Title
Improving Ethiopian Smallholders’ Income and Food Security: An Assessment of Alternative Policy Options

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Abstract
Smallholder farmers dominate food production, but also represent the largest share of people in developing countries experiencing food insecurity. In Ethiopia, agricultural growth now forms the backbone of the country’s long-term plans for economic growth. This study aims to analyze long-term changes to the agricultural sector and its consequences for the evolution of smallholder farmers under various policy scenarios. A farming typology based on the agro-ecological zone, the dominant activities, and the degree of market integration is established for this purpose. The agro-ecological zone is divided into the rainfall-sufficient and drought prone highland areas and the pastoralist lowlands. Dominant activities are either pure livestock-keeping or a combination of crops and livestock. Market integration is based on the share of agricultural output sold to the market. The resulting typology is extrapolated to all regions of Ethiopia. The spatially differentiated typology is integrated in an Ethiopia-version of Global Biosphere Management Model (GLOBIOM), a globally-consistent partial equilibrium model representing spatial land-use patterns and accounting for biophysical resource constraints. 19 crops (the standard GLOBIOM crops, teff, coffee and sesame), 4 animal types (cattle, sheep, goats and poultry) and 2 livestock products (milk and meat) are represented in the model. Projections of population and GDP growth per region are used to set up the initial demand for each product and each time step. Policies aiming to improve food security and reduce poverty are subsequently implemented. These include infrastructure and irrigation extensions as well as the improvement of access to fertilizers. Results show that the distribution of the farming systems changes across space and time under different policy scenarios. Impacts on smallholders’ poverty and food security status differ depending on the policy, enabling a spatially explicit assessment of policy options at both the local and national level.
Improving Ethiopian smallholders’ income and food security: a farm-type analysis

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Motivation

Smallholder farmers: Dominate food production: produce 90% of grain
Experience food insecurity: on average farm size < 1ha
In transition: poverty line decreased from 45.5% to 27.8% over past decade.

Agricultural sector: Backbone of Ethiopia’s long-term plans for economic growth

Objective

To analyze long-term changes to the agricultural sector and its consequences for the evolution of Ethiopian smallholder farmers under various policy scenarios.

Typology

A new farming typology is established using farm household data (LSMS/ISA-ERSS survey comprising ~ 3000 households). This is based on:

The agro-ecological zone: Moisture-reliable and drought-prone highland areas and the pastoralist lowland areas

The dominant activities: Pure livestock-keeping or a combination of crops and livestock based on main crops grown

Interaction with large scale farmers is taken into account.

The resulting typology is harmonized using national statistics and extrapolated to all regions of Ethiopia.

GLOBIOM

GLOBIOM is a globally-consistent partial equilibrium model with spatial land-use patterns and biophysical resource constraints.

Typology with initial endowment in livestock and crop production is integrated in an Ethiopia-version of GLOBIOM.

Aim is to analyze where deficiencies occur and how these can be resolved via trade, productivity and the impact of policies.

Conclusion

Policies aiming to improve productivity in order to reduce poverty and the future uptake of natural land will subsequently be implemented in GLOBIOM:

- Increase in input use and irrigation development to enhance productivity
- Infrastructure development to facilitate trade between deficit and surplus regions

Impact of policies over time on smallholders’ poverty and food security status will be assessed for each farming system. This will enable an assessment of policy options at both the local and national level.