



Climate change impacts on global renewable energy production potential: A multi-model approach

Seleshi Yalew (1,2), David EHJ Gernaat (1,3), Michelle TH van Vliet (2), Fulco Ludwig (2), Detlef P. van Vuuren (1,3)

(1) Copernicus Institute of Sustainable Development, Utrecht University, Utrecht, The Netherlands, (2) Water Systems and Global Change Group, Wageningen University, Wageningen, The Netherlands, (3) Netherlands Environmental Assessment Agency-PBL

Climate change affects the demand, supply and consumption of energy as well as investment costs. A number of studies have analyzed some of these effects on energy. However, there is lack of studies with consistent data and tools for assessing climate change impacts on the the energy sector, particularly at global scale and in relation to other sectors such as agriculture and water. The lack of consistency in modeling approaches has resulted in large uncertainties in climate change impacts on potential energy production and associated sectoral competitions.

This study investigates future climate change impacts on global energy production potential from hydropower, solar, wind, and biomass sources. It also investigates inter-sectoral competitions between land, water, and energy in relation to climate change. To this end, a multi-model inter-comparison is performed using consistent climatic and socio-economic inputs and scenarios.

Results show that multi-model assessment and inter-comparison using consistent climatic and socio-economic inputs is indispensable for a better understanding of climate impacts on energy production potentials. Multi-model inter-comparison of climate impacts on energy can draw robust identification of hotspot regions and provide valuable insights for regional and global energy policymakers.