

**Essays on Gender Issues, Food Security, and
Technology Adoption in East Africa**

av

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AKADEMISK AVHANDLING

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Abstract

This thesis consists of five self-contained papers:

Paper 1: Are there systematic gender differences in the adoption of joint sustainable intensification practices?

Evidence from Kenya

This paper uses household- and plot-level data to test whether there are systematic gender differences in the adoption of joint sustainable intensification practices in Kenya. Using a multivariate probit model, we find that gender differences in the adoption of some technologies do exist. Women plot managers are more likely to adopt maize-legume intercropping, but less likely to adopt minimum tillage and apply animal manure relative to male plot managers. However, we find no gender differences for adoption of maize-legume rotation, improved seed varieties, and application of inorganic fertilizer. The results further show that the adoptions of agricultural technologies are strongly influenced by plot characteristics and household factors such as plot size, plot ownership, soil fertility, extension service, access to credit, and age.

Paper 2: What determines gender inequality in household food security in Kenya? Application of exogenous switching treatment regression

This paper contributes to an understanding of the link between gender of household head and food security using household- and plot-level survey data from 88 villages and five districts in rural Kenya. We use an exogenous switching treatment regression effects approach to assess the gender food security gap. The study establishes that the female food security gap is attributable to observable differences in endowments and characteristics, but also to some extent to differences in the responses to those characteristics. We find that female-headed households (FHHs) could have been more food secure, had they had the male-headed households' (MHHs) observable resources and characteristics. Even if that had been the case, however, our results indicate that FHHs would still have been less food secure than the MHHs. The analysis further reveals that FHHs' food security is influenced by many factors: household wealth, social capital network, land quality, input use, access to output markets, information, and water sources. Policies aimed to reduce discrimination, strengthen local institutions and services, improve the road network, and increase FHHs' access to resources would increase the food security status of female farmers.

Paper 3: A study of post-harvest food loss abatement technologies in rural Tanzania

This paper focuses on preservation and improved storage technologies as an adaptation strategy to climate change. We also study the tradeoff between preservation techniques and improved cereal storage technologies among rural households in Tanzania. Using a bivariate probit model, we find that preservation measures and modern storage technologies are substitutes. In addition, we find that climate variables influence farmers' choice of preservation methods and improved storage technologies. Extension services increase adoption of improved and modern storage technologies. This finding has strong policy implications as it suggests that solving the present information inefficiency can significantly improve the rate of adoption, and hence reduce storage losses. Since modern technologies are relatively expensive, intervention by the government (through subsidies) and non-governmental organizations can play a significant role in stimulating the adoption of effective post-harvest management practices by poor households.

Paper 4: Does Perception of Risk Influence Choice of Water Source and Water Treatment? Evidence from Kenyan towns

This study uses household survey data from four Kenyan towns to examine the effect of households' characteristics and risk perceptions on their decision to treat/filter water as well as their choice of main drinking water source. Since the two decisions may be jointly made by the household, a seemingly unrelated bivariate probit model is estimated. It turns out that treating non-piped water and using piped water as a main drinking water source are substitutes. The evidence supports the finding that perceived risks significantly correlate with a household's decision to treat/filter unimproved non-pipe water before drinking it. The study also finds that higher connection fees reduce the likelihood of households connecting to the piped network. Since the current connection fee acts as a cost hurdle which deters households from getting a connection, the study recommends a system where households pay the connection fee in instalments, through a prepaid water scheme or through a subsidy scheme.

Paper 5: Ndiritu, Simon Wagura and Wilfred Nyangena (2011), "Environmental goods collection and children's schooling: Evidence from Kenya", *Regional Environmental Change*, 11(3), 531-542

This paper presents an empirical study of schooling attendance and collection of environmental resources using cross-sectional data from the Kiambu District of Kenya. Because the decision to collect environmental resources and attend school is jointly determined, we used a bivariate probit method to model the decisions. In addition, we corrected for the possible endogeneity of resource collection work in the school attendance equation by using instrumental variable probit estimation. One of the key findings is that being involved in resource collection reduces the likelihood of a child attending school. The result supports the hypothesis of a negative relationship between children working to collect resources and the likelihood that they will attend school. The results further show that a child's mother's involvement in resource collection increases school attendance. In addition, there is no school attendance discrimination against girls, but they are overburdened by resource collection work. The study recommends immediate policy interventions focusing on the provision of public amenities, such as water and fuelwood.

JEL Classification: C35, O13, O33, Q16, Q18, Q53, Q54, Q56

Key words and phrases: Agricultural technology adoption, bivariate probit model, children, climate change adaptation, Complementarity, discrimination, drinking water, environmental goods collection, exogenous switching treatment regression, food security, fuelwood, gender issues, Kenya, multivariate Probit, post-harvest loss abatement, preservation methods, risk perception, schooling, storage technologies, Tanzania, water quality, water treatment.

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