

Can clean biomass energy use lower CO₂ emissions in African economies? Empirical evidence from dynamic long-run panel framework

ABSTRACT

This paper seeks to answer an empirical question of whether clean biomass energy consumption lowers CO₂ emissions while controlling for technical innovation in eight selected countries from Africa for the 1980-2015 period. The countries which are chosen based on availability of data on biomass energy and technological innovation include Egypt, Algeria, South Africa, Mauritius, Kenya, Morocco, Tunisia, and Zambia. Applying pooled mean group, mean group, and dynamic fixed effect panel estimators, the results indicate that clean biomass energy use decreases CO₂ emission in the long run. But the effect of biomass energy consumption on CO₂ emission is insignificant in the short run. The findings imply that CO₂ emission can be reduced by increasing clean biomass energy in the energy mix of these countries. Similarly, environmental quality and economic growth can be achieved simultaneously by increasing the share of biomass energy in large-scale production process. Furthermore, the environmental Kuznets curve (EKC), which hypothesizes an inverted U-shaped relationship between CO₂ emission and economic growth, was validated in the long run. This suggests that the EKC pattern is only observed in the long run. Thus, as part of recommendation from this study, policy makers in these countries should formulate more policies that will enhance clean biomass energy production and its usage to substitute significant percentage of fossil fuel use in production process.

Keyword: Biomass energy; CO₂ emission; EKC; GDP per capita; Technological innovation