

The Food Security and Nutritional Diversity Impacts of Coupling Rural Infrastructure and Value Chain Development: Evidence from a Generalized Propensity Score Analysis

Authors : Latif Apaassongo Ibrahim, Owusu-Addo Ebenezer, Isaac Bonuedo

Abstract : Structural barriers - including inadequate infrastructure, poor market linkages, and limited access to financial and extension services - have been the major constraints to improved welfare in the semi-arid regions of Ghana; food insecurity and malnutrition are persistent. The effects of infrastructural improvements as countermeasures are often misdirected by confounding effects of other economic, social, and environmental variables. This study applies Directed Acyclic Graphs (DAGs) to map the causal pathways between infrastructure development and household welfare, identifying key mediators and confounders for one such initiative in Ghana. Then, using Generalized Propensity Score (GPS) and Doubly Robust Estimation (IPWRA), this study evaluates the differential roles of government-supported infrastructure improvements in access and intensity of commercial relative to public infrastructure, on household food security and women's nutritional diversity given three major value-chain improvements. The main findings suggest that these infrastructure improvements positively impact food security and nutrition, with women's empowerment and nutritional education acting as key mediators. Market access emerged as a stronger causal mechanism relative to productivity gains in linking infrastructure to improved welfare. Membership in Farmer-Based Organizations (FBOs) and participation in agribusiness linkages further amplified these impacts. However, the effects of infrastructure improvements were less clear when combined with the adoption of climate resilience practices, suggesting potential trade-offs.

Keywords : food security, nutrition, infrastructure, market access, women's empowerment, farmer-based organizations, climate resilience, Ghana

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