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THE IMPACT OF AGRICULTURAL PRODUCTIVITY SHOCKS ON CO_2 EMISSIONS IN IRAN

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Abstract

The growing global population and increasing demand for food have led to intensified agricultural practices, often with detrimental environmental consequences. Developing sustainable food systems requires understanding the relationship between agricultural productivity and CO_2 emissions. To achieve this, both linear and non-linear ARDL models were utilized to analyze data from 1986 to 2021, examining the relationship between agricultural productivity and CO_2 emissions in Iran, a country facing serious environmental challenges. The linear ARDL results indicate that an increase in livestock production over the long term is associated with higher levels of CO_2 emissions. However, short-run data support a contrary claim, i.e., the coexistence of intensive livestock production with lower CO_2 emissions. Conversely, the non-linear ARDL model demonstrates that both positive and negative disturbances in livestock production are followed by a decline in CO_2 emissions only in the short run. In the long term, positive disturbances in livestock production are identified as a main source of CO_2 emissions, while negative disturbances are irrelevant. In this context, both linear and non-linear models consistently argue for a positive connection between crop production and the environment; in other words, the linear model posits that the growth of crop production will result in a decrease in CO_2 emissions in the long term. The non-linear model revealed that positive shocks in crop production were associated with a decrease in CO_2 emissions, whereas negative shocks had a negligible effect. These findings underscored the need for policies that prioritize sustainable agricultural practices, including reducing reliance on livestock production, adopting innovative farming techniques, and transitioning to more environmentally friendly energy sources. By implementing these strategies, Iran was expected to mitigate the environmental consequences of agricultural activities while ensuring food security and economic growth.

Key words: Agriculture, CO_2, Iran, Productivity, Shocks

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