



## The impact of cooperatives on agricultural technology adoption: Empirical evidence from Ethiopia

Degnet Abebaw<sup>a,\*</sup>, Mekbib G. Haile<sup>b</sup>

<sup>a</sup> Ethiopian Economics Association/Ethiopian Economic Policy Research Institute, P.O. Box 34282 Addis Ababa, Ethiopia

<sup>b</sup> Center for Development Research (ZEF), University of Bonn, Walter-Flex Str. D-53113, Germany

### ARTICLE INFO

#### Article history:

Received 27 April 2011

Received in revised form 27 July 2012

Accepted 5 October 2012

Available online 16 November 2012

#### Keywords:

Cooperatives

Agricultural technology adoption

Impact evaluation

Ethiopia

Africa

### ABSTRACT

Using cross-sectional data and a propensity score matching technique, this paper investigates the impact of cooperatives on adoption of agricultural technologies. Our analysis indicates that cooperative members are more likely to be male-headed households, have better access to agricultural extension services, possess oxen, participate in off-farm work, and have leadership experience. We also found that geographic location and age of household head are strongly associated with cooperative membership. Our estimation results show that cooperative membership has a strong positive impact on fertilizer adoption. The impact on adoption of pesticides turns out to be statistically significant when only agricultural cooperatives are considered. Further analysis also suggests that cooperative membership has a heterogeneous impact on fertilizer adoption among its members. The results suggest that cooperatives can play an important role in accelerating the adoption of agricultural technologies by smallholder farmers in Ethiopia.

© 2012 Elsevier Ltd. All rights reserved.

### Introduction

Agricultural productivity in Sub-Saharan Africa (SSA) is very low and most countries in the region neither produce enough nor are able to import food for their population (Diao et al., 2008). This situation has continued to become an important development challenge to African policy makers and the international development community. In 2003, African Governments enacted the Comprehensive Africa Agricultural Development Programme (CAADP) that aims at enhancing the performance of agriculture in order to alleviate poverty and food insecurity in the continent (AU/NEPAD, 2003). To achieve its goal, CAADP encourages and supports, among others, investment in agricultural research, technology dissemination and adoption to increase agricultural productivity and economic growth in the continent.

Empirical studies using micro-level data indicate that agricultural intensification through dissemination and adoption of better agricultural technologies can reduce poverty and food insecurity in SSA (Shiferaw et al., 2008; Kijima et al., 2008). However, the intensification of the agricultural sector through better use of improved farm inputs has been restrained by several factors (Croppenstedt et al., 2003; Diagne, 2006). As Poulton et al. (2006, p. 244) pointed out “agricultural intensification involves both technical change and the presence of input, seasonal finance and marketing systems to increase farm production and deliver it to consumers at a competitive price”.

In Ethiopia, over 95% of the agricultural output originates from smallholder farmers. Despite their major contribution to the country's economy, these farmers are commonly characterized by limited access to input and output markets, and low productivity (Gebremedhin et al., 2009). Cognizant of this problem, the Government of Ethiopia (GoE) has given high policy attention to improving agricultural productivity through greater intensification of smallholder farming practices (MoFED, 2006).

In its endeavor to improve agricultural productivity, the GoE has given substantial policy attention to farmers' cooperatives. To this end, the government established the Federal Cooperative Commission (FCC) in 2002. Among others, the commission intends to establish one cooperative per *kebele*<sup>1</sup> and attained 70% of this goal by 2010. As indicated in Spielman et al. (2010), cooperatives play important roles in the delivery of various public agricultural services in the country. In particular, they are actively involved in the dissemination of agricultural inputs, collection and sale of members' outputs, provision of business loans, and offering training to members. Alternative major channels where farmers could access key inputs for production of staple food crops in the country have been private input dealers and public sources such as the Ministry of Agriculture (MoA) and the Ethiopian Seed Enterprise. This situation has, however, been lately changed since the GoE has given cooperatives to play a dominant role in the distribution and marketing of fertilizers in the country (World Bank, 2011). In 2010, farmers'

\* Corresponding author. Tel.: +251 11 6453200; fax: +251 11 6453020.

E-mail address: [degnet2003@yahoo.com](mailto:degnet2003@yahoo.com) (D. Abebaw).

<sup>1</sup> A *kebele* is the smallest administrative unit in Ethiopia.

cooperatives provided about 56% of the chemical fertilizers<sup>2</sup> supply to smallholder farmers in Ethiopia (Matsumoto and Yamano, 2010).

However, as in other SSA countries, the adoption and dissemination of improved agricultural technologies in Ethiopian agriculture have actually been low (Spielman et al., 2010). For instance, in 2009/2010 main cropping season, only 44% and 12% of the farmers used fertilizers and improved seeds, respectively (CSA, 2010).<sup>3</sup> This limited adoption of improved agricultural technologies in the country has been attributed to both supply and demand side constraints (Croppenstedt et al., 2003; Feleke and Zegeye, 2006; Gebremedhin et al., 2009). However, most of the previous adoption studies either did not use farmers' cooperative membership as an important explanatory factor or did not control for the potential endogeneity of the cooperative membership variable.

Using primary data from Ethiopia, a recent study has reported that members of cooperatives receive significantly higher market prices of farm outputs compared to non-members (Bernard et al., 2008). However, the same study indicated that cooperatives have limited impact on farm output supply to the market. This paper extends the earlier work by looking at the impact of cooperatives on agricultural technology adoption in rural areas of Ethiopia. In particular, this paper addresses the research question: "does cooperative membership increase the probability of adoption of improved agricultural technologies in Ethiopia?" This question is of crucial interest for policy makers and cooperative managers because, as stated earlier, cooperatives are expected to raise the adoption of improved farming practices among their member farm households.

Against this backdrop, the main purpose of this study is to assess whether cooperative membership increases the likelihood of adoption of fertilizers, improved seeds and pesticides. As in other social programs, evaluating the economic impact of cooperatives is a difficult task due to endogenous program placement and selection bias. In the first instance, it is possible that some regions or *kebeles* may have more cooperatives due to greater agricultural potential or commercial activity. Moreover, cooperative membership is not random as an individual household becomes a cooperative member on a voluntary basis. As such, it might be that households who are members systematically differ from non-members. In fact, previous empirical studies in Ethiopia (e.g., Bernard et al., 2008; Bernard and Spielman, 2009) and elsewhere (e.g., Wollini and Zeller, 2007; Fischer and Qaim, 2012) have reported group differences between cooperative members and non-members along several observed characteristics. Additionally, cooperative members and non-members may differ in terms of unobserved characteristics. These problems are tested and accounted for in this paper.

This study employs a propensity score matching (PSM) method to mitigate some of the above-mentioned challenges in the estimation of impacts of cooperatives on agricultural technology adoption. In measuring the impact, the PSM method here involves pairing members and non-members of a cooperative who have similar observable characteristics. Our econometric analysis is based on cross-sectional data collected from a random sample of 965 households residing in seven districts. The empirical data were collected between January and March 2009. The outcome variables of our analysis include adoption of fertilizers (DAP and Urea), improved seeds and pesticides. The data on adoption of these technologies refer to the 2007/2008 main agricultural season.

The rest of this paper is organized as follows. The next section briefly describes the evolution of cooperatives and the main agricultural tasks they perform in Ethiopia. The methodology section outlines the econometric procedures employed to estimate the impact of cooperative membership on adoption of improved agricultural

technologies. Besides, it also outlines the sampling procedure of the study and type of data used for estimation. The results and discussion section provides and discusses the estimated impacts of cooperative membership on adoptions of fertilizers, improved seeds and pesticides. The last section summarizes the main findings, and draws some policy implications and outlook for further research.

## Cooperatives in Ethiopia

Cooperatives have a long history in Ethiopia. Traditional forms of collective action such as *iqub*, a traditional form of rotating savings and credit association; work groups such as *jige*, *wonfel*, and *debo*, which help in mobilizing labor resource; and *idir*, a traditional association which provides insurance for members during death and other accidents are only few that have been operating in Ethiopia. These informal associations are still ubiquitous in the country. However, it was in the 1950s that formal cooperatives were established (Couture et al., 2002; Kodama, 2007). At that time, few cooperatives were mainly engaged in producing industrial crops for export market and their members were predominantly large landholders (Lemma, 2008).

The Derg regime (1974–1991) gave special attention to cooperatives as instruments of mass movement and to ensure equitable resource mobilization and distribution in the country (Emana, 2009). Cooperatives were particularly founded on Marxist principles aimed at bringing an end to capitalist operation (Rahmato, 1990). They were mainly of service and producers' cooperatives that used to organize peasants, control production and marketing, and sell inputs and consumer goods to members (Kodama, 2007). These cooperatives were, however, characterized by mandatory membership, production quotas and with a tendency to exclude smallholders (Spielman, 2008). With the downfall of the Derg regime in May 1991, some of these cooperatives were looted and misused by local people for their assets (Rahmato, 1994).

Between 1991 and 1993, cooperatives did not get any policy attention by the current GoE (Emana, 2009). However, the GoE has enacted a new cooperatives proclamation in 1994 (proclamation No. 85/1994). According to this proclamation, cooperatives are independent entities organized to promote common socioeconomic interests of their members (FDRE, 1994). The FCC, later named as the Federal Cooperatives Agency (FCA), was established to manage the proper implementation of cooperatives' legislation and to devise policies and legal measures consistent with international conventions on cooperatives (Bernard et al., 2010).

The current GoE continued its support to cooperatives in the various poverty reduction strategies of the country. For instance, the Sustainable Development and Poverty Reduction Program (SDPRP)<sup>4</sup> noted the role of cooperatives "... to provide better marketing service and serve as a bridge between small farmers (peasants) and the non-peasant private sector" (FDRE, 2002, p. 43). Increased policy attention to cooperatives is also found in the Plan for Accelerated and Sustainable Development to End Poverty (PAS-DEP), and in the Growth and Transformation Plan (GTP) (MoFED, 2006, 2010).

## Methodology

### Conceptual framework for cooperative membership

Following Wollini and Zeller (2007) and Fischer and Qaim (2012), a household's decision to be a member of a cooperative can be analyzed in a random utility framework. According to this framework, the actual utility level of cooperative membership to

<sup>2</sup> DAP and Urea are the sole chemical fertilizers imported from abroad and used by farmers in Ethiopia.

<sup>3</sup> Improved seeds in this paper include both hybrid seeds and open pollinated varieties (OPVs).

<sup>4</sup> SDPRP is Ethiopia's first Poverty Reduction Strategy Program (2002–2005), followed by PASDEP (2005/2006–2009/2010), and GTP (2010/2011–2014/2015).

Download English Version:

<https://daneshyari.com/en/article/5070668>

Download Persian Version:

<https://daneshyari.com/article/5070668>

[Daneshyari.com](https://daneshyari.com)