West Africa's CO_2 emissions: investigating the economic indicators, forecasting, and proposing pathways to reduce carbon emission levels

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Abstract

This paper investigates the nexus between carbon emissions (CO_2) and economic growth in West Africa based on the Environment Kuznets Curve (EKC) hypothesis by utilizing spatial panel data technique to check the possible effect of spatial dependence among countries in West Africa. Our empirical findings suggest the presence of spatial dependence of carbon emissions distribution in West Africa. By examining the existence of EKC embedded within the Stochastic Impacts by Regression on Population, Affluence, and Technology (STIRPAT) approach, we conclude an inverse N-trajectory of the relationship between carbon emissions and

economic growth. Furthermore, to mitigate global carbon emissions, we utilize a recurrent neural network (RNN) bidirectional long short-term memory (BiLSTM) algorithm devoid of exogenous variables and assumptions to forecast carbon emissions from the year 2015 to the year 2030 based on the predictive accuracy of our formulated algorithm. Due to the upward trends in future emission levels, we propose emissions mitigation pathways for countries in West Africa to still hold carbon emissions-related global warming well below 1.5 and 2 °C. Such mitigation pathways proposed could help implement strategic policies to minimize carbon emissions to a considerable level. As a policy implication, drafting strict environmental regulations and utilizing renewable energy technologies will help mitigate carbon emissions for all West African countries.

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Ethics declarations

Conflict of interest

The authors declare that they have no conflict of interest.

Additional information

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