

Research

Analyzing the effect of clean cooking fuel and technologies on carbon emissions in G20 countries

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Growing concerns about energy scarcity and indoor air pollution have paved the way for adopting clean cooking fuel and technology at several remote locations. Realizing the immense potential of clean cooking in mitigating carbon emissions, this research explores the relationship between clean cooking fuels and technologies and carbon emissions among G20 nations. By utilizing the data from 2000 to 2020, the research employs static panel data models, including random-effect and fixed-effect regressions, and Driscoll-Kraay standard errors with fixed effects regression to address econometric challenges such as cross-sectional dependence and heteroscedasticity. The results indicate that greater access to clean cooking fuels and technology can significantly reduce emissions from CO₂, highlighting the importance of Liquefied Petroleum Gas and renewable energy alternatives such as biogas, and solar cookstoves in mitigating environmental damage. Additionally, the study explores the impact of several control variables such as population size, human development, internet usage, forest cover, renewable energy consumption, urbanization, trade openness, GDP per capita, and foreign direct investment on environmental degradation. The results suggest that while population growth and internet use exacerbate CO₂ emissions, higher levels of human development, renewable energy consumption, and forest cover can reduce environmental degradation. The research underscores the significance of embracing clean energy solutions and sustainable practices to achieve long-term environmental sustainability and meet global climate goals.

Keywords Clean cooking fuels · Environmental degradation · CO₂ emissions · Renewable energy · G20 nations · Sustainable development

1 Introduction

Energy consumption at the global level has been steadily rising over the past few decades due to population growth, industrial development, and expansion of the economies [1]. To maintain sustainable levels of global economic growth while preserving the environment, it is essential to ensure widespread access to affordable, clean, and secured energy for everyone [2]. In this connection, In 2015, the United Nations urged its member countries to adopt sustainable development goals (SDGs) so that peace and economic prosperity can be achieved worldwide. Among the 17 proposed SDGs, the seventh SDG focuses on meeting sustainable energy for everyone thereby reducing energy poverty among the member nations [3]. To achieve this long-term growth trajectory, all nations must transition from fossil fuels to renewable energy solutions which is essential for the overall well-being of the people.

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