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Heterogeneity of Smallholder Farm Households Affecting the Water-Energy-Food Nexus in Ethiopia

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Abstract

Managing the multiple tradeoffs among bioenergy use, agricultural productivity, and ecosystem functions is a major development challenge. This presentation assesses and describes the dimensions and sources of heterogeneity in relation to the dynamics of water-energy-food (WEF) nexus affecting the decisions of smallholder farm households in Ethiopia. This research activity is in accordance with the on-going research project on “Bioenergy, Food Security and Poverty Reduction: Mitigating tradeoffs and promoting synergies along the Water-Energy-Food Security Nexus” of the Center for Development Research (ZEF), University of Bonn. Its overall goal is to more sustainably manage natural resources, increase food security and reduce poverty for poor rural men and women in the face of rapid agricultural, water and energy development, and climate change problems in the Eastern Nile basin. This includes aiming to contribute in improving land, water and energy productivity in rain-fed and irrigation agro-ecosystems, and increasing the ability of low-income households and communities to adapt to environmental and economic variability, demographic shifts, climatic shocks, and long-term changes.

Although, gender is one of the aspects of heterogeneity, in this study we further explored the dissimilarities between male and female farm-households by co-developing a conceptual model of the target socio-ecological system in two major regions i.e., Amhara and Oromia regional states in Ethiopia. We used the ARDI (actors, resources, dynamics and interactions) method in the development of conceptual model as part of companion modelling, which will support in the designing of an agent-based model. Results show that there are four aspects that make the male and female farm households different such as gender specific productive roles, the perception of resource, access to external actors, and the decision to manage and utilise the resources, which may affect the dynamics of WEF nexus.

Keywords: ARDI approach, conceptual model, dynamics, gender, heterogeneity