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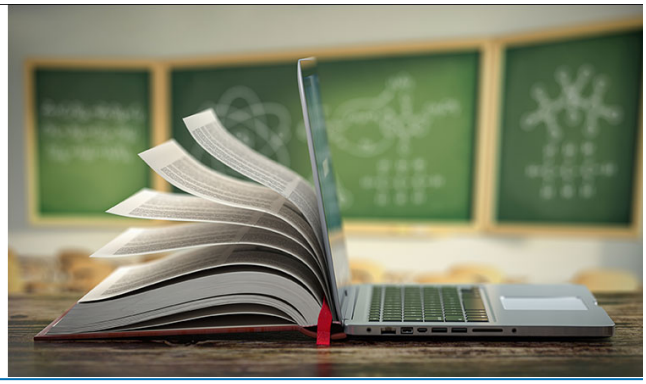

A review: Agricultural production and food industry during Pandemic COVID-19

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Abstract. During the Covid-19 pandemic, many sectors were affected, including the world economic sector, which had fallen sharply, leading to several countries experiencing recession. some businesses closed due to government restrictions. However, this is different from the food industry, which is required to continue producing to meet food needs during the Covid-19 pandemic. This is not in line with the production system that is being implemented because there are several obstacles related to the supply of raw materials for production and ensuring that the health level of workers is maintained during a pandemic. This is a challenge for the food industry, because on the one hand they have to meet the needs of consumers while the production system is hampered because it can be caused by an unusual division of working hours. Therefore, a literature study was conducted regarding the state of the food industry production system during the Covid-19 pandemic and examined several policies that could be taken to ensure that the food production system continues as expected and supports food security.

1. Introduction

The 2019 corona virus disease outbreak (COVID-19) was first discovered in Wuhan, China. This virus has spread very quickly to almost all countries [1]. The more widespread of the corona virus has resulted in a number of countries experiencing lockdown. Several activities in all sectors have temporarily stopped, one of which is the business economy. All activities, both private and government, are recommended to be carried out from home using the internet media this also impacts the food sector because the increasing activity from home requires the food industry sector to maintain its production in line with the increasing need for food during the pandemic. Unemployment caused by the closure of activities in the manufacturing and service sectors and the occurrence of labor shortages in the food production system due to social restrictions and movements can cause rapid economic changes that can lead to a recession in a country [1].

The COVID-19 pandemic has also caused major disruptions to economic activity by placing restrictions on international travel [2]. During the COVID-19 period, business actors, especially in the food sector, have faced challenges in terms of food security caused by climate change and major conflicts, both of which are the main factors that contribute to food conditions. Plant scientists need to determine how investing in innovation needs to change in response to the COVID-19 pandemic. Concerns related to labor shortages and food safety could increase efforts to use automation at all stages in carrying out food production systems for supply purposes. Food is maintained. Disruption of

transportation and trade can accelerate efforts to develop food crops in order to remain protected to support food production to meet consumer needs [3]. The demand for food security in the food industry sector does not only apply in several countries with a high number of COVID-19 cases, but also applies in Indonesia, even though initially Indonesia was not yet included in the country with the highest cases. However, Indonesia as a country that relies on the agricultural sector and most of its population working in the food sector is required to make food security innovations so that food production continues and food needs are met during the Covid pandemic19. In this paper, we will discuss the conditions and challenges faced by agricultural production actors in the food industry sector during the COVID-19 pandemic.

2. Literature review

2.1. Direct Impact of COVID-19
From the literature study that has been carried out, there are several impacts, especially in agriculture during COVID-19.

*2.1.1. Food security***.** Food security and food systems were of direct concern during the COVID-19 pandemic. The corona virus pandemic has revealed a lot, nothing more than how connected our world is. The impact of globalization is most evident in the choked supply chains that threaten food security around the world. Maintaining or renewing these networks during times of pandemics will require technology, innovation and political determination [4]. The distribution of food channels across the country has been disrupted due to the COVID-19 pandemic, with strong negatives for those who are most vulnerable. some media coverage states that food security has suddenly decreased due to [5]:

1. Loss of income by workers which largely affects their ability to buy food;
2. Regulations for stay at home and limited physical access to food markets and / or activities related to native foods;
3. The closure or decrease in the capacity of institutions to carry out activities that support food social safety nets, such as food banks and school feeding programs, are not running as usual; and
4. Market disruptions such as problems with supermarkets' ability to rapidly fill food storage warehouses from a centralized distribution system following previous demand (ie panic buying) for kitchen staples.
5. Fresh vegetables, fruits and milk waste due to limited farmers or entrepreneurs to transport them from the production point to the market or local supermarket in the nearest town or city.

A pandemic could affect a wider agricultural system. It is not known to what extent this situation will continue because the COVID-19 pandemic is not yet known when it will end. This will affect the condition of traditional farmers because they experience distribution disruptions due to restrictions during the epidemic period as well as the food industry which requires a supply of raw materials from farmers. The food industry must continue to reproduce while the condition of raw material supplies is disrupted due to abnormal distribution as usual.

2.1.2 Availability of labor. In addition, the problem that arises is to respond with facts about labor in the food sector. Many companies, including the food industry, restrict their employees to direct office activities. This happens because employees have to do work from home to avoid COVID-19 and some employees affected by have to do quarantine so that activities in the company are totally transferred to the homes of each employee using the internet. The number of workers who are directly active in the food production process is not balanced with the increasing production during the pandemic period due to efforts to keep trying to maintain food security. this is a huge challenge for the food industry. Addressing these labor shortages and safe working conditions for workers and communities, is essential for future food security and averting disaster for future security and supply.

During the COVID-19 pandemic it is expected that every food industry will be able to innovate to implement a production system that continues to run as in normal conditions with production capacity

that remains on target and also maintains conditions for raw material supplies to carry out production, due to decreased raw material distribution activities due to restrictions a number of employees who have responsibilities in the area of distribution and because of social restrictions on a large scale.

2.1.3. Agricultural system resilience. The spread of the COVID-19 pandemic has raised concerns in the community regarding the availability of food in Indonesia. Even though the COVID-19 outbreak is still in the high category, food production and distribution activities must continue in the midst of this pandemic. This pandemic caused disruption to the global logistics system which had an impact on food access issues. In Indonesia itself, as well as other countries that have an economic level similar to or below Indonesia, the problem of access to food that arises is generally influenced by the inadequate income of the community, even just to buy staple food. The large number of people who lost their jobs due to COVID-19 contributed to the decline in food security so that people had to depend on food assistance from the government.

2.1.4. Connectivity to agricultural systems. The COVID-19 pandemic has an impact on international relations including in the agri-food sector. This is due to the refusal of export exports in several countries which limit global agrifood trade and access to international markets [5]. From the description above, it can be seen that the companies that can at least respond well are those that have implemented a supply chain system, a technology that provides visibility of many important elements in management. When this information becomes a foundation in business strategy, the company can mitigate disruption well. The COVID-19 pandemic is a catalyst for companies to start implementing smart systems based on AI, automation, hybrid cloud, external data analysis and blockchain technology. Technologies like this make it easier for companies to identify supply and demand patterns locally and globally to meet dynamic business challenges and inevitable disruptions. The benefits that this technology can provide in supply chain management are:

1. Demand for main goods and certain areas can be fulfilled well because it has been predicted by looking at purchasing patterns after the COVID-19 outbreak.
2. Potential problems with suppliers can be well visualized and facilitate decision making regarding the supply of goods.
3. Management and transactions with new suppliers are more effective in ensuring the availability of goods if the main supplier experiences problems.
4. Risk identification, decision making, and solution implementation are more valid because they are based on external data and information from AI analysis.

Various ways companies deal with supply chain changes. There are three different categories based on company readiness:

1. Companies that have mitigation preparations. The company has prepared and implemented supply chain risk management and business continuity strategies. They also have suppliers that are not only from a certain geographic location to minimize the risk if one area has problems. They also have several vendors for main components so they don't depend too much on one supplier. In addition, they have prepared an inventory management strategy to deal with supply chain disruptions.
2. Companies that respond responsively. Companies like this have a close relationship with their main supplier. They ensure the systems in use can provide visibility to the wider supply network to better understand risks and take specific actions according to their priorities. In addition, the company has alacrity in production and distribution networks in order to learn and keep global demand quickly. They invest in supply chain planning and control tower solutions so they can detect, respond to, and even predict supply chain problems.
3. What a messy company. This company is too dependent on one supplier or suppliers in one regional area for main components. They don't have the visibility in the supply chain network to see the risks they might face. They do not have systems to monitor inventory status, predict material stock-outs and optimize production, or predict finished goods stock-outs to optimize

allocations to customers. They also do not have a flexible logistics network to ensure that these items remain valuable.

2.2 Sustainability of production and supply chains for the devastating COVID-19 Pandemic

The COVID-19 pandemic has demanded long-term action from policymakers, business managers and others interested in sustainable supply and production, particularly in the food sector, which is closely related to the food industry. In general, this paper discusses some of the behavioural changes that have been implemented such as staying at home, social distancing, and work-related travel both on commuting and other forms of transportation. In addition, supply chain problems, social innovation, technology consulting problems from the corona virus outbreak were also identified [6].

2.2.1 Sustainability of production during COVID-19 Pandemic. The concept of sustainability can be broken down into three types, namely [7] :

1. Economic sustainability, which is defined as a development capable of producing goods and services continuously so that sustainability can be achieved and avoid sectoral imbalances that can damage agricultural and industrial production.
2. Environmental preservation: An environmentally sound system must be able to maintain the stability of resources, avoid exploitation of natural resources and environmental functions.
3. Social sustainability: Social sustainability is defined as a system capable of achieving equality, providing social services, including in terms of food security. how food security can be maintained to achieve sustainable social goals

During the COVID-19 pandemic, every company would be even better if the production system was implemented by applying the concept of sustainability by considering three aspects, namely economic, environmental and social. With regard to the economy, in the production process every industry, especially those engaged in food production, can carry out its production by implementing an efficiency system both in terms of human resources and raw materials because of the limitations that each company must have during a pandemic related to labor and limited raw materials while the food industry is still required to meet food needs. In the environmental aspect, sustainability is applied by implementing an environmental impact control system on production, but still does not have a direct impact on the environment in producing in the food industry. While on the social aspect, COVID-19 has a direct influence on the production system. namely the food industry must continue to carry out the production system with normal targets while the limitations of large-scale social resources during the COVID-19 pandemic, this affects the social aspects of food security. So it is a challenge for companies to continue to be able to carry out the production process, especially for the food industry by considering three sustainability aspects, namely economic, environmental and social.

2.2.2 Sustainability of supply chain during COVID-19 Pandemic. Sustainability, in general, is development that meets the needs of the present without having to sacrifice future generations to meet their needs. Sustainability is a long term dynamic that must be faced in facing several challenges for supply chain managers. To achieve sustainability, they need to address social, environmental, and finance, and these three things are very closely related to the supply chain [8]. To maintain food security, several actions and policies have been taken. Affordability, availability and accessibility of food for the community are the focus of the government, private sector and other stakeholders. thus food safety during a pandemic can be anticipated by using technology such as e-commerce and the Internet of Things (IoT), this is done not only because it increases food security but can also help improve food safety during the COVID-19 pandemic. The downstream process recovery process is believed to be able to assist in the use of the latest technology, which can help provide food availability for the community and increase the value of products, especially food products. However, existing innovations, technology use, and applicable regulations are not in line with food consumption needs. There are several problems such as uncertainty in the amount of food demand and supply, high costs and inefficiencies of logistics

and delivery services, high levels of losses and waste, the powerlessness of upstream actors, and food safety [9].

3. Conclusions and future work

The COVID-19 pandemic has affected food security systems in almost all over the world. In facing a pandemic period, the food sector, especially the food industry, is challenged to continue producing food with normal production targets amid the limitations faced due to the imposition of large-scale social restrictions. The production and food supply system will be maintained by applying the concept of sustainability, in this case every agricultural company, especially the food industry, must make innovations while maintaining food security.

In future research, a production system framework will be made, especially in the food industry by considering aspects of sustainability, namely in the production sector and supply chain.

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