The role of biomass in climate change mitigation

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Abstract

Integrated assessment models (IAM) representing agricultural production, energy systems, carbon and nutrient cycles, and atmospheric chemistry have been used in order to investigate different pathways for meeting stringent climate goals such as those agreed at the *21st Conference of the Parties* in Paris in December 2016. Comparisons of IAM results have highlighted the importance of biomass and bioenergy in climate change mitigation strategies. However, given complexities of biomass and bioenergy (competition with other land uses and multiple sources, conversion possibilities and end-uses) they offer little policy relevant insight on the synergies and conflicts of different supply and use possibilities.

In this study we use a detailed long term (2100) global IAM in order to investigate different biomass futures and how this resource may contribute to climate change mitigation. The futures are characterised by differences in socioeconomic and technological development, as describe in the *Shared Socioeconomic Pathways*. The scenario projections cover a broad range of potential futures, highlighting how different technological and social developments lead to diverging biomass supply and use possibilities. Thus offering insights on the requirements for effective use of biomass and the potential synergies and conflicts which may arise.

The results indicate that biomass has an important role to play, contributing up to one third of global energy consumption by 2100, without significantly affecting food production if managed properly. The emission mitigation potential depends on land use strategies as well as technology development, with second generation biofuels and carbon capture and storage projected to be extremely important in meeting climate targets.

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