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“Solidarity in a competing world —  
fair use of resources”

## Policies for a Sustainable Biomass Energy Sector in Malawi: Enhancing Energy and Food Security Simultaneously

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### Abstract

Biomass energy in the form of firewood and charcoal still dominates the energy sector in sub-Saharan Africa, in particular as the main cooking energy source in rural and urban areas. These strong linkages between energy, food security and the environment place biomass at the heart of sustainable development, especially since biomass is inherently renewable. However, population and GDP growth are exacerbating already existing supply-demand imbalances in highly populated countries such as Malawi, making it imperative to identify policy interventions that promote sustainable biomass energy while simultaneously considering the linkages with other sectors.

Our study thus analyses how the biomass energy sector in Malawi will evolve in the coming years and which policy measures could ensure sustainability. We use new data on demand and supply for biomass energy in Malawi and develop a model that estimates fuelwood demand based on actual diets and cooking habits and project future demand considering GDP and population growth. The model is expanded to simulate how demand side interventions in the form of improved cookstoves affect biomass demand. Moreover, we develop a behavioural model for agroforestry adoption considering constraints of rural households to analyse the potential of agroforestry for promoting a sustainable biomass energy sector in Malawi.

Without any change in cooking habits, household demand for biomass energy almost doubles within 20 years. Even with the most optimistic assumptions of sustainable biomass yields, demand in 2030 is one third above sustainable supply. Our findings show that policy measures aimed at increasing cooking efficiency reduce demand for cooking energy initially, but are not enough to establish a sustainable biomass energy sector due to high population growth. Supply side interventions like agroforestry on the other hand will not only increase sustainable supply substantially, but can also enhance food security and protect the environment. Since trees take time to grow, it is imperative to start investing in reforestation and agroforestry now to save Malawi from more forest degradation. In regions with large supply-demand imbalances and high population growth, however, a faster development of modern energy is highly desirable.

**Keywords:** Agroforestry, biomass energy, food security, Malawi, sustainability

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