

Changes in behavior and welfare of organic rice farmers during the COVID-19 pandemic

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ABSTRACT

The Covid-19 pandemic that has hit Indonesia since 2020 sociologically has caused various changes in the order of social life and has implications for various social changes that occur in rice farmers and their level of welfare. The specific purpose of this study is to take an inventory of various phenomena of changes in farmer behavior in organic rice agribusiness and whether there are differences in farmer behavior in the agribusiness system before and during the Covid-19 pandemic associated with their level of welfare. In the long term, this study will be used to prepare the Food Crops Agribusiness Development Model following the research roadmap of the researchers that have been carried out. The study used a survey of organic rice farmers in the East Priangan area with a total sample of 43 farmers from a population of 427 organic farmers. The data used consist of primary and secondary data. Different analyzes were used to determine the behavior of farmers in organic rice agribusiness activities before and during the covid-19 pandemic. The different analyzes were processed using the Wilcoxon statistical test. Based on the analysis, there are genuine behavioral changes in all agribusiness subsystems studied, which consist of providing production facilities, on-farm subsystem, product processing subsystem, marketing subsystem, a subsystem of supporting elements, and changes in this behavior. Also causes a decrease in the level of welfare.

Keywords: Agribusiness, Social changes, Subsystem.

Article type: Research Article.

INTRODUCTION

The increasing issue of environmental protection triggers the growth of organic agriculture, in addition to increasing attention from academics, consumer preferences for safe food for health, development of community trends/lifestyles, being able to protect/maintain health, physical, fertility, and biological properties of the soil, enabling ecosystems to better adapt to the impact of climate change and increase in the potential for carbon sequestration from the soil (Pathak *et al.* 1992; Carpenter Boggs *et al.* 2000; Karki *et al.* 2011; Widiarta *et al.* 2011; Bhooshan *et al.* 2011; Surekha *et al.* 2013; Krause & Machek 2018). Another contribution in terms of economic welfare is increasing farmers' income through higher productivity than conventional rice and premium prices (Reddy 2010; Surekha *et al.* 2013). Amid various efforts to increase food production, particularly the increase and development of organic rice, a world catastrophe arose with the COVID-19 outbreak, which with a very sudden spread, has shocked the world economy in 2020, and has exhibited a vast impact on the social, economic, and daily life of citizens, and caused havoc on various health, economic and social factors, so that it

has become a global pandemic (Min Shi *et al.* 2020; Ali & Alharbi 2020; Luo Ren-fu *et al.* 2020; Bendaif *et al.* 2020; Khadom *et al.* 2021; Kormishkina *et al.* 2022; Sulandjari *et al.* 2022). The Covid-19 pandemic hit the world, including Indonesia, has continued unabated and has even shown a significant increasing trend until the end of 2021, starting from the announcement of the first patient on March 2, 2020 (Kompas.com 2021). Sociologically, the Covid-19 pandemic has caused unplanned social changes, meaning that social changes occur sporadically and are not wanted by the public. As a result, the unpreparedness of the community in facing this pandemic has, in turn, led to social disorganization in all aspects of people's lives, which at the end can shake social values and norms that have been developed and embraced by the community so far (Saputra 2020). Given the crisis from Covid-19 until 2021, which does not subside even though the trend shows a significant increase, the government then implements various policies, including large-scale social restrictions (PSBB). PSBB is a restriction on specific activities of residents in an area suspected of being infected with COVID-19 to prevent the possible spread of the disease following Government Regulation No. 21, 2020 (Kemenko PMK RI, 2020). Then proceed with the PPKM policy (Enforcement of Restrictions on Community Activities) adapted to conditions in each region. PSBB and PPKM, of course, have direct implications for all forms of social change that occur in society, including the agricultural sector. Even though the agricultural sector and its supply chain are excluded from the PSBB (Sunarsih *et al.* 2020), responding to this, the community, including rice farmers, have made adaptations and various behavioral changes to adapt to developing conditions in order to maintain their lives. Changes in the behavior of rice farmers are related to the lowland rice agribusiness system, including organic rice, which includes providing production facilities, on-farm, processing, marketing, and supporting elements. Behavior is a series of actions by individuals, organisms, systems, or artificial entities concerning themselves or their environment, including other systems or organisms around them and the physical (dead) environment. Changes in behavior in the main actors (farmers in the broadest sense) and business actors are changing in behavior that occurs in response to changes due to the Covid-19 pandemic by practicing behaviors that were not generally done before the Covid-19 era (Sunarsih *et al.* 2020). Several research results, including Prisma (2020), have found several behavioral changes, although they are still limited. The results of a study by Sunarsih *et al.* (2020) found that the phenomenon of behavior change had been found in several cases, however, it had not yet caused the occurrence of patterned and permanent behavior; the direction and impact are also not yet stable. This change in the behavior of farmers ultimately leads to changes in their level of welfare. The level of welfare of these farmers can be measured by the NTP (Farmers Exchange Rate) or NTUP (Agricultural Business Exchange Rate). Studies on changes in farmer behaviour, especially organic rice farmers, are related to their level of welfare due to the Covid-19 pandemic, which has not been widely carried out and is still in the early stages of the process. This study was conducted considering that every change always has an impact, including their welfare level. So, given their welfare level, it is necessary to study changes in farmer behaviour in the Organic Rice agribusiness system during the Covid-19 Pandemic Period.

MATERIALS AND METHODS

This study was designed quantitatively with a survey method and is explanatory research. The study location was in the East Priangan Development Area, including Tasikmalaya City, Tasikmalaya Regency, Ciamis Regency, Garut Regency, Banjar City, and Pangandaran Regency, with a study unit of Organic Rice Farmers in the region. The study location was determined by purposive sampling based on the consideration that it is an agricultural area whose development relies on the agricultural sector and is a rice production center in West Java Province. Types of data used in the form of primary and secondary data. The former was obtained through field survey activities, filling out questionnaires, and expert interviews (in-depth interviews). The latter was obtained through literature searches of research results, literature studies, reports, and documents from various agencies. The population in this study were all the organic rice farmers in the East Priangan area, totaling 427 people. According to Suharsimi Arikunto (2002), if the population is large or higher than 100, 10-15% or higher than 20-25% can be taken. Based on considerations of practicality, little cost, time, and effort, several samples were taken to represent the population of as much as 10%, i.e., 43 respondents, then to proceed with proportional sampling in order to determine the number of samples taken from each study area. Hypothesis testing was carried out using the Wilcoxon Beda test. Different analyzes were used to determine the behavior of farmers in organic rice agribusiness activities before and during the Covid-19 pandemic. After the analysis results are obtained, it is descriptively related to the level of welfare using a Farmer's Exchange Rate (NTP) measuring instrument. The difference analysis was processed

using the Wilcoxon statistical test to test two paired samples in order to compare whether there was a difference between the two samples due to treatment. This Wilcoxon test will use the SPSS for Windows program. The Wilcoxon difference test with large samples ($N > 25$) can be used according to the formula according to Sudjana (2005):

$$Z = \frac{T - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}$$

where

T = Number of small marked rankings

N = number of samples

The statistical hypotheses to be tested using the Wilcoxon test in this study are:

H_0 : A = B (There is no difference in the behavior of farmers in the organic rice agribusiness system that was carried out before and during the Covid-19 pandemic)

H_1 : A \neq B (There are differences in the behavior of farmers in the organic rice agribusiness system before and during the Covid-19 pandemic)

Information

A = farmer behavior in the organic rice agribusiness system before the Covid-19 pandemic

B = farmer behavior in the organic rice agribusiness system during the Covid-19 pandemic

The test criteria used to determine the decision of the hypothesis are:

If $\text{phit} \leq 1/2\alpha \rightarrow \text{Reject } H_0$

If $\text{phit} > 1/2\alpha \rightarrow \text{Accept } H_0$

The decision rule will use the confidence level ($\alpha = 0.05$).

RESULT AND DISCUSSION

Analysis of Changes in Farmer Behavior

The discussion was carried out using the Wilcoxon Test on 43 respondents of organic rice farmers in the East Priangan region. The study was carried out on changes in farmer behavior towards activities based on the agribusiness system consisting of: **a.** Subsystem for providing production facilities; **b.** On-farm subsystem; **c.** processing subsystem; **d.** marketing subsystem; and **e.** Supporting elements subsystem. The analyses concluded that there were significant changes in farmer behavior in agribusiness activities before and during the Covid-19 pandemic. The full explanation of the significance of differences in farmer behavior can be seen in Table 1.

Changes in farmer behavior in the subsystem of providing production facilities

Based on the analyses carried out, the results showed that there was a very significant change in behavior in the provision of agricultural production facilities during the pandemic, with a value of $Z = 5.662$ or $\text{Asymp. Sig} = 0.000$, which was smaller than the confidence level = 1 % (Table 1). Changes in behavior in the subsystem of providing production facilities, among others, are related to indicators of how to purchase agricultural production facilities, purchase frequency, fertilizer prices, seed prices, and labor wages. Prior to Covid-19, the purchase of production factors (fertilizers and pesticides) was carried out in stages as needed. However by various restrictions issued by the government, farmers reduced the frequency of going out of the house, so that the time to buy inputs was reduced. Farmers were changing how they buy at once and reducing the frequency of purchasing factors of production. The change was also in line with the tendency to change the behavior of farmers studied by Prisma (2020). Likewise, as a result of restrictions, the prices of production factors show a tendency to increase, especially the prices of fertilizers, seeds, and the wages of labor needed for farming activities. The price increase varies

depending on the study area, requiring more farm capital. Even Prisma (2020) stated that prices for agricultural inputs and farm laborers increased by around 10% - 75%.

Table 1. Significance of differences in farmer behavior of each subsystem in the agribusiness system before and during the Covid-19 pandemic.

Behavior of activities for providing production facilities before the Pandemic-During the Pandemic	
Z	-5.662 ^b
Asymp. Sig. (2-tailed)	0.000
Behavior of on farm activities before the Pandemic-During the Pandemic	
Z	-5.660 ^b
Asymp. Sig. (2-tailed)	0.000
Behavior of processing activities before the Pandemic-During the Pandemic	
Z	-5.862 ^b
Asymp. Sig. (2-tailed)	0.000
Behavior of marketing activities before the Pandemic-During the Pandemic	
Z	-5.955 ^b
Asymp. Sig. (2-tailed)	0.000
Behavior of supporting element activities before the Pandemic-During the Pandemic	
Z	-5.820 ^b
Asymp. Sig. (2-tailed)	0.000

Note: a. Wilcoxon Signed Ranks Test; b. Based on negative ranks.

Changes in farmer behavior in the on-farm subsystem

According to the analyses, there is a very significant change in behavior in on-farm activities during the pandemic, with a value of $Z = 5.660$ or $\text{Asymp. Sig} = 0.000$, which is smaller than the significance level of $= 1\%$. In the on-farm subsystem activity, several indicators of cultivated land area, use of labor, type of fertilizer used, land management, capital for farming, plant maintenance, irrigation, harvest time, cropping patterns, and harvesting methods were studied. Analyzing all the indicators studied exhibits a change in behavior in on-farm activities carried out by farmers. Farmers are very considerate of government calls and restrictions imposed by the government, thus temporarily changing their on-farm activities. Once waiting for the development of Covid-19, most farmers reduced the area of land they cultivate by around 15-25%, while Prisma (2020) stated that only about 8% of farmers will reduce their land area with a change of about 25% - 50%. Alterations in the behavior of farmers to temporarily reduce the area of the land they cultivate, subsequently have an impact on other activities, including the reduced use of labor and only relying on labor in the family, the type of fertilizer used, land management, plant maintenance, irrigation, harvesting methods. In the case of cropping patterns, about 60% of farmers rotate crops by planting other commodities for food security and getting a faster alternative income, i.e., using part of their land to plant various vegetables. Prisma (2020) stated that some farmers are changing the commodities they plant due to alterations in market demand due to Covid-19, short crop rotation, generating money, and attractive prices.

Changes in farmer behavior in the product processing subsystem

Based on the analyses, there is a very significant change in behavior in the processing results during the pandemic period, with a value of $Z = 5.862$ or $\text{Asymp. Sig} = 0.000$, whose value is smaller than the level of significance $= 1\%$. In general, in the yield processing subsystem, there is a change in the behaviour of farmers and adapts to developing situations and conditions. The grain drying method is carried out as usual but with a limited number of workers in the family, because during the pandemic, the wages of farm laborers in the study area increased. Prisma (2020) pointed out that in the East Lombok region of NTB, the price of farm laborers rose from Rp. 60,000 - to Rp. 100,000/day. At the end, there was an increase in the cost for milling, which was initially Rp. 500/kg increased to Rp. 600/kg.

Changes in farmer behaviour in the marketing subsystem

According to the analyses, there is a very significant change in behaviour in product marketing activities during the pandemic period, with a value of $Z = 5.955$ or $\text{Asymp. Sig} = 0.000$, which is smaller than the significant level of $= 1\%$. In the marketing subsystem, behaviour changes are related to product marketing, marketing methods, grain prices, and rice prices. Although the cause is not purely due to Covid-19, it is felt that the harvest during this pandemic period is not satisfactory, possibly since the handling of farming is not optimal due to various limitations. Its productivity has decreased by about 10-20% than before the pandemic. Several marketing

institutions, which are usually very active during this pandemic, were reduced so that marketing was a bit hampered, and it was somewhat difficult for farmers to sell their products. The price of rice (paddy) commodities decreased, usually Rp. 550/kg, during the pandemic only in the range (Rp. 475- Rp. 500/kg). Even in the results obtained by Prisma (2020) in the East Lombok region of NTB, the price of grain fell from Rp. 400 to Rp. 350/kg.

Changes in Farmer Behaviour in the Supporting Elements subsystem

Based on the analysis, there is a genuine change in behaviour in the activities of supporting elements during the pandemic, with a value of $Z = 5.820$ or $Asymp. Sig = 0.000$, which is smaller than the significant level of $\alpha = 1\%$. The changes in behaviour in the subsystem of supporting elements include farmers lacking in getting guidance from agricultural extension workers. Usually, in a month, there are 2-3 visits. During the pandemic, there is never even a face-to-face meeting. According to Prisma (2020) around 16% of farmers stated that there was interference in obtaining information from extension workers and the private sector, and even field officers no longer visited their villages. The scale of farmer groups also affected farmers rarely even held group meetings due to various government restrictions to reduce the impact of the spread of Covid-19. Based on Prisma (2020), 43% of respondents stated that the farmer meeting activities were not active in preventing the spread of Covid-19. During the pandemic, farming costs increased, however, farmers were reluctant to make loans to banks. For those who still had instalments to the bank also had limitations, so some of them were in arrears to the bank. During the Covid-19 pandemic, the media to obtain information, especially farmer contacts, usually use social media (WhatsApp) to communicate with other administrators. The other is the internet with various features to find information related to its business.

Welfare of Farmers

As a proxy indicator of farmers' welfare, Farmer's Exchange Rate (NTP) is obtained by comparing two indices, namely the Farmers Accepted Price Index (IT) and the Farmers Paid Price Index (IB). The NTP figure shows the ability to exchange (terms of trade) agricultural commodities for goods and services for consumption by farmers, both for the household needs of farmers and the costs of the production process. The higher the NTP number, the stronger the purchasing power of farmers. Since Covid-19 was announced in March 2020, its impact on NTP began to be felt sometime later. The most significant decrease in NTP in West Java Province is from January 2021 to July 2021, from the NTP value of 100.06 gradually decreasing to 96.45 in July 2021 (see Fig. 1).

Based on monitoring the average price in West Java Province in July 2021, West Java's NTP decreased by 0.08% compared to June 2021, from 96.53 to 96.45. The development of the price index of agricultural production received by farmers (IT) exhibits fluctuations in the price of commodity production. In July 2021, IT experienced a decrease of 0.14% compared to IT in June 2021, from 104.07 to 103.92 declining by 0.14%. Meanwhile, IT displays that the prices of goods and services consumed by farmers for both farmer households and the needs of the production process in July 2021 decreased by 0.06% compared to the previous month, which was 107.81 to 107.74 (Central Bureau of Statistics, 2021).

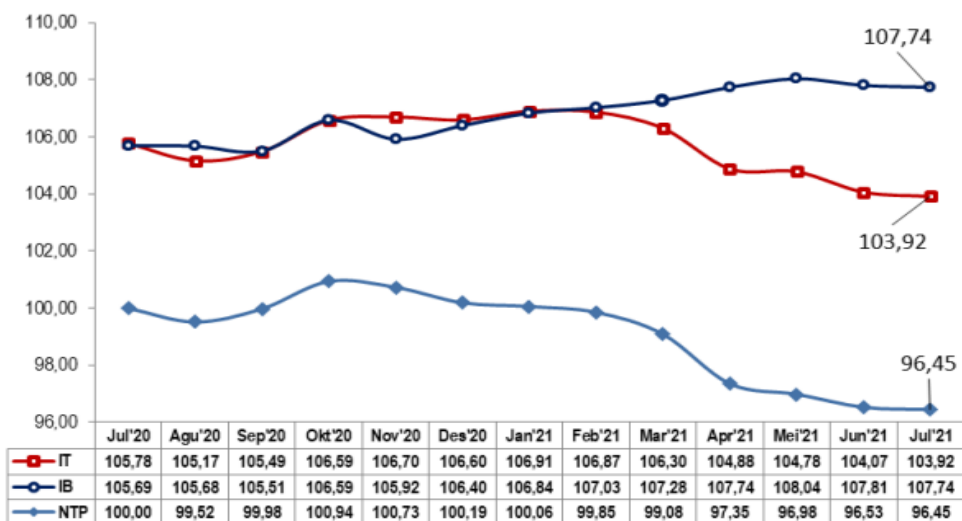


Fig. 1. Development of price index received, price index paid, and farmer's exchange rate.

If broken down by sub-sector, the decline in IT was caused by IT in the Food Crops Sub-sector, which fell by 1.16% from 102.91 to 101.71; IT Horticulture Sub-sector grew positively by 3.59% from 105.34 to 109.12; The IT of the People's Plantation Sub-sector also grew positively by 2.26% from 101.18 to 103.46; IT Livestock Subsector rose by 0.09% from 108.16 to 108.25; IT Fishery Subsector increased by 0.88% from 113.98 in June 2021 to 114.99 in July 2021. Meanwhile, the index paid by farmers for the production process, Production Costs, and Additional Capital Goods (BPPBM) in July 2021 increased by 0.02%. One group experienced a decrease, and the rest experienced an increase. The Seeds group experienced deflation of 0.05%. However, the Fertilizer, Pesticide, Drug, and Feed groups experienced inflation of 0.06%. Furthermore, the Rental and Other expenditures group experienced inflation of 0.09%. The Transportation and Communications group experienced inflation of 0.06%. The Capital Goods Addition group experienced inflation of 0.05%. Meanwhile, the Wage Group experienced inflation of 0.06%.

CONCLUSION

It can be concluded that along with changes in farmers' behaviour to limit their agribusiness activities as a result of various government policies to limit community activities to prevent the transmission of Covid-19. Then the Farmer's Exchange Rate also shows a downward trend. Before Covid-19, the Farmer's Exchange Rate showed a good number (at least 100), however, after Covid-19, the Farmer's Exchange Rate showed a downward trend which resulted in the ability/purchasing power of farmers in rural areas and the terms of trade (terms of trade) of agricultural products with goods and services consumed as well as production costs also showed a decline.

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