



Tropentag, September 14-16, 2022, hybrid conference

“Can agroecological farming feed the world?
Farmers’ and academia’s views”

Empirical analysis of fuelwood consumptions and its environmental implications in rural sub-city, southern Ethiopia

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Abstract

With the predicted fast growth of the human population and economic development, the global energy demand is expected to be high in the coming decades. In Ethiopia, traditional biomass fuels (animal dung, crop residues, fuelwood and charcoal) are the primary source of domestic energy for the majority of the rural population. The use of fuelwood as an energy source contributes to deforestation that aggravates soil degradation, resulting in soil fertility decline and loss of biodiversity. The consumption of animal dung and crop residues resulted in soil fertility loss and reduced agricultural productivity. Moreover, fuelwood consumption contributes to forest degradation and greenhouse gas emissions. The present study aimed to assess household energy sources and their contribution to climate change. The multi-stage sampling procedure was employed to select sample households. A total of 152 households with different wealth statuses were included in the present investigation. Firewood consumption and greenhouse gas emission at the household level were estimated. The average annual firewood consumption per household was 2781.30 kg (2.78 tons). The amount of firewood consumed per household could emit 337.62 kg CO₂^e/yr. The use of an improved stove could help to save 1.05 tons of firewood and protect 4×10^{-3} ha of forest degradation per year per household. Improved energy saving stoves were observed to reduce the amount of firewood consumption at the household level and resultantly reduced forest degradation and greenhouse gas emissions. Therefore, all stakeholders in the household energy sector need to work jointly in awareness creation and provision of alternative energy sources and improved energy-saving technologies.

Keywords: Energy source, environmental impacts, fuelwood, household, stove