

Ex-post Impact of Agricultural Technology Adoption on Poverty in Ethiopia: A Review

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Abstract

In Ethiopia, given the lower agricultural productivity, insistent food insecurity and massive poverty exists, there has been continued interest in the adoption of agricultural technology and its impact on productivity and poverty in the country. To increase agricultural productivity and thereby to reduce poverty, different empirical studies highly recommended that agricultural technology adoption. The main objective of this paper is to review the ex-post impact of agricultural technology adoption on poverty: Evidence from north Shewa zone of Amhara region, Ethiopia. From the study economic, institutional factors and human specific factors are found to be the determinants of agricultural technology adoption and the adoption of agricultural technology has a direct and significant impact on increasing household's consumption expenditure while also reducing household poverty. The paper recommends future studies focusing on increasing the access and adoptions of agricultural technologies so as to maximize the positive welfare effects of farm households.

Keywords: Agricultural productivity • Technology adoption • Impact • Poverty

Introduction

Poverty is the most critical development challenges facing the world. Developing countries in general and Africa in particular are highly affected by poverty. Previs studies, around 33.4% of the African population lives under extreme poverty. This is because of their economy depends highly on agriculture as major sources of income and livelihood, which is highly featured by rain fed, traditional farming system, subsistence production and vulnerable to climate change effects [1]. Increased agricultural productivity in the continent offers an unusually powerful lever for raising the incomes of the majority of the poor households, lowering food prices and stimulating growth in other sectors [2]. To increase agricultural productivity, adoptions of agricultural technologies are widely recommended. In countries with land scarcity and growing problems of land degradation, agricultural production can be increased through agricultural intensification (application of agricultural technology is the main route) [3-7]. Thus, agricultural technology has been a primary factor contributing to increases in farm productivity. Although there is still widespread poverty, the situation without current technology development would have been unimaginable [8]. Though many efforts and investments to promote modern agricultural technologies have been made in the continent, due to the least equipped with financially and technically to adopt, the adoption rate of new or

improved agricultural technologies is very low. This is true for many sub-Saharan African countries [2, 9-10].

Ethiopia, one of the Sub-Saharan African countries, in which the agricultural sector provides a livelihood for millions of the citizens (80%), contributes 34.1% to the GDP, employs some 79% of the population, accounts for 79% of foreign earnings and is the major sources of raw material and capital for investment and market. However, the share of the agriculture sector to GDP is declining overtime due to the sector is constrained by dependent on rainfall, traditional farming methods and minimal application of modern agricultural inputs. The declined share of agriculture and the rapid population growth of the country associated with limited farm size exacerbate poverty in the country. Therefore, increasing agricultural productivity through modern agricultural technologies has become a priority. However, the majority of agricultural practices that are used have not always kept up with modern technologies, significantly limits the output and productivity of smallholder farmers [11-14].

The green revolution agricultural policies introduced various uses of modern farming practices and technologies that simultaneously maintain and increase farm productivity, profitability, income and improve quality of farm produced on a sustainable basis. From an environmental stand point, agricultural innovation reduced negative externalities such as soil erosion, inorganic agrochemical pollution and agricultural greenhouse gas emissions; and rebuild or preserve ecological resources, such as soil fertility, forest, water, air and

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biodiversity, including animal and plant genetic diversity; and enhanced knowledge of sustainable resource management. It had played an impressive increase in yields per hectare, thereby reducing poverty and delivering wider development objectives [15-17]. The Green revolution may spur its share of unintended negative consequences, often not because of the technology itself but rather, because of the policies that were used to promote rapid intensification of agricultural systems. Hence, better policies maximize the positive role of it. Following green revolution, Ethiopia's agricultural development policy has been applied to modern agricultural inputs and practices including land management, fertilizer use, high yielding varieties, weed and pest management, soil and water conservation, natural resource management, modern farming techniques and machineries among smallholder farmers to raise productivity and ensure food security [18-19]. Therefore, the agricultural technology enables productivity growth in agriculture and also reduces poverty through increasing income and consumptions [3].

Accordingly, over the years various studies have been conducted on the process of adoption of agricultural technology and the impact of adopting agricultural technology on agricultural productivity and poverty in Ethiopia. It found that agricultural technology adoption significantly raises productivity, household income, nutrition and consumption while also reducing household poverty. However, many of the aforementioned studies evaluated the impact of single technologies, and the impact on single crop, and have been employed particularly OLS, Ordered Probit and Propensity Score Matching model for impact measurement [14, 20-29].

This paper therefore tries to review a study done on the ex-post impact of agricultural technology adoption on poverty: Evidence from north Shewa zone of Amhara region, Ethiopia. The reviewed study is concentrating on the impact of agricultural technology adoption on poverty; evaluates the impact of adopters of at least one and more technologies in any of one of the crop land; employed an Endogenous switching regression model as the model solves the impact evaluation pitfalls.

Determinants of Agricultural Technology Adoption

The adoption of agricultural technologies depends on different household, socio-economic, and institutional related factors. From the study under review, the results from the selection model identified that the probability of adoption of farm technologies significantly depends on whether a farm household has access to credit, extension visit, saved money, farm cooperatives and lives near to the market places or not.

The Impact of Agricultural Technology Adoption on Poverty

Empirical studies conducted on the impacts of adoption of agricultural technologies noted that a direct and significant impact on raising productivity and thereby reducing poverty and food insecurity. From the study, the impact measurement model (Endogenous Switching model) shows the impact of adoption of agricultural

technologies used in the study on food consumption expenditure per adult (poverty proxy); and the results indicate that adoption gives larger food consumption per adult relative to non-adoption. That is, adopters who actually adopted increase their food consumption expenditure per adult, and, if those who do not currently adopted were to adopt it, their food consumption expenditure per adult would increase as well. The study's result confirms that adoption of agricultural technologies has a positive impact on households' food consumption expenditure per adult equivalent, and confirms the potential direct role of adopting agricultural technologies on reducing poverty, as higher farm consumption expenditure from adopting agricultural technology translates into lower consumption poverty.

Conclusion

Literatures on the area witnessed the significant impact of agricultural technology adoption on raising productivity and also poverty reduction. This paper reviewed the ex-post impact of agricultural technology adoption on poverty: Evidence from north Shewa zone of Amhara region, Ethiopia. Reviewed study revealed that farm households' decision to adopt agricultural technologies is positively influenced by sex of the household head, credit access, household saving, extension visit, farm cooperatives and negatively by distance from market; and the adoption of agricultural technologies used in the study has a positive impact on poverty reduction by raising farm households' food consumption per adult. Thus, the reviewed study confirms the potential direct role of adopting agricultural technologies on reducing poverty in Ethiopia.

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