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## Incorporating Nutrition and Health in a Technology Adoption Impact Study: The Effect of Improved Seeds on Food Security in Ethiopia

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### Abstract

Despite the remarkable progress made in the past two decades, a large share of Ethiopians are still frequently food insecure. In view of the country's fast growing population and the exploitation of land area, the intensification of agricultural production is considered crucial to meet the increasing demand for food and to serve as a growth engine for the whole economy. The Green Revolution in Asia has set an example for how such growth can be achieved: through the adoption of new agricultural technologies including high yielding seeds of staple crops. However, the nutritional quality of the agricultural output has long been neglected in favour of its quantity fostering malnutrition with all its consequences for health and ultimately labour productivity.

This paper contributes to the technology adoption and impact assessment literature investigating the impact of partial adoption of high-yielding seeds on smallholders' food security status. Acknowledging the widespread problem of malnutrition, we focus on the nutritional dimension using different dietary diversity indicators. We first develop a theoretical and conceptual framework linking agricultural production, food security, nutrition, and health in the context of technology adoption and then implement it in an econometric model.

Second, using household data of 398 Ethiopian farmers collected in 2014, we assess the impact of adopting improved seed varieties on dietary diversity. We estimate the effect by employing a two stage procedure and thereby overcome the endogeneity problem of technology adoption and food security. Technology adoption is modeled and exemplified by the share of land allocated to high yielding seed varieties, hence allowing for the option of partial adoption.

Our results could not prove a significant impact of the level of technology adoption on food security, thus rejecting the Green Revolution paradigm, i.e., increased food security through new technology in the research area. Since livestock ownership, non-farm diversification, social capital, access to credit, and gender had a significant and positive effect on food security, a policy focus in these areas appears to be of greater importance for the improvement of dietary diversity than the promotion of improved seeds.

**Keywords:** Dietary diversity, Ethiopia, food security, improved seeds, technology adoption