



Tropentag, October 5-7, 2011, Bonn

“Development on the margin”

## Determinants of Household Fuel Use and Options for Fuel Switching in Rural Western Kenya

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### Abstract

Biomass has remained the dominant source of energy used by most rural households in the developing world. Current use patterns have been linked to adverse effects on forest resources. Alternative fuels such as kerosene could mitigate these negative effects. In order to design policies that enhance the use of alternative fuels a first step is to understand the determinants of fuel quantity and fuel types. This is crucial for informing forest conservation policy without making local households worse off. This research looks into the factors that determine the use of energy by rural households living next to a common property resource. Empirical results are based on a quantitative study of 286 households randomly selected from the community living in villages within 5 km from the edge of Kakamega forest in western Kenya. The data collected include details of the quantities and values of different energy types used as well as household and demographic attributes. A demand system for household energy use is estimated using a two stage LES-AIDS model. Results show that household income is an important, but not the only determining factor for the type and level of fuel consumption. The household size, public forest governance rules and prices of different fuel types also play an essential role. The results of this study confirm biomass fuels are used alongside modern fuels without displacing them, evidence of fuel stacking as opposed to fuel switching, a phenomenon also observed in urban households. The public forest is an important source of biomass fuel supplying firewood to 50% and charcoal to 15% of sampled households. The consumption of kerosene tends to increase with the price of charcoal, suggesting potential for a change to a more forest conserving fuel with increasing scarcity of charcoal. A price instrument coupled with effective institution for forest management can enhance the conservation of the common pool forest.

**Keywords:** Fuel demand, fuel switching, Kakamega forest, LES- AIDS