



Agricultural infrastructure donation performance: Empirical evidence in rural Ethiopia



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ABSTRACT

Research literature is trying to find linkages in Ethiopia to increase economical outcomes of smallholders' agriculture. This project focuses in the performance analysis of an infrastructure donation. The infrastructure donation is a hand-dug well donated by an NGO shared by 4 families in Ethiopia. Each family has the responsibility to create a vegetable farm and cultivate different crops in order to improve nutrition for the family while developing an economic commitment of selling the excess crops. The sample is taken from 106 hand-dug wells involving 424 families in three villages near Addis Ababa where agriculture is the main activity.

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1. Introduction

Ethiopia is one of the world's poorest countries, according to statistics from related UNDP Human Development Indicators. It has an area of 1,104,300 km² and a population of 85,219,000 inhabitants where 15.6% of the population is urban, the rest of the rural and where poverty is. Poverty is pervasive and widespread (Bogale et al., 2005; Dercon and Christiaensen, 2011; Dercon et al., 2012; Kumar and Quisumbing, 2012). Based on data of the Ministry of Finance and Economic Development (MOFED, 2012), 29.6% of the total population of the country lives below the national poverty line.

Ethiopia has an ancient culture; it is virtually the only African country that was never been colonized. It always defended from the invaders, traditionally Muslim people, leading to an attitude of isolation from the rest of the world. However Ethiopia suffered a civil war which lasted 30 years until 1991 when it proclaimed the independence of Eritrea, a region north of the country and the only way out to the sea. Despite the conflicts in its border regions with Eritrea and Somalia nowadays, Ethiopia, as a country is living in current political stability although all these unstable movements have had ripple effects in the business sector. In 1992 after 17 years of socialism and military dictatorship

Ethiopia launched a comprehensive set of economic reforms marking the country's transition to market-based economy. The fall of the Marxist-oriented Dergue government coincided with the elimination of many restrictions on market activities (Mani et al., 2013; Dercon et al., 2012). Also a growth strategy was introduced denominated Agricultural Development Led Industrialization (ADLI) giving priority to the agricultural sector (Shiferaw and Bedi, 2013).

As in many developing countries, Ethiopia is still suffering a massive exodus of rural people migrating to the capital in search of working in other sector than farming. So the Government is currently willing to support projects carried out outside the cities to increase the standard of living of the rural area. Therefore, the introduction of home vegetable gardens and small orchards at a family level is a substantial improvement in the standard quality of the rural population living. Also, access to water with the excavated hand wells will enable the population to produce food continuously all the year. Broussard et al. (2014) have analyzed the impact of growth in agricultural productivity on household poverty dynamics in rural Ethiopia using a panel dataset (1994–2009) suggesting that government policies aimed at reducing poverty should adopt a growth plus approach—designing policy interventions to support agricultural productivity growth, plus to protect assets and enhance market access for rural households in the country. In Ethiopia the land is owned by the State and farmers have rights to use for “n” years, although there is risk of losing the land if the Government decides to take it. In rural Ethiopia, agriculture is the major source of income. This implies that growth in agricultural productivity

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directly affects the welfare of the rural poor (Abro et al., 2014; Irz et al., 2001).

In this trend this research project focuses in a field experiment in Ethiopia analysing the variables which determine the performance of an infrastructure donation (a hand-dug well), measured as the capacity of the farmer to sell excess crops, and aimed to develop improvements in agriculture, nutrition, education and economics of the households in the long term. Moreover, this research analyses the possible development of a culture of better nutrition, better water management, more training within rural farmer households in Ethiopia making farming a sustainable micro-business. For this research an NGO called Missionary Community Saint Paul Apostle (MCSPA) which has been working in the area of Muketuri (Ethiopia) for 30 years in health agriculture and educational programmes has helped the project. Recently, they launched a new programme focused mainly on improvements in agriculture with hand-dug well donations. They have achieved to make 41 hand dug wells 8 in Muketuri, 17 in Gimbichu and 16 in Mechela Andode. The empirical work and infrastructure grants information has been provided by this NGO.

The structure of this article is the following: First, a bibliographical review is made within Ethiopian context. In order to analyze the performance of an infrastructure donation given three years ago in three villages in the Muketuri area: Gimbichu, Mechela Andode and Muketuri to 106 families. A descriptive analysis of the sample is made as well as different multivariate statistical analysis to test the correlation among technical-economic variables such as farming outcomes, selling in the market, distance to the well or number of harvests and social variables such as genre, number of members in the household, education and family conditions. Finally, as interesting conclusions that can be highlighted is that the well's performance is positively correlated to bean cultivation but negatively to teff cultivation. When observing the interactions terms between variables and villages, farm size and one of the household members having a remunerated job become significant for the well's donation performance in Muketuri and the husbands' age and the number of members in the household in Mechela. The research must be developed further because there were answers the households did not understand absolutely for cultural reasons. Future research lines will be to develop a project-finance with budget training, control and maintenance of the wells, in order to make this type of hand-dug wells grants performance sustainable in Ethiopian villages, being this the path towards agriculture productivity and poverty alleviation.

2. Agriculture, economy and nutrition in Ethiopia

The Government of Ethiopia has made significant efforts in terms of public investments to promote the growth of agriculture as a means of accelerating the economic transformation (MOFED, 2012). Also, Ethiopia has implemented one of the largest, fastest and less expensive land registration reform in Africa (Bezu and Holden, 2014) starting to observe the link between land tenure, land productivity growth (Holden and Otsuka, 2014). Growth in agricultural productivity directly affects the welfare of the rural poor (Abro et al., 2014; Irz et al., 2001). Other empirical studies also reveal that productivity growth in agriculture helps reduce poverty (Cervantes-Godoy and Dewbre, 2010; Christiaensen and Demery, 2007; Christiaensen et al., 2010; Datt and Ravallion, 1998; Hanjra et al., 2009a,b; Majid, 2004; Minten and Barrett, 2005; Ravallion and Chen, 2005; Sarris et al., 2006; Thirtle et al., 2001, 2003). Furthermore, empirical evidence about the extent to which agricultural productivity helps reduce poverty at the household level are not very well documented in the country. For example, Dorosh and Thurlow (2009) and Diao and Pratt (2005) studied the

economic effects of agricultural growth using Computable General Equilibrium (CGE) models. Nevertheless, the aggregate nature of the models does not allow researchers to examine the dynamics of poverty and productivity at household level. Other studies (Alemu, 2010; Geda et al., 2009; Tafesse, 2003) use econometric analyses to examine the linkages between agricultural productivity and poverty in Ethiopia. However, these studies use a static framework and do not assess the extent to which the dynamics of growth in agricultural productivity affect the dynamics of moving out of poverty to allow overtime comparisons. Bigsten and Shimeles (2008) examined poverty transition and persistence in Ethiopia for 1994–2004. The deindustrialization and a severe lack of the mechanization in Ethiopia's key economic sectors have led to a deep crisis and informal economic situation. Among the main problems the country is facing when managing a farm is particularly the lack of positive economic outcomes and the lack of achieving a savings culture among the farmers who are self-employed. However, if supported by strategic policies and investments, this low level of industrialization, combined with its natural resource base could open attractive opportunities for the growth of farming and its sustainability. The decline in investment in social enterprises, particularly state sponsored cooperatives, has accelerated the turning of the Ethiopian society into subsistence-based livelihoods with important consequences for day-to-day farm management. However, over the past few years, there has been a great endeavour of the population to create entrepreneurial groups in substantial farming of products and other services (Bali and Varghese, 2013).

Identifying determinants, pressures and trade-offs of crop management in smallholder farms in Sub-Saharan Africa is also researched in order to enhance the development agricultural strategies in Africa aligned with farm yield and performance optimization from the nutrition, health and socio-economic point of view (Affognon et al., 2014; Valbuena et al., 2014; Jayne et al., 2014). Additionally, research has increased analysing crop cultivation, crop yield, land and water management planning together with advances in farming systems and agronomy (Singh, 2015; George, 2014; Sinclair et al., 2014). High amount of research has been done about the improvement of agriculture training and techniques in low income countries (Nyssölä et al., 2012). Emerging social economy of small farms is presently taking place despite the prerequisite legal sanction to safeguard and support their development. In such conditions, banks and other potential creditors are reluctant to provide these small self-employed farmers with loans. Such situation slows down the enormous potential of farms to generate outcomes contributing to create business development programmes within the country (Mcintosh et al., 2011; De Mel et al., 2014; Verrest, 2013).

Currently, research is focusing in analyzing the real quantitative impact of all these measures linking also to improvements in health, education, agriculture and economics aligned with the Millennium Development Goals (MDG) (Karlan and Appel, 2011). In this research infrastructure donations are analyzed as a form of "informal lending" in line with researchers as Madestam (2014), Ravi (2014) and Turvey and Kong (2010). The population's access to credit is limited, thereby stifling their capacity to invest in production inputs and sustainable resource management. In such context and in order to understand the different financial sources it is necessary to analyze which one would suit best for the farmer's needs. When analysing the different areas where infrastructure grants can be used the essential part of this is when self-employed farmers must be taught how to manage and forecast their small farms basic revenues and costs or they will not be able to make their farms sustainable. Infrastructure donations must aid farmers and their performance measured in quantitative outcomes (increase in sales, income results, asset accumulation and job creation) and bio sanitary outcomes (health, food security, nutrition, education,

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