Analysis Of Agricultural Based Sustainable Economic Development In Indonesia

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Abstract

The agricultural sector is one of the strategic activities that has the potential to bring change to economic growth in Indonesia. This research attempts to understand the relationship between agricultural sector production, arable land and its relation to economic growth. The research data is secondary data obtained from the World Bank for the period 2000 to 2020. Outputs of this study indicate that there is a causal relationship between arable land and total production of the agricultural sector where fertile land significantly influences the production of the agricultural sector in Indonesia, meaning that if there is a change in fertile land, it will also be followed by a change in the total production of the agricultural sector.

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Background

Indonesia is one of the largest agricultural countries in the world where nearly 60% of the livelihoods of the Indonesian population are in the agricultural and plantation sectors. The agricultural sector plays an important role as a provider of people's food needs. In addition, the agricultural sector also plays a role as a source of foreign exchange through commercial activities for exporting agricultural commodities (Neilson, 2022).

The main commodities of Indonesia's agricultural sector are rice, palm oil and corn, these commodities dominate the national and global markets. This is marked by the export of these commodities to several Asian countries and even the European Union. With the entry of local commodities into global market share, of course this needs to be an important concern for the government in creating a healthy market ecosystem by intervening in the market through regulations or state policies (Sheth & Parvatiyar, 2021). The challenge for farmers at this time is that there are many conversions of agricultural land into settlements, this will certainly have an impact on the quantity of productivity in the agricultural sector (Amin & Helmi, 2021). Several factors that cause the conversion of agricultural land, namely commodity price stability , water availability, pest attacks etc. This is reinforced by a statement which states that one of the farmers' problems is in marketing, both related to prices, markets, and suppliers, which often harm farmers (Thanh, Le Van Thuy, Anh, Nguyen, & Hieu, 2021).

The agricultural sector has great potential to create large profits, thus making domestic and foreign investors try to invest in the agricultural sector. According to Yusuf, Ichsan, & Suparmin, (2021) states that there are several deals Breakers such as the rupiah exchange rate and Bank Indonesia interest rates need to be considered by potential investors, even though the exchange rate and Bank Indonesia interest rates do not have a significant effect on stock price movements

in the agricultural sector, they can be influenced by other variables such as legal and political conditions. According to Magdalena, & Suhatman (2020) the increasing capital invested in the agricultural sector will also be followed by an increase in the resulting production.

According to Ngong, Thaddeus, & Onwumere, (2020) there are 11 agricultural sector products that dominate the global market, one of which is white pepper, palm oil, rice, cocoa, rubber etc. Based on previous studies, it was stated that the production of the agricultural sector, especially rice, has a significant effect on the quantity of rice imports, meaning that if rice production increases, rice imports will decrease. Of course, in increasing rice productivity, the government needs to take several policies, for example, such as providing capital to farmers or providing fertilizer subsidies to ease the burden on farmers (Syofya , 2018). On the other hand, the increase in population in Indonesia every year has caused the fulfillment of food to increase, coupled with the fulfillment aimed at export activities, this is what makes the production of the agricultural sector need to be increased (Rozaki, 2020).

According to Sasongko, Harnani, & Bawono, (2022) increased agricultural productivity can be influenced by several factors such as land area, fertilizer prices, and labor. Strengthened by the output of research by Gassner, Harris, Mausch, Terheggen, Lopes, Finlayson, & Dobie, (2019) which stated that land area and labor had a significant effect on increasing the production of the agricultural sector. However, it is different from research conducted by Bai, Wang, Huo, Salim, Bloch, & Zhang (2019) which states that land area has an effect on increasing the production of the agricultural sector while labor and fertilizer have no significant effect on increasing the productivity of the agricultural sector. One of the government's efforts in handling agricultural land is through Sustainable Agricultural Land Control (LP2B) which is regulated in Law Number 41 of 2009 regarding the government's strategy to protect agricultural land by suppressing all forms of agricultural land conversion activities (Inopianti, Munibah, & Purwanto, (2021).

Increasing the productivity of the agricultural sector has a significant effect on farmers' income which will also have an impact on increasing state income (Abdallah, Ayamga, & Awuni, 2019). This is in line with research conducted by Lin, (2019). which states that increasing the production output of the agricultural sector can alleviate poverty. This study tries to explain how the relationship agricultural productivity variables, agricultural land area, and Indonesia's economic growth through an autoregressive vector model.

Research Method

This study analyzes economic growth (GDP), agricultural productivity, and agricultural land area in percent obtained through secondary data (World Bank). This study uses a quantitative research method with an autoregressive vector model . The econometric model in this study is as follows:

$GDPt = \beta0 + \beta1TPt1 + \beta2ALt2 + et$

$TPt = \beta0 + \beta1GDPt1 + \beta2ALt2 + et$

$ALt = \beta0 + \beta1TPt1 + \beta2GDPt2 + et$

Information:

GDP = Economic growth
TP = Total agricultural production
AL = fertile land
β = Constant
e = Error term _
t = Time period

This study uses a research period from 2000 to 2020. The descriptive variable is taken from the variable used as an indicator presented in the table following :

Table 1. Variable description

Variable	Description	Source	Analysis Unit
GDP	GDP is the total gross added value of both goods and services produced by Indonesia. based on constant 2015 rupiah prices .	world bank	Percent (%)
TP	The agricultural sector is the total production of commodities which includes agriculture , forestry , fisheries and livestock produced by Indonesia for the period 2000-2020.	world bank	Percent (%)
AL	Agricultural land is the total fertile land that can produce agricultural productivity in Indonesia. does not include land converted to agricultural functions .	world bank	Percent (%)

Results and Discussion

From the results of tests conducted by researchers can be stated as follows:
The first step before carrying out further testing, first must do a data stationarity test where this test is carried out to find out whether the data we use in the study is stationary or not stationary.

Table 2. Root Test Results test

Variable	Unit Root test	Statistics for ADF	Probability	Information
GDP	Levels	-0.529699	0.8656	Not stationary
	First diff	-1.931589	0.3119	Not stationary
	Second diff	-3.321349	0.0292	Stationary
BUT	Levels	-3.063441	0.0469	Stationary
	First diff	-3.711654	0.0141	Stationary
	Second diff	-4.381120	0.0035	Stationary
AL	Levels	2.044850	0.9996	Not stationary
	First diff	-5.735997	0.0002	Stationary
	Second diff	-5.397228	0.0007	Stationary

**the cut-off value used is at a significance level of 5% or 0.05*

Stationarity test in the table. 2 above shows that the data used in this study GDP and AL variables are not stationary at the level. Furthermore, the first differencing shows that the GDP variable is also not stationarity at the first level different so that the second diffrencing test is carried out . The results of the second differencing show that all variables, both GDP, TP, and AL, are stationary at the second level different from the probability values consecutively (0.0292), (0.0035), (0.0007) which means less than the significance level (0.05).

After carrying out the data stationarity test, then carrying out the structural Lag test to determine the optimum Lag this study. The methods used are LR, FPE, AIC, SC, and HQ. The optimum lag is known through the output with the smallest value.

Table 3. Optimum Lag Test

lag	LogL	LR	FPE	AIC	SC	HQ
0	-81.33778	NA	1.439537	8.877661	9.026783	8.902898
1	-56.12748	39.80573*	0.266297*	7.171314*	7.767802*	7.272263*
2	-47.68135	10.66880	0.308827	7.229615	8.273469	7.406277

Lag test above in Table.3 shows that the VAR model using the LR, FPE, AIC, SC, and HQ criteria. The optimum Lag is in Lag 1 because the output value in Lag 1 is smaller than the other lags .

After the data is declared stationary and the optimum lag is known, then the cointegration test is then carried out in which this test is carried out to find out whether or not there is a long-term relationship between variables.

Table 4. Johansen Cointegration .

H	Eigenvalue	T Statistic	0.05 Critical Value	Prob
None	0.553903	26.13157	29.79707	0.1248
At most 1	0.382238	10.79441	15.49471	0.2245
At most 2	0.082842	1.643028	3.8411466	0.1999

Based on the test results Cointegration in Table 4 shows that the T Statistical value is smaller than the Critical value. Value with a significant level of 0.05. This indicates that there is no indication of cointegration or that there is no long-term relationship between variables. So the next step is to use the VAR model analysis test.

Table 5. VAR Analysis

VAR Analysis	D(GDP)	D(TP)	D(AL)
D(GDP (-1))	1.014502	-0.086588	-0.046264
	(0.75171)	(0.24014)	(0.23417)
	[1.34959]	[-0.36057]	[-0.19757]
D(TP(-1))	0.263695	0.409990	0.074727
	(0.64437)	(0.20585)	(0.20073)
	[0.40923]	[1.99169]	[0.37228]
D(AL (-1))	-0.368790	-0.491860	0.919823
	(0.60989)	(0.19484)	(0.18999)
	[-0.60469]	[-2.52449]	[4.84148]
C	0.456936	14.72984	0.345899
	(17.8576)	(5.70482)	(5.56288)
	[0.02559]	[2.58200]	[0.06218]

**t table df20 with a significance level of 0.05 is 2.0859*

Based on the output of the VAR in Table 5 above, it shows that there is no influence between the total production of the agricultural sector (TP) and arable land (AL) on economic growth (GDP) in Indonesia, because the t statistic value is smaller than the t table value (2.085). While on the other hand fertile land D(AL (-1)) has a significant effect on the total production of the agricultural sector D(TP) with a statistical t value (2.52449) greater than the t table value (2.085) which means that in the short term, an increase arable land at the time of one quarter ago significantly affect the current total production of the agricultural sector.
In addition, it was also found that fertile land D(AL (-1)) had a significant effect on fertile land D(AL) with t statistic (4.84148) greater than t table (2.52449) meaning that in the short term, an increase in fertile land at one quarter ago significantly affected arable land at this time.

Table 6. Granger Test Causality

Hypothesis	**OBS**	**F- Statistics**	**Probability**
TPT doesn't Granger Cause GDPT	20	1.68486	0.2116
GDPT doesn't Granger Cause TPT		0.22154	0.6438
TPT doesn't Granger Cause GDPT	20	1.91389	0.1844
GDPT doesn't Granger Cause TPT		0.28673	0.5993
ALT doesn't Granger Cause TPT	20	6.88705	**0.0178**
TPT doesn't Granger Cause ALT		0.39404	0.5385

Based on the outputs of causality testing granger in Table.6 shows that arable land (AL) has a causal relationship with the total production of the agricultural sector (TP) with a probability value (0.0178) less than the significance level (0.05).

Conclusion

Based on the outputs and discussion above, it can be concluded that arable land (AL) has a causal relationship with the total production of the agricultural sector (TP). This can be seen through the test results which show that arable land (AL) has a significant effect on the total production of the agricultural sector (TP), which means that if fertile land in Indonesia increases, it will also be followed by an increase in the production of agricultural commodities.

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