

# **Effects of Renewable and Non-Renewable Energy Consumption on Environmental Quality in Sub-Saharan Africa: Empirical Evidence from Aggregated and Disaggregated Data Analysis**

**Mohamadou Oumarou** \*

*Department of Public Economics  
University of Garoua-Cameroon*

**Mohammadou Nourou**

*Department of Quantitative Methods  
University of Garoua-Cameroon*

**Abstract:** The aim of this research is to assess the effects of renewable and non-renewable energy consumption on environmental quality in Sub-Saharan Africa (SSA). To this end, this research uses aggregated and disaggregated data, taking into account other variables that produce carbon dioxide (CO<sub>2</sub>) emissions. In order to address the problem of endogeneity, reverse causality and omitted variables, the system generalized method of moments (GMM) is applied to panel data from 2002 to 2022 for 29 SSA countries. The results obtained from aggregated data show that an increase in renewable energy consumption significantly reduces CO<sub>2</sub> emissions, while an increase in fossil fuel consumption degrades the environment. Using disaggregated data, the results show that among renewable energies in SSA, environmental improvement comes from the consumption of renewable energies excluding hydroelectric. Consequently, this study suggests increasing the production and use of renewable energy and reducing dependence on fossil fuels.

**Keywords:** Renewable Energy Consumption, Non-Renewable Energy Consumption, Environmental Quality, Aggregated and Disaggregated Data, Sub-Saharan Africa

**JEL Classification Number:** C33, O13, Q42, Q54, Q58

---

\* Corresponding author. Email: [cazanier95@gmail.com](mailto:cazanier95@gmail.com)