National Institute of Technology Rourkela

Synopsis Seminar

Seminar Title	: The Dilemma of Energy Poverty Alleviation and Climate Change Mitigation: A Comparative Analysis of Developing Nations in Asia and Africa
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Abstract : The connection between climate change and energy poverty primarily emphasizes the interplay among human development, energy usage and environmental sustainability. In this thesis, we have explored the connections between energy poverty and climate change by emphasizing the common roots, synergies and trade-offs between policies targeted to achieve the twin goals of energy poverty alleviation and climate change mitigation. By adopting an integrated and multidimensional approach that considers the needs of communities and the environment, it is possible to reconcile the dilemma of energy poverty and climate change. The key lies in finding sustainable solutions that provide reliable energy access while reducing greenhouse gas emissions and promoting social well-being. Energy poverty and climate change are two sides of the same coin, intertwined in cause and consequence. Tackling these issues through sustainable energy solutions provides a unique opportunity, not just for the environment but also for human development and equity. The review of existing literature reveals that, there is a lack of sufficient cross-country studies that simultaneously addresses the dual challenges of energy poverty and climate change. Even though some recent studies acknowledge different aspects of energy poverty and climate change in the developing countries, they often fail to acknowledge the link between energy poverty alleviation and climate change mitigation policies. The current study bridges this gap in the literature by investigating four primary objectives. First of all, we investigate the role of governance and renewable energy in energy poverty alleviation and decarbonisation. Second, we examine the effects of government decentralisation, financial development and climate change mitigation policies on clean energy transition. Third, we estimate the energy efficiency scores for different economic sectors (*Agriculture, Industry* and *Services*) and examine the effectiveness of energy efficiency on greenhouse gas emission, by considering the threshold effects of energy poverty and economic growth. And finally, we investigate the effects of different types of cooking fuel usage and fuel switching behaviour on indoor air pollution and indoor pollution attributable mortality rates.

The current research draws a comparative analysis between the Asian and the African developing countries in several aspects related to energy poverty and climate change mitigation policies. Such comparative study provides a novel approach in addressing the common problems and solutions specific to these regions, which together comprise of the World&rsquos largest share of the energy poor population. Comparative analyses provide a relative scale for measuring the progress and shortcomings of one area of study in terms of the other. Even though many earlier studies have compared the energy and development problems in two or more countries, there are no such studies yet, that compare the energy poor nations of Africa and Asia for a closer look into the similarities and differences of their problems, and investigate whether they can learn from each other&rsquos best practices. The second important contribution of this research is the development of a conceptual framework that helps in identifying the synergies and trade-offs between the energy poverty alleviation and the climate change mitigation policies. In this context, special emphasis is placed in Chapter-2 on the role of governance and renewable energy. Identifying the synergies help in targeted policies to find optimum solution, whereas by identifying the trade-offs, policymakers can decide their priorities and decide on how much they are willing to sacrifice one goal for the other, if necessary. The third contribution of this thesis is the construction of an Energy Transition Index for the developing countries, based on the framework of Hu et al. (2019), who framed this index for the OECD countries. Moreover, by investigating the effects of environmental policy through the channels of financial development, decentralisation and economic openness, Chapter-3 contributes to the energy and climate literature for the developing countries. A fourth contribution is the estimation of sectoral Total Factor Energy Efficiency Scores for the developing countries considered in this study. Further, although there are many studies which have examined the effects of energy efficiency on Greenhouse gas (GHG) emission, there are no studies which have performed threshold regression to study the impact of sectoral energy efficiency on GHG emission, by considering economic growth and energy poverty as the threshold variables. Finally, the current research estimates a fuel-switching index to capture the switching of fuels from traditional coal or biomass to modern electricity or natural gas cooking fuel. Moreover, most studies on cooking fuel poverty have been conducted at the household level, and there is a lack of cross-country studies to understand the impact of cooking-fuel poverty on indoor air pollutants and mortality rates. The current study provides a holistic approach by incorporating the different aspects related to energy poverty and climate change, and offers policy recommendations to reconcile the dual goals of energy poverty alleviation and climate change mitigation in the developing nations of Asia and Africa.

Keywords: Energy Poverty Climate Change Energy Transition Energy Efficiency