ELSEVIER
www.elsevier.com/locate/worlddev

World Development Vol. 59, pp. 461–474, 2014

0305-750X/$ - see front matter

http://dx.doi.org/10.1016/j.worlddev.2014.01.033

Policies for Agricultural Productivity Growth and Poverty Reduction in Rural Ethiopia

ZEWDU AYALEW ABRO
Addis Ababa University, Ethiopia

BAMLAKU ALAMIREW ALEMU
Addis Ababa University, Ethiopia
Hohenheim University, Stuttgart, Germany

and

MUNIR A. HANJRA *
International Water Management Institute (IWMI), Pretoria, South Africa
Charles Sturt University, Wagga Wagga, NSW, Australia

Summary. — Increasing the productivity of smallholder agriculture holds the key to poverty reduction. The empirical literature is limited to ascertain the linkages and the implications for policy uptake in Ethiopia. We examine the impact of growth in agricultural productivity on household poverty dynamics in rural Ethiopia using a panel dataset (1994–2009). Findings suggest 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.

Key words — drought, land productivity, dynamic poverty, pro-poor growth, Ethiopia

1. INTRODUCTION

Poverty is pervasive and widespread in Ethiopia (Bogale, Hagedorn, & Korf, 2005; Dercon & Christiaensen, 2011; Dercon, Hoddinott, & Woldehanna, 2012; Kumar & Quisumbing, 2012). Based on the 2010/11 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. The data further show that poverty is more prevalent in rural (30.4%) than urban areas (25.7%) (MOFED, 2012). Other studies also confirm that poverty disproportionately affects people in the rural areas (Bogale *et al*., 2005; IFAD, 2001, 2010; World Bank, 2008).

In rural Ethiopia, agriculture is the major source of income and livelihoods. This implies that growth in agricultural productivity directly affects the welfare of the bulk of the rural poor (Irz, Lin, Thirtle, & Wiggins, 2001). Other empirical studies also reveal that productivity growth in agriculture helps to reduce poverty (Cervantes-Godoy & Dewbre, 2010; Christiaensen & Demery, 2007; Christiaensen, Demery, & Kuhl, 2010; CSLS, 2003; Datt & Ravallion, 1998; Hanjra, Ferede, & Gutta, 2009a, 2009b; Irz *et al*., 2001; Majid, 2004; Minten & Barrett, 2005; Ravallion & Chen, 2005; Sarris, Savastano, & Christiaensen, 2006; Thirtle, Irz, Lin, McKenzie-Hill, & Wiggins, 2001; Thirtle, Lin, & Piesse, 2003; World Bank, 2008).

The Government of Ethiopia has made significant efforts in terms of public investments to speed up the growth of agriculture as a means of accelerating the economic transformation (MOFED, 2012). However, public investments did not achieve the intended objectives and rapid population growth may be dampening any investments made in the rural sector. Furthermore, the empirical evidence about the extent to which and pathways through which gains in agricultural productivity help reduce poverty at the household level are not very well documented in the country using panel dataset. For instance, Dorosh and Thurlow (2009) and Diao and Pratt (2005) studied the economy-wide effects of agricultural growth using Computable General Equilibrium (CGE) models. The main concern with the CGE models is that total factor productivity (TFP) growth is assumed to be exogenous. Thus, the models lack the scope to analyze the endogenous drivers of productivity growth. Moreover, the aggregate nature of the models does not allow researchers to examine the dynamics of poverty and productivity at household level.

Other studies (for example, Alemu, 2010; Geda, Shimeles, & Weeks, 2009; Tafesse, 2003) used econometrics analyses to examine the linkages between agricultural productivity and poverty in Ethiopia. However, these studies use a static framework and did not assess the extent to which the dynamics of growth in agricultural productivity affect the dynamics of moving in and out of poverty (poor or non-poor; chronic poor or transient poor) to allow overtime comparisons. Bigsten and Shimeles (2008) is perhaps the only study that examined poverty transition and persistence in Ethiopia but for the period 1994–2004. This distinction is important, as the policies for alleviating chronic poverty are quite different from those for

* The authors would like to thank the three anonymous reviewers for their invaluable comments to improve the earlier version of the article. The comments were indeed very helpful in improving the manuscript. Final revision accepted: January 31, 2014.

smoothing transient poverty. Against this backdrop, the main objective of this paper is, therefore, to examine the dynamics of agricultural productivity growth on dynamics of household poverty using the Ethiopian Rural Household Survey (ERHS) panel dataset.

While ERHS data have been widely used, most studies using the data focus on the relationship between assets and poverty (Dercon & Christiaensen, 2011; Dercon *et al.*, 2012; Kumar & Quisumbing, 2012). This paper contributes to the literature by analyzing the dynamics of productivity growth and its effect on dynamics of rural poverty using the ERHS data. However, in order to improve the confidence of such analysis, the paper first establishes a rigorous productivity analysis using ERHS data, given that there is no peer-reviewed publication for such assessment. As the ERHS data used for the analysis are not a national representative survey (which covers only 15 villages in rural Ethiopia), we first established the growth in income and poverty reduction profiles of households based on the ERHS data and then compared it with the national level growth and poverty reduction performance (Tables 3 and 6).

We found that agricultural productivity has a positive impact on improving the indicators of welfare of rural households. Besides agricultural productivity, the results also suggested that a combined effort to design policy interventions for not only increasing productivity but also protecting asset of rural households, improving access to nearest towns and markets, reducing inflationary pressures and prudent population policy are very important.

The remainder of this paper is organized as follows. After a brief description of the data in Section 2, Section 3 presents the research methods and method of simulation for alternative government interventions for poverty reduction. Section 4 presents the findings of the study. The last section gives some concluding remarks.

2. DATA

The data for this study come from the four rounds of the Ethiopian Rural Household Survey (ERHS), which is a panel dataset covering 15 villages in rural Ethiopia. The number of households surveyed in the first to fourth round was 1477. In the fifth round, it was 1681/1452. In the sixth and seventh rounds, the number was 1384 and 1577/1358, respectively. We created the panel based on two criteria. On the one hand, households must have cultivated some plot of land and on the other hand, they have to have positive value of production. All households with zero or missing values for these two variables were omitted. Finally, a balanced panel of 1007 households consisting of 4028 observations over four rounds was created.

The data cleaning process for most of the variables is straightforward. Nevertheless, further description is important for some of the variables. Aggregation of quantity of crops produced by farmers into value of production for all crops produced by farmers involves three steps. First, quantity produced measured by different local units of measurements was converted into a standard measure, kilogram. We used village level conversion factors prepared by the International Food Policy Research Institute (IFPRI). In the second step, the quantity of production in kg was converted into value in Ethiopian Birr using village level prices collected during the survey. However, the ERHS data do not have price data for 1999. Based on recommendation from researchers who previously used this dataset, the 1997 ERHS price data were scaled up by village level inflation rate calculated from the IFPRI's village level price index. An alternative to this would be to use the Central Statistical Agency (CSA) zone level producer price data for aggregation. Aggregation was made using both sources of data for the purpose of comparisons. Third, after aggregating the plot level nominal value of production at household level, the nominal value was deflated by the spatial price index. The justification behind this task is that even though farmers produce a lot of crops, the data do not identify the input levels by crop type making multi-output-multi-input analysis difficult.

Just like the production data, many farmers reported their cultivated land by using different local units of measurements. Plots cultivated by households measured by local units were converted into standard measure, hectare, using the IFPRI's conversion factor. Finally, the plot level information was aggregated into household level.

The amount of labor used is measured by a proxy variable by the number of household members between the age of 10 and 65 years converted to male adult equivalent units. The labor of an adult female and children are converted into adult male labor equivalent by 0.8 and 0.3 rates, respectively (Yesuf, D Falco, Deressa, Ringler, & Kohlin, 2008). The use of family labor as proxy for labor use in agricultural production was due to inconsistency in the duration of labor use data across different rounds.

The value of farm capital is a self-reported value by farmers, which is the sum of the value of sickles, hoes and ploughs used for cultivation. The use of self-reported values not only shows the difference in quantity of ownership but also shows differences in quality of the assets owned by farmers. In fact, measuring farm capital using self-reported values increases the risk of measurement errors in the data. An alternative would be to use the number of farm capital (number of hoes, ploughs and of sickles owned). However, this option assumes all the farm assets are homogenous among households.

Following Bachewe (2009), we developed an index of land quality indicator using the information on farmers' self-reported slope and fertility of their plots. To calculate the average land quality index, we assigned a value of 1 for a plot with flat slope (meda), 2 for hill slope and 3 higher hills for every household. Similarly, if the land is very fertile (lem), a value of 1 and 2 if fertile (lem tef) and 3 infertile (tef) was assigned. Then multiplying the slope and fertility indicator of the plots, a plot with a value of 1 has the best land quality, while 9 would indicate the lowest quality. Other combinations of quality indicators are in between 1 and 9.

It is clear that water is a critical input in agricultural production. We measured it by the amount of rain recorded either in the study villages or their proximate meteorology stations depending on data availability. We included a dummy variable if the farmers use any kind of irrigation or not. However, information was not collected for the 1994a and 2009 rounds. For 1994a the question whether the farmer used irrigation as modern input in the 1994b survey was used. For the 2009 round, whether farmers used water harvesting technologies was used as proxy.

Alike the irrigation variable, information was not collected for participation in government extension program in the 1994a and 2009 rounds. A question that reflects the role of the extension system and development agents from the 1994b survey was used. The question was "Who or what influenced your decision to grow the crops?" For those farmers who were influenced by the extension agents on their decision for specific crops, it is assumed that they have participated in the extension program in 1994a. For the 2009 round, the number of extension visits was used as proxy for extension