonesia became the 2nd largest country as a wheat importer from Ukraine, namely 2.81 million tons, or 14.49% (worth US$ 638 million) of the total Ukrainian wheat exports in a year. 2022 was

the worst year for Ukraine, because the value of wheat exports to Indonesia decreased by 97% in 2022 or only US$2 million in January-July. Nasir *et al* (2022) concluded that, the decline in the value of wheat exports from Ukraine caused by the impact of the ongoing conflict and the impact on local farmers. It means that the existence of conflict in an area can affect agriculture.

The decline in agricultural commodities certainly has a negative impact on the welfare of farmers. When agricultural production continues, while the demand in the market has decreased or even stopped, oversupply will occur (Tolno *et al*, 2015). The drop in agricultural prices will make farmers reduce their production because they are losing money (Johnson *et al*, 2019). The drop in agricultural prices will make farmers reduce their production because they are losing money (Cortignani *et al*, 2020). If agricultural production continues to decline, then in the future when there is a pandemic, changes in nature, until the humanitarian conflict reaches its peak, there will be a scarcity of food because farmers continue to reduce their production (Pu and Zhong, 2020).

East Java is a region that is vulnerable and resistant to food availability, as stated by Wardhani *et al* (2014) and Budiawati *et al* (2021). According to Central Statistics Agency of The Republic of Indonesia (2022), the total population in East Java in 2021 is 40.8 million people with a population growth rate of 0.70% from 40,665.70 thousand people in 2020. As an effort to strengthen food in East Java, efforts must be made to manage food security. As an effort, researchers tried a food security management approach created by Cakti Indra Gunawan. The reason for using Cakti Indra Gunawan's food security approach is because no one has yet discussed online integrated food security management as Cakti Indra Gunawan has researched in several journals at the Batam Polytechnics and International Journal.

According to the Cakti Food Barns theory, as well as researched by Gunawan (2020), also Gunawan and Pudjiastuti (2022), food security management should be integrated with the software. The contribution of this research is to provide scientific discourse in the field of security management, especially integrality food management. Based on these reasons, the researcher is interested The Cakti Food Barns Theory.

LITERATURE REVIEW

The Food Crop Production in East Java, Indonesia

Food crops that are the focus of food security are very diverse. According to the data from the Central Statistics Agency of The Republic of Indonesia (2023), there are food crops that are a source of food in East Java, namely rice, corn, soybeans, peanuts, and sweet potatoes. Rice plants in East Java are the first commodity of the five main food crops in East Java (Aprillya *et al*, 2019). The position of rice plants is at the first level (50.69%), and followed by corn plants (36.32%), Cassava (10.31%) and sweet potatoes, peanuts, soybeans each at 1.68% , 0.62%, and 0.38%. The data will be shown below

Table 1. Food Crop Production Contribution in East Java, 2021 (%)

No.	Name of Food Crop	% of production
1.	Rice	50.69%
2.	Corn	36.32%
3.	Cassava	10.31%
4.	Sweet Potatoes	1.68%
5.	Peanuts	0.62%
6.	Soybeans	0.38%.
	Total	**100%**

Still referring to the central statistics agency of the republic of Indonesia (2023), data shows a decline in rice production from 2020 to 2022. In 2022, rice production in East Java will shrink to 5,500,801 tons. Even though in 2020, rice production is still at 5,742,176 tons. Likewise in 2021, rice production will still be at 5,652,705 tons. In sum, if rice production declines every year, it can lead to food scarcity because production is unable to meet consumption needs.

Based on the data above, we can see that the increase and decrease in the production of food crops, especially rice, will have an impact on food security, especially in East Java. What's more, rice plants, which in the future will become rice, are the staple food of the Indonesian people (Tirtalistyani *et al*, 2022). If this is not managed properly, of course through the food storage program, there will be a food crisis in the future (Marshall, 2023).

Tabel 2. Rice production in East Java

No.	Period of year	Total of Production (ton)
1.	2020	5.742.176
2.	2021	5.652.705
3.	2022	5.500.801
	Total	**100%**

Based on the author's observations in the field and actual references, there are several causes for the decline in rice production in East Java, namely:

- The presence of pests that significantly affect the productivity of rice plants in East Java, researched by Dhamira and Irham (2020), Suyono *et al* (2020), and Hoesain *et al* (2021).
- The factor of scarcity of subsidized fertilizers will also still occur in 2021 so that not a few farmers allow their crops to be damaged (Irawan and Antriyandarti, 2021).
- Increased rice plants that failed to grow, researched by Amalo *et al* (2017) and Hidayah *et al* (2023).
- Some farmers choose to plant crops other than rice, researched by Damhuri *et al* (2018).

RESEARCH METHOD

This research uses a comparative literature review coming from various sources, both government documents and other sources (Fink, 2019). This research article uses a literature study approach with descriptive analytic data types. Posada-Quientero and Chon (2020) stated that data collection techniques used previous studies related to the topic and were sourced from the latest research and documents, namely the last 10 years.

The stage of data collection based on the Blackburn *et al* (2016) are:

- Process and prepare data for analysis
- Read the entire data, namely by reflecting on the meaning of the data as a whole
- Group a set of data into organized data, including codification by describing settings, and sources.
- Describe the themes in narrative/descriptive form and make sense of the data.

Data analysis uses several methods presented Beskow *et al* (2014), Certo *et al* (2016), Stewart *et al* (2017), and Noyes *et al* (2018), as follows:

- Examine the data in the research.
- Check the description of the research data
- Clarify the bias acquired in the study
- Utilize a long time in searching for data with the aim that researchers can understand the phenomena.

RESULT AND DISCUSSION

The Definition of Cakti Food Barns Theory

The food barn is the center of the availability of food in the form of rice, wheat, corn, cassava, sago, or other staples that are commonly eaten by villagers in a country. These food staples are collected in a giant barn, in a place in the form of a building that can accommodate food staples for at least 3 years. This food staple is distributed free of charge by the village government to all its citizens, both poor and rich, when the food crisis occurs.

To maintain the quality of these food staples so that they are not damaged, fermentation technology or extracts of food staples can be used (Chandravarnan *et al*, 2022). For example rice can be dried regularly every week in the sun, then put back in the barn (Yuan *et al*, 2019). Or the rice can be cooked and fried into a long-lasting food with added preservatives (World Health Organization, 2015). Likewise, Parenti *et al* (2020) confirmed that, wheat can be processed into special bread that is processed using technology, either in a simple or complex manner according to capabilities.

The Requirement of Cakti Food Barns Development

Some of the conditions for the development of cakti food barns in East Java, Indonesia are:

1. Availability of large buildings such as former school buildings, unused houses, or village government assets that can be converted into food storages.
2. There is a management information system that is transparent and integrated both online and offline can detect in detail the number of villagers, which are classified as rich and have food availability, as well as groups who really do not have the ability to provide staple foods during a crisis food happens. It means that the data collection is carried out before the food crisis occurred and the village government appointed a special food storage manager who was appointed by the villagers, especially from traditional leaders, religious leaders, and other community leaders who were respected and trusted by the villagers. This is to prevent chaos from happening due to the unfair distribution of free food staples.
3. Availability of special forces from military and police elements as well as other security elements appointed by the state to secure food storage both before and after the food crisis. Firm action based on the State Food Emergency Law will become a legal umbrella for the special forces to shoot dead rice barn looters, both from the villagers themselves and attacks from other villagers who are experiencing hunger. In other words, it is better to strictly punish the looters than to wait for a big chaos to occur which can destroy all aspects of life.

4. Availability of agricultural experts, especially in nurseries, plant empowerment, and technological processing of yields from various plants produced by villagers. This is to strengthen preparations for making food storages so that during a food crisis, when there is no more rain or water sources recede, this effort can minimize the occurrence of chaos due to ineffective management of food storages for a very long period of time.
5. The principle of *gotong royong* (good collaboration) is created, especially villagers who have sufficient wealth and large land areas to provide assistance to the village government so that their land can be planted en masse with the assistance of other villagers who do not own land. Yields can be maximized for saving food staples stored in food barns. If there are villagers who are lazy or indifferent in preparing food storage, starting from planting, maintaining, fertilizing, harvesting, processing into food that can be extracted, then they are considered treason against the state because they are against the Food Emergency Law.

The Mechanism of Cakti Food Barns Development

The stepwise mechanism for the development of cakti food barns in East Java, Indonesia are :

1. The central government maps the strength of food barn in all villages within the country's territory. This is intended so that there is no imbalance in the supply of food in each village.
2. The village government administers it well, assisted by the manager who has been appointed to map out which village residents will be distributed food staples free of charge.
3. The security forces strictly control the frauds committed in the management of the food storage.
4. Experts in the field of food and food management immediately map out which lands can be planted, what is the right technology to process these food ingredients so that they can be consumed for many years.
5. The mobilization of villagers to start the process of planting, fertilizing, tending, harvesting, and storing food staples in food storages was carried out before the food crisis occurred. The quicker the preparation, the better it will be in anticipation of food scarcity.

The food security management model of the Cakti Food Barn in East Java can be described through the following description:

1. The president of Indonesia and governor of East Java must make emergency food security regulations if a food crisis occurs.
2. the younger generation who will oversee the formation or construction of free food storages in every village in East Java.
3. The management of the East Java food barn through the East Java Food and Agriculture Security Service, immediately created an online food emergency management information system and integrated it with the online management system under the direct command of the president.
4. Create a management team for food barn in each village, consisting of the village head, government officials and the local village community.
5. Prepare quickly and as early as possible water reserves sourced from wells, rivers and rainwater, before the long dry season takes place.

6. The people were given land assistance to manage and then the crops from the land were stored in the food barns in every village in East Java.

The Problem and Solution on the development of food barn

Several problems in the development of food barns consist of :

1. Limited land in a village for planting food crops.
2. Limited funds from the village government and villagers to build food storage.
3. Limited food experts and food technology experts in a village.
4. Limited security personnel to secure food storage
5. Disobedience and rebellion from wealthy villagers or residents who feel they don't want to be regulated by the state in a food emergency.
6. Limited interest in the younger generation to be involved sincerely and enthusiastically in managing food storage.

The solutions to the above problems are:

1. A village in an urban area certainly does not have agricultural land, but that does not mean that the village does not have food storage. By Karen, that is, the village government can buy crops from villages that have a surplus of food by bartering or by mutual agreement.
2. The village government can ask the central government to send food experts and agricultural experts to educate villagers
3. The central government is obliged to educate villagers for conscription, especially for the younger generation. With this conscription, it will be able to increase a sense of nationalism, love for the motherland, love for humanity, as well as become a stronghold in guarding the food barn.
4. The state must be present explicitly through the village government to take firm action against young people who are lazy, apathetic, and not sincere in working together and don't want to be involved in food storage.

The Concept of Cakti Food Barn Theory

Cakti Food Barn Theory is a new model of integrated information and management system to prevent the scarcity of food in East Java, Indonesia. It anticipates the force majeure, drought season and also the impact of Covid-19. The scarcity of food around the world would give worse effects, such as hunger and mass mortality, chaos, mayhem, and criminality. However, several countries will vanish if there is no application of food barns as an anticipation. Figure below will show us the concept of Cakti Food Barn Theory.

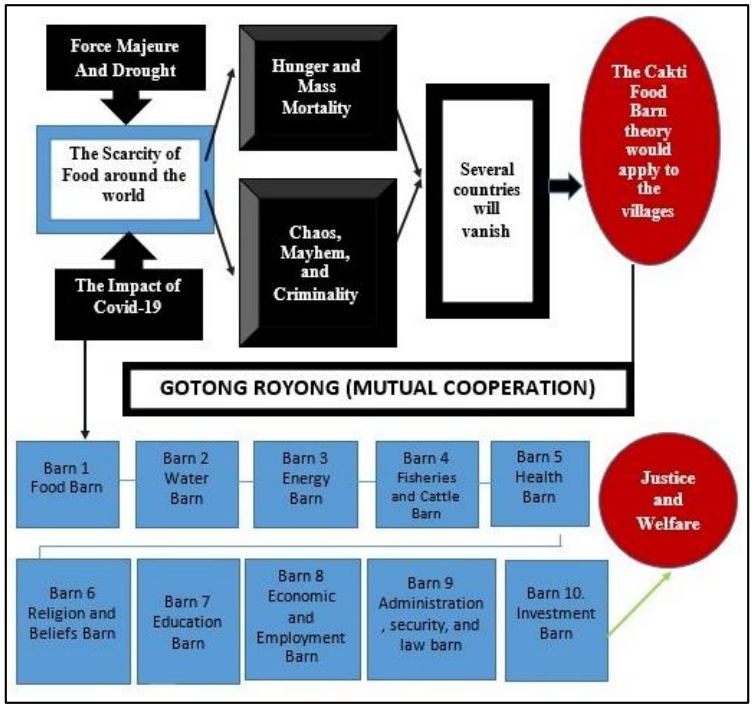

Figure 1. The concept of Cakti Food Barn Theory with Mutual Cooperation

According to Figure 1, we may conclude that the Cakti Food Barn Theory would apply to the villages. It consists of 10 barns to strengthen the food security management in East Java, Indonesia, hereby:

- Food Barn, to ensure the supply of food.
- Water Barn, to provide the clean water needs for human.
- Energy Barn, to produce an alternative energy for human needs.
- Fisheries and Cattle Barn, to boost the supply of food.
- Health Barn, to boost the public health.
- Religion and Beliefs Barn, to conduct and attain the moral happiness.
- Education barn, to educate the people in the preparation of scarcity, and when chaos and crises
- Economic and employment barn, to provide an alternative job when chaos and crises.
- Administration, security, and law barn, to acquire the activities of food barn become secure, safety, and better quality.
- Investment barn, to enhance the microeconomic activities when chaos and crises.

Justice and welfare are the aims of the Cakti Food Barn Theory. Previous research has been conducted about food barns and food security management, such as Bahua *et al* (2016), Riptanti and Qonita (2017), Powell and Wittman (2018), Fraval *et al* (2020), Wulansari *et al* (2021), and Taslim *et al* (2022). But, no food barn concept combines 10 barns. Nevertheless, the Cakti Food Barn Theory shows the integration and collaboration to strengthen food security management in East Java, Indonesia. This concept is the novelty

of food barn application to ascertain justice and prosperity for human beings, especially in the chaos and crises.

CONCLUSION

Based on the presentation of data and analysis, it can be concluded that there is a need for food barn management, one of which is through the Cakti food barn model. The tentative condition of food crop production in East Java, if there is no best solution, will have an impact on food security in East Java. The existence of emergency regulations, the synergy of the government, military apparatus and the community, integrated management, water storage and mutual cooperation are the keys and solutions to the problem of food security in East Java. The key to the management of the Cakti Food Barn is collaboration from various stakeholders including farmers, the government, the private sector, the education sector, and community leaders to prevent something even worse due to food scarcity.

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