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“Filling gaps and removing traps  
for sustainable resource management”

## Modelling Adoption and Welfare Impacts of Agricultural Upgrading Strategies (UPS) among Rural Smallholders in Tanzania

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### Abstract

The uptake of agricultural technologies among the rural smallholders is considered as an important way of improving household's welfare in developing countries. Unlike much of the literature which focused on examining adoptions of agricultural innovations at either crop-level or at a definite stage of the value chain and associated impacts, this study examines rural households' adoption of a bundle of upgrading strategies (UPS) along the local traditional AVCs and evaluates the associated welfare impacts in terms of household's income and food security covering access, availability, utilisation and stability. We use panel data of 820 rural households, collected in 2014 and 2016, from four treatment and two control villages located in Chamwino and Kilosa districts in Tanzania. Out of 820 households in our sample size, 486 are treated households while 334 are non-treated households. In modelling UPS adoption and average treatment effects (ATT and ATU), we adapt a panel data endogenous switching regression (ESR) model to circumvent selection bias emanating from both time varying and time invariant observed and unobserved heterogeneity. As a robustness check, a difference-in-difference (DID) model is estimated. Results show that, adopting upgrading strategies enhance households' incomes and households' food security status in all four pillars significantly. We suggest that efforts aimed at raising households' income and food security status in the rural areas, should focus on promoting adoption of upgrading strategies on several components of the traditional AVCs such as natural resources, crop production, processing, waste management and bioenergy, markets, and consumption for improved rural households welfare.

**Keywords:** Agricultural value chain, panel data endogenous switching regression model, Tanzania, upgrading strategies, welfare impacts