Analysis of the Impact of Carbon Emissions on The Agricultural Industry in Java Island

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Abstract

This study uses data envelopment analysis (DEA) by evaluating agricultural carbon emissions performance (ACEP) in Java as a total factor in 5 provinces in Indonesia, namely Jakarta, West Java, Central Java, and East Java. We use research data from 2008 to 2021. Based on panel data in the five provinces on the island of Java, Indonesia is quite good in efforts to reduce carbon emissions through increasing public awareness of the importance of protecting the environment, policies for reducing carbon emissions with various government programs, and natural factors that occur in 2020 to 2021.

Keywords: Deposit Interest Rate, Islamic Finance, Indonesia, Thailand, Malaysia.
JEL Classification: C10, E04, E44

Received: Mei 12, 2021
Accepted: September 12, 2021

DOI : 10.54204/TMJI/Vol312021001

Introduction

Human resource factors have an impact on economic improvement (Rusmingsih, Widarni, & Bawono, 2021). The role of education and technology is very important in building human resources (Puspaningtyas & Harnani, 2021). Increasing human resources through investment in human capital has an impact on improving economic performance and activity (Elang & Prabowo, 2021). Increased economic activity has the potential to damage the environment (Sianipar, Yudoko, Adhiutama, & Dowaki, 2013)

The greenhouse effect has motivated governments all over the globe to endeavor to conduct economic activity while reducing carbon dioxide emissions. Low carbon economic development in an effort to gradually reduce carbon dioxide production caused by economic activities. Indonesia is one of the countries that are very important in the world's oxygen supply. However, Indonesia is also a producer of carbon dioxide which causes the greenhouse effect (Yamaka, Phadkantha,& Rakpho, 2021).

Indonesia seeks to maximize the reduction of carbon emissions in economic activities. As an agricultural country, the agricultural sector is a fairly large sector in Indonesia. The agricultural sector consumes less fossil energy than the Industrial sector. However, the agricultural sector is

also a significant contributor to carbon dioxide due to the use of pesticides and fertilizers produced by industry (Aryapratama & Pauliuk, 2021).

The agricultural sector in the world is one sector that contributes significantly to the increase in the greenhouse effect and the increase in global warming (Gao, Tian, Zhang, & Xia, 2022). As an agricultural country, Indonesia cannot avoid consuming agricultural supporting products such as fertilizers and pesticides which in turn increases the production of carbon dioxide in the air. Not to mention the processing of agricultural products and the use of agricultural machines that use fossil energy. The agricultural sector and its derivatives such as fisheries and livestock are also a contributor to carbon dioxide gas on earth (Wolff, Zeppetello, Parsons, Aggraeni, Battisti, Ebi, Game, Kroeger, Masuda, & Spector, 2021).

This study tries to measure the impact of carbon emissions in Indonesia and acts as a reference in agricultural economics, especially those that discuss Indonesia.

Research Method

This study uses data envelopment analysis (DEA) by evaluating agricultural carbon emissions performance (ACEP) in Java as a total factor in 5 provinces in Indonesia, namely Jakarta, West Java, Central Java, and East Java. We use research data from 2008 to 2021.

Result and Discussion

The required data were collected for 13 years and the data obtained were processed and presented in a table. Overall, the island of Java has a fairly high ACEP. Efforts to reduce carbon emissions by the Indonesian government, such as the car free day policy, have been proven to be effective in reducing carbon emissions.

Years	Jakarta	Banten	West Java	Central Java	East Java
2008	0.98	0.96	0.95	0.95	0.93
2009	0.97	0.95	0.93	0.92	0.90
2010	0.97	0.94	0.92	0.92	0.89
2011	0.96	0.94	0.90	0.89	0.87
2012	0.96	0.93	0.90	0.89	0.87
2013	0.97	0.93	0.90	0.89	0.88
2014	0.96	0.94	0.90	0.87	0.87
2015	0.95	0.93	0.89	0.87	0.86
2016	0.95	0.92	0.89	0.88	0.86
2017	0.95	0.92	0.89	0.88	0.86
2018	0.95	0.92	0.89	0.87	0.85
2019	0.96	0.91	0.88	0.87	0.82
2020	0.91	0.88	0.71	0.70	0.69
2021	0.89	0.75	0.65	0.64	0.61

In 2020 the corona virus outbreak struck in Indonesia and had a positive impact on the environment by decreasing carbon emissions on the island of Java during 2020 to 2021. The agricultural sector during the pandemic also had an impact so that agricultural activities slowed down slightly and had a significant impact on reducing carbon emissions.

Policies related to efforts to reduce carbon emissions have proven effective in this study. And the awareness of rural communities regarding the environment and the greenhouse effect has an impact on reducing carbon and increasing human capital as a trigger for reducing carbon emissions through environmental awareness..

Conclusion

Based on panel data in the five provinces on the island of Java, Indonesia is quite good in efforts to reduce carbon emissions through increasing public awareness of the importance of protecting the environment, policies for reducing carbon emissions with various government programs, and natural factors that occur in 2020 to 2021.

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