The Short-run Effects of the 1996/97 Land Redistribution on Farm Practices and Agricultural Productivity in Amhara Region of Ethiopia

Kefyalew Endale[*] and ***Tomoya Matsumoto***[**]

Abstract

This study investigated the short-run effects of the 1996/97 land redistribution in Amhara region on farm practices and agricultural productivity of farmers in the affected areas. A difference-in-difference estimation technique was employed using agro-ecologically similar control groups from the border sharing administrative zones of Oromia region. We found a significant negative effect of the land redistribution on crop yield and value of crop yield. Analysis of household survey data suggested that the land redistribution reduced agricultural productivity by distorting the allocation of agricultural inputs. In other words, rural land markets are highly imperfect and the poor beneficiaries of the land redistribution could not afford to purchase oxen and other key farm inputs in the short-run due to imperfect credit markets. This study suggests the need to improve targeting of existing pro-poor programs, such as credit, agricultural extensions and rural capacity buildings, which enhance rural factor markets, such as land rentals, to boost the agricultural productivity effects of redistributive land reforms both in the short-run and long run.

Keywords: Amhara region, land redistribution, 1996/97, farm practices, agriculture productivity

[*]Assistant professor of economics and head of economic research unit in the Institute of Development and Policy Research (IDPR), Addis Ababa University. Corresponding author, Email: ekefyalew@gmail.com

[**]Professor, Otaru Unviveristy of Commerce; Email: tmatsumoto@res.otaru-uc.ac.jp

1. Introduction

Efficiency gain is one of the arguments for redistributing land from land rich to land poor farmers (Cornia, 1985; Otsuka *et al.,* 1992). Small farmers rely on family labor to a large extent and could put more labor effort per farmland over the land rich farmers. They could also complement the increase in labor effort by intensive use of fertilizer, chemicals, and improved seeds to boost yield per farmland (Cornia, 1985). This is called the inverse farm-size productivity relationship (Cornia, 1985; Otsuka *et al.,* 1992). When the inverse relationship exists, the redistribution of land from the land rich to the land poor would enhance the average productivity.

However, the income poor beneficiaries of land redistribution cannot acquire the other complementary inputs such as oxen, improved seeds, fertilizer, and pesticides in the short run due to credit constraint (Chang, 2009). Land redistribution can also reduce agricultural productivity in the short-run by altering the farming experience of landholders. Empirical studies have the role of farming experience in enhancing agricultural productivity (Obasi *et al.,* 2013) and in reducing technical inefficiency in crop production (Khairo and Battese, 2005). The reallocating land from experienced farmers to youth and land poor households could reduce the productivity of the transferred land until the beneficiaries improve their farming skill through learning by doing. Therefore, the inverse farm-size productivity cannot hold in the short run due to the imperfection of rural credit and factor markets.

Land redistribution can also affect farm practices and agricultural productivity through its effects on the land tenure security perception of landholders. Studies suggest that land redistribution makes landholders to be suspicious over their landholdings in affected districts than in unaffected ones (Deininger and Jin, 2006). Tenure insecurity, resulting from frequent land redistribution, could reduce agricultural productivity by discouraging farmers from investing sustainable soil quality enhancement practices, such as stone terraces (Deininger and Jin, 2006, Gebremedhin and Swinton, 2003).

Even if the issue of land reforms has been central in agricultural development, there are only a few studies examining the consequence of land reforms due to data limitation as a limited number of countries actually carried out the reforms (Besley and Burgess, 2000; Deininger *et al*., 2008). In addition, most of the land reform-related studies in developing countries, such as India and Philippines, are mainly about tenancy reform rather than redistributive land reform although the latter is believed to have larger impact on efficient allocation of resources and poverty reduction than the former (Besley and Burgess, 2000). In the case of Ethiopia, existing studies focus mainly on the effects of land certifications induced tenure security on soil conservations, organic fertilizer uses, hybrid seed variety adoptions, resource management, tree planting, farm productivity, and many related agricultural practices (Hagos and Holden 2014; Tsegaye *et al.,* 2012; Melese and Bulte 2015). With regard to the farm practice and agricultural productivity effects of the 1996/97 land redistribution in Amhara region we found only two empirical studies[1] conducted by Benin and Pender (2001) and Benin (2006).

This study, therefore, aims to provide additional evidence to the literature on the effects of redistributive land reforms by examining the effects of the 1996/97 land redistribution implemented in Amhara region of Ethiopia on farm practices and crop yield. The reform was implemented in East Gojjam, West Gojjam, Awi, and North Shewa zones of the region. The motives for the reform, according to the regional government, was to address the unfair distribution of land and to improve efficiency in farmland use. Opposition parties and researchers, on the other hand, argue that the reform was politically motivated to punish the officers of the previous political regimes and to attract political support from those not involved in the previous political regimes such as youth and land poor (Ege, 1997; Gelaye, 1999).

The redistribution was implemented by classifying the farmers into bureaucrats, remnant feudal, medium, poor, youth, and *mote-keda* categories. '*Bureaucrats'* refer to those that had administrative positions during the 1975-1991 military regime and the '*remnant feudal*' are those who were *'feudals'* during the pre-1975 imperial regime and continued

holding relatively "larger land" until 1996/97. The '*medium'* class refers to farmers who had reasonable farmland and no connections with the pre 1991 political regimes. The fourth category is the poor class that comprise the 'disadvantaged' or farmers of tiny farmland or landless, and the fifth category is the youth which refers to dependent members who were 18 years old and over in 1996/97. Finally, the *mote-keda* category refers to those landholders who either died or left the village and with no legal dependent member left in the village to claim the land. A summary data from a few Peasant Associations shows there is a consistency between the way farmers were classified for the reform and the pre-reform distribution of landholding (Annex 1). 'Bureaucrats' and 'remnant feudal' sections used to hold larger farmland followed by 'medium', 'poor', and 'youth' sections.

A ceiling of one hectare was imposed on 'bureaucrats' and 'remnant feudal' categories and a three-hectare ceiling on 'medium' categories (Askale, 2005; Ege, 1997). The landholding in excess of the ceilings from *'bureaucrats'*, *'remnant feudals'*, 'medium' and the entire land of 'mote-keda' categories were to eligible land poor households and use through a lottery method (Ege, 1997). The rule states that every poor household and married couple should get one hectare of land. Those households whose landholding size was deemed too tiny were entitled to extra land to the total limit of one hectare. For the landless youth, divorced, and unmarried, the rule allowed them to get 0.5 hectare or if they have some land before the reform, they receive extra land until the total limit of 0.5 hectare. In practice, there existed deviations from the rules because a mismatch between the confiscated land and the numbers of eligible farmers for extra land. According to the district officers, the communal land was also allocated to reduce the mismatch. A few reforms implemented by Peasant Associations in East Gojjam, West Gojjam, and Awi zones of Amhara region were consistent with the allocation rule (see Annex 2).

2. The Study Sites and Methods

2.2. The study sites

The analyses focus on the East Gojjam, West Gojjam, Awi, and North Shewa administrative zones of Amhara region because land redistribution

was implemented in majority of the peasant associations in these administrative zones of Amhara region in 1996/97.[2]

2.3. Methods

We use a Difference-in-Difference method to identify the effect of the land redistribution on farm practices and crop yield. Comparable groups are used from border sharing zones of the neighboring Oromia region (Annex 3). The farmers in both regions were exposed to similar rural land reforms such as the 1975 radical land reform until 1991. After the 1991 regime change, redistributive land reform was implemented in Amhara region in 1996/97; but, there has not been any land redistribution in Oromia region after 1991. This creates a quasi-natural experiment in which the neighboring region is a control group and geographical discontinuity is exploited. This technique is called geographical discontinuity which is a non-randomized Regression Discontinuity Design where the discontinuity threshold is a boundary that demarcated the regions (Lee and Lemieux, 2010).

There are also agro-ecological similarities between the study sites in Amhara and the comparable groups used from Oromia such as type of major crops grown and proportion of land covered by the major crops (Annex 4). Maize, for example, accounted for about 25% of the crop land and 50% of the production volume between 1997 and 1999 both in West Gojjam and in East Wellega zones. There is also an agro-ecological similarity between the North Shewa zones of Amhara region and the North and East Shewa zones of Oromia region (Endale, 2015). The agro-ecological similarities are essential to reduce estimation biases on the impact of the reform arising from agro-ecological heterogeneity between the affected and comparable groups.

We further defined a group of woredas/districts that are located close to either side of the demarcation between Gojjam and East Wellega as “nearby group” to further reduce the agro-ecological heterogeneities between the comparable groups. Reasonable numbers of comparable enumeration areas (EAs)[3] are obtained from both the affected and unaffected sides in the districts within about 50 km from either side of the border separating these border sharing parts of the two regions. Moreover, regressions are also

estimated using zonal level comparable groups. The discussions and policy implications are based on the estimates which are robust in the regressions using the "nearby group" as well as in the zonal level comparison groups. For the transmission mechanism analysis purpose, we classified the farmers into losers, beneficiaries and unaffected based on the reported changes in their farm-size by the reform.

2.4. Empirical Specification

As described in the introduction, land redistribution can affect farm investment and agricultural productivity in two major channels. Farm-size and tenure security perception of farmers are two key measures of the two channels. However, there is no data to examine these two channels separately for the short-run analysis. The survey has repeated cross-sectional data on input uses, size of farmland, and crop yield information but no information about tenure security perception of farmers such as whether they have fears over future land redistribution. That makes it difficult to measure the tenure security channel of the reform. Repeated cross-sectional data, however, allows estimating the effects of a binary treatment variable (D'Haultfoeuille *et al.,* 2013*;* Imbens and Wooldridge, 2008). Suppose there are two comparable groups that are observed both before and after an intervention and only one group received treatment in the second period. Then the effect of the treatment on the treated group can be measured using the control group under conditional independent assumption between the treatment variable and the potential outcome variables.

Equation (1) shows the relationship of the dependent variables with the 1996/97 land reform in Amhara region and other independent variables. The reform is captured by an interaction of two dummies $DAmhara^{*}T$. Where *DAmhara* is a region dummy which takes one for samples from Amhara region which is the only region where the 1996/97 land redistribution took place and zero for samples from Oromia region (control area); and *T* is a year dummy which takes one for post-reform years (1997/98-1999/00) and zero for the pre-reform years (1995/96-1996/97). To reduce bias arising from other policies and programmes such as the rural land certification which started in early 2000s, we use data collected before the year 2000.

$$y_{cedt} = \beta_0 + \beta_1 DAmhara * T + H_{edt}\gamma + P_{cedt}\delta + C_c\theta + D_d\omega + YR_t\mu + \varepsilon_{cedt} \quad (1)$$

The subscripts c, e, d, and t denote crop, enumeration area, district, and year, respectively, and y_{cedt} denote the dependent variables namely average inorganic fertilizer use (kg/ha), crop yield, and value of crop yield. The coefficient of the DAmhara*T term (or β_1) captures the overall effect of the land redistribution, which is the sum of its resource reallocation and tenure security perception effects, so long as the factors which influence the outcome variables other than the land redistribution are controlled. Since enumeration areas (EAs) are the lowest units for reporting of crop yield in the AGSS, the dependent variables represent the EA level average value of each variable. For inorganic fertilizer variable plot level regression results are additionally reported because there is a plot level data for this dependent variable.

The variables in vector H_{edt} denote the EA level characteristics of households and landholders such as average of household size, the proportions male landholders, and the proportion illiterate landholders among others. The covariates in vector P_{cedt}, on the other hand, denote the plot characteristics aggregated at the EA level such as the mono-crop dummy, the proportion of plots affected by shortage of rain, the proportion of plots affected by excessive rain. Finally, D_d, YR_t, and C_c denote district, year, and crop fixed effects, respectively. The year fixed effects capture the effects of factors that would cause changes in the outcome variables over time even in the absence of a policy change, while the district fixed effects and crop dummies respectively measure the effects of district specific characteristics and crop specific attributes on the outcome variables.

2.5. Data Sources

The data for this study is obtained from three main sources. Background data about the reform process is obtained through key informant interviews with woreda rural land administrators and land redistribution archived records in woreda land administrative offices. The estimation is based on the AGSS data of CSA collected between 1995/96 and 1999/00. AGSS has

rich information about demographic characteristic of households, input use at plot level and crop yield at EA level. Values of crop yield are computed by multiplying crop yield by the farm gate prices obtained from the Producer Price Surveys of CSA. The third source is RePEAT[4] survey data collected in Ethiopia in 2014. It is used to get insight as to how the reform affects farm investment and crop yield in the short-run and to provide descriptive evidence on demographic characteristics and changes in landholdings of beneficiaries and losers of the reform affected areas.

3. Results and Discussion

3.1 Descriptive Results

RePEAT survey of sample households from the North Shewa administrative zone of Amhara region on the latest redistributive reform and status of their land before and after the reform showed that more than 95% reported that the latest land redistribution was in 1996/97 and 53% of them reported that the reform changed their farm-size (Table 1).

The demographic information from the survey is consistent with the implementation rule. The reform favored the youth and landless and the data revealed these features of the reform. The RePEAT data also showed that beneficiaries were the youngest groups and 76% of them were landless before the reform. There were also no major differences in the current average landholding between losers, beneficiaries, and unaffected farmers.

Data presented in Annex 5 show changes in mean differences of farm practices between treated and control groups before and after the land redistribution. The results show that a positive relationship between intensity of inorganic fertilizer use and land redistribution after outliers in the intensity of inorganic fertilizer are excluded. The relationship of the land redistribution with crop yield as well as value of crop yield, on the other hand, were negative. The uses of organic fertilizer, HYV seeds adoption, irrigation, and pesticide were reportedly very low before and after the reform in both control and comparable groups or these practices are unrelated with the land redistribution.

Table 1. Demographic characteristic and changes in landholdings of sample farmers affected by the 1996/97 in North Shewa zone (Amhara)

	North Shewa (Amhara)		
	Losers	Beneficiaries	Unaffected (mostly 'medium' categories)
Age of the head (average)	60	45	47
Household Size (average)	6.42	6.1	5.32
Proportion of male head	0.9	0.86	0.82
Holding size (ha) before the redistribution	4	0.36	NA
Holding size (ha) after the redistribution	2.07	2.01	NA
Percentage of landless before redistribution	0	76	NA
Land holding size in hectare	1.67	1.61	1.63
Total land under operation in ha. (including plots under temporary contract)	1.97	1.9	1.91

Source: Computed based on the 2014 RePEAT survey data. Note: the total numbers of losers, beneficiaries, unaffected, and farmers in the control groups are 38, 39, 69, and 164, respectively. NA stands for not applicable.

3.2 Regression Results

In Annex 6, marginal effects from Tobit regression of inorganic fertilizer[5] use on land redistribution and other regressors are reported. The estimates of the reform suggest that land redistribution has positive effects on the intensity of inorganic fertilizer use (in kg/ha). The impact of the redistribution varies between 25% and 102% depending on the definitions of affected and control groups. There was access to fertilizer on credit at very small interest rate between 1994 and 1998 (Matsumoto and Yamano, 2010) and the scheme lessens constraints of youth and land poor household beneficiaries of land redistribution to inorganic fertilizer in the short-run. The losers who are likely to increase their family labor hour per farmland as their holding reduced by the reform (inverse farm-size and productivity hypothesis) and also induced to increase their use of fertilizer because it is a complementary with the increased family labor.

Gender inequality was observed in North Shewa where having larger male headed landholders was significantly associated with larger intensity of fertilizer use ($p<0.001$). Larger family size was associated significantly with larger intensity of fertilizer use in Gojjam and Wellega zones while the two were negatively associated in the districts in North Shewa zone ($p<0.001$). More years of education was significantly associated with increase in the intensity of fertilizer use in Gojjam and Wellega zones.

From the plot and crop characteristics, inorganic fertilizers use was large on mono-crop plots than on intercrop plots which was indicative that intercropping was practiced in the production of legumes and some of these crops do not require urea as they fix atmospheric nitrogen. The proportions of plots that experienced shortage of rain were negatively associated with the inorganic fertilizer use because its effectiveness declined when there was no sufficient soil moisture. The estimate of excessive rain, on the other hand, suggested that high rainfall did not necessarily decrease the intensity of inorganic fertilizer use. Indeed, a significant positive relationship between excessive rain and increase in fertilizer use was observed in the case of North Shewa (Amhara) and North and East Shewa (Oromia) zones.

In Annex 7 the effects of land redistribution and other factors on crop yield (kg/ha) and value of crop yield in ETB (Ethiopian Birr) are reported. Land redistribution had significantly negative effects in all of the crop yield and value of crop yield estimations in the short-run. Its coefficients in Columns (1) and (2), which are based on the "nearby group", shows that the reform was associated with a 30 percent decline in crop yield ($P<0.001$) and with a 36 percent decline in the value of crop yield ($P<0.05$). The negative impact is due to the distortionary effect of the reform on oxen, purchased intermediate inputs and reductions of soil conservation efforts which is discussed below from RePEAT (2014) survey data.

The negative agricultural productivity evidence of the redistribution contradicts finding of Benin and Pender (2001) and Benin (2006) which showed positive coefficient of the reform on the value of crop yield obtained by comparing the crop yield between the affected and unaffected villages within Amhara region. However, the contrasting findings could be due to

the difference in the control groups. The current study uses controls from neighboring unaffected region while the aforementioned studies used unaffected peasant associations as controls within Amhara region. The reform was implemented in areas where local administration was strong and demand for land was high. These implies that within Amhara there might exist systematic differences between the affected and unaffected peasant associations and using the unaffected peasant associations as a control for the affected could result in biased estimation outcome.

Regarding the estimates for the other covariates, the coefficient of mono-crop is positive in all the regressions and significant in 5 (out of 6) regressions. Its positive estimate captures the better crop care, such as weeding and harvesting on the right time, on mono-crop plots unlike intercrops where different crops which could germinate and ripe at different time are planted on one plot. The estimates of crop damage incidences such as crop disease, insect and pests, and excessive rains are also negative and significant which suggests how detrimental these factors are for crop yield (relative to plots which did not experience crop damage)

3.3 Transmission Mechanism

To find out how the land redistribution affected agricultural productivity in the short-run, a data from the 2014 RePEAT survey in Ethiopia was used. The RePEAT survey has gathered information as to how sample farmers in North Shewa zone of Amhara region responded to the 1996/97 reform immediately after the reform in terms of oxen use, soil conservation practices, labor use, and fertilizer use (Table 2). Since family size and farming capability were not taken into consideration during the reform, the land ceiling forced the losers to underutilize their family labor and oxen. For example, about 61 and 37 percent of those who lost land in 1996/97 reported that the land redistribution forced them to underuse oxen and family labor, respectively. As the losers were the ones who probably had larger number of oxen, the land confiscation from these groups could significantly reduce oxen use per farm size in the affected areas. Benin (2006) also reported that both man hours and oxen hours were significantly

lower in the villages affected by the 1996/97 reform than the unaffected villages in Amhara region.

The beneficiaries who comprised land poor households and youth, on the other hand, reported that they increased the use of inputs after the land reform. However, most of these farmers were landless before the reform. For instance, about 76% of the sample of beneficiaries of the 1996/97 reform in the 2014 RePEAT survey indicated that they were landless before the redistribution. Hence, their response of increased input use reflected their small input utilization status before receiving land in 1996/97 (see Table 2).

Table 2. Results regarding input use and soil conservation investment

Variables	Number of respondents with behavioral response			
	Increased/more employed	Decreased/less employed	No changes	Do not remember
Panel A: The response of losers				
Oxen/animal input	29	61	10	0
Family labor	42	37	18.4	2.6
Stone terraces	31	24	45	0
Check dam	34	21	45	0
Other soil conservations	42	21	34	3
Inorganic fertilizer	42	26	32	0
Panel B: The response of beneficiaries				
Oxen/animal input	79	2.6	18.4	0
Family labor	76.3	2.63	21.05	0
Stone terraces	76	24	0	0
Checkdam/drainage ditches	63	11	21	6
Other soil conservations	68	2.6	29	0
Inorganic fertilizer	71	0	29	0

Source: Computed based on the 2014 RePEAT survey in Ethiopia. The numbers in each cell refers to the percentage of respondents. Farmers were asked to answer how the reform affected their input use and soil conservation practices in the first three years after the recent land redistribution.

Due to their poor asset base and the high imperfections in the input markets, the beneficiaries used very small quantity of the key complementary inputs with land than the required quantities in the subsequent years after the redistribution. The capital constraints and the unavailability of other

schemes, such as credit schemes to help the poor beneficiaries after the reform, might have resulted in a misallocation of inputs in the short-run. Therefore, the main transmission mechanism through which the land redistribution reduced crop yield in the short-run is by distorting the allocation of key farm inputs such as oxen.

3.4 Placebo Regressions

The coefficient estimates of the land redistribution could be spurious if a significant variation exists within the treated and/or within the controlled areas. For the robustness of the foregoing estimates there should not be significant differences in the dependent variables across districts within the Amhara region and across districts within the control groups. Placebo regressions conducted using data only Amhara region and only from Oromia region. For the regression which uses data only from Amhara region, districts from some part of the region are considered placebo control group. Similarly, for the regression which uses data entirely from Oromia, some of the districts are defined as placebo treated group. The artificial policy variable is generated by the interaction of the placebo treatment status dummy and the year dummy which takes one in the post reform period and zero otherwise. The coefficients of the artificial policy variable should be insignificant for the foregoing interpretations on the coefficients the actual policy variable to hold.

Two sub groupings created from the districts in the Gojjam province. The first group is the shaded parts of Gojjam provinces from Panel A of Annex 3 as treated group and districts in the un-shaded part of the same province as a placebo control group. Secondly, West Gojjam zone considered as treated group and Awi zone as its placebo control group. For East Wellega, the districts in the shaded part of East Wellega zone on Annex 3 are used as a placebo treated group and the districts in non-shaded part of the zone as control groups. The placebo regression results for inorganic fertilizer per hectare and crop yield are reported in Annexes 8 and 9, respectively. None of the placebo policy variables are statistically different from zero in the fertilizer use per hectare as well as yield and value of yield regressions. Hence, there is no an evidence of confounding effects in the estimates of the

land reform measure which invalidate the reported estimates in the main analysis.

4. Conclusion and Policy Implications

This study investigated the short-run relationship of the 1996/97 land redistribution in Amhara region with inorganic fertilizer use, crop yield, and value of crop yield. A difference-in-difference estimation method was employed to examine the relationships using agro-ecologically similar control group from the border sharing administrative zones of Oromia region, a region where there has not been a redistributive land reform after the 1991/92 regime change.

The first result is that the reform increased the intensity of inorganic fertilizer use (in kg/ha). Even though land was given to the poor households, they were not constrained to acquire fertilizer as there was a national level scheme to ensure farmers' access to this input on credit at a very small interest rate. The losers of the reform increased family labor effort per household land after the reform as the reform lead to smaller farmland per family size ratio. Because of the complementarities between intensity of family labor in farming and fertilizer use in raising agricultural productivity, the losers are also induced to increase the intensity of inorganic fertilizer use.

The land reform has, however, affected crop yield and value of crop yield negatively in the short-run. Since family labor and farming capability (such as the number of oxen) were not taken into consideration during the land allocation, the land ceiling on those labeled as "*bureaucrats"* and "*remnant feudal"* classes have resulted in an underuse of their resources such as family labor and oxen in the short-run.

Analysis of data from the 2014 RePEAT survey in Ethiopia also suggests that the reform has distorted the resource allocation in the affected areas in the short-run. The beneficiaries who were predominantly land poor or landless before the reform were unable to access some of the key inputs like oxen in the first few years following the reform. The losers, on the other

hand, were unable to fully utilize their oxen and family labor. For instance, about 61 percent of sample land loser households reported that the reform forced them to underutilize their oxen input and 37 percent underutilized their family labor. Moreover, some of the beneficiaries were the youth who are more likely to be less experienced in farming and this in turn might have also contributed to the decrease in crop yield in the short-run. Evidences by Khairo and Battese (2005) and Obasi *et al.,* (2013) have shown crucial role of farming experiences on agricultural productivity.

The findings suggest that access to already existing support programs such as credit and agricultural extension for poor farmers need to be improved. There are targeting problems with regard to access to credit from microfinance institutions and extension services. According Woldehanna *et al.,* (2018) loan seekers in rural Amhara need to form groups and also required to save 20% of the loan size at the microfinance institutions while the poor demand for flexible credit facilities such as individual based loans and without pre-saving requirements. Farmers also seek development agents help in selecting productive crop seeds and vegetation seedlings but the extension works are not delivering such services especially in inaccessible areas or located at long distance from woreda towns. Addressing these gaps can help to reduce the short-run falls in productivity arising from rural market imperfections and to boost the long-term gains from the redistributive land reform by lessening constraints of farmers' access to key farming inputs such as rental oxen, labor, fertilizer, and improved seeds.

Rural capacity building might also help to reduce the resource misallocations by stimulating the market for inputs in the rural areas. Review of Amhara regional land use proclamation requires contracting parties to travel to woreda towns to conclude binding land rental transactions for three or more years of contracting periods. Availing such facilities at peasant association and/or village levels also stimulates agricultural productivity by decreasing the transaction costs of land rents.

Annexes

Annex 1: The number of landholders and average farm-size in some Amhara PAs by class before the 1996/97 land redistribution in the region

	Name of PAs			
Variables	Yedaguat	Agumamit	Arbce Menfesawi	Ateta Alayta
'Bureaucrats and remnant feudals'				
Number of holders	36.00	57.00	262.00	108.00
Average Land holding Size(ha)	2.52	3.61	1.83	1.24
Medium *(mekakelegna)*				
Number of holders.	195.00	47.00	393.00	71.00
Mean land holding Size (Ha)	1.65	2.11	1.43	1.08
Average family size	-	4.74	4.76	-
Mote-Keda				
No. of died/left with no heir)	40.00		111.00	23.00
Average land holding size	0.25		0.48	0.6
Poor (chequn)				
Number of holders	337.00	130.00	609.00	325.00
Average land (ha)	1.00	0.93	0.63	0.56
Percent of holders < 1ha	53.00	43.00	74.00	80.00
percent of holders < 0.5ha	26.00	36.00	41.00	45.00
Average family size		3.81	3.64	-
Youth				
Number of holders			285.00	
Average (*ha.*) pre 96/97			0	
Average age			23.63	
Percent of women youth			25.26	
Percent of son/daughter of				
Poor households			44.00	
Medium households			31.00	
Bureaucrats & remnant feudal			25.00	

Source: Computed based on the archived records of Woredas where land redistribution was implemented.

Note: Yedaguat PA is found in EnemayWoreda/district of East Gojjam zone and it has five villages. Agumamit and Arbce-Menfesawit are both in the West Gojjam zone. Agumamit is in the JihabTenan district and has five villages whereas Arbce-Menfesawit is in the Bure Wombera district and has four villages. Ateta-Alayta PA is in the Banja district of Awi zone and has seven villages.

Annex 2: The number of landholders and average farm-size in some Amhara PAs by class after the 1996/97 land redistribution in the region

	Woynam-yetenb	Aguma mit	Ateta-Alayta			
Bureaucrats and remnant Feudal						
Number of holders	134					
Average land (ha.)	1					
Age of holder (mean)	51.9					
Percent of Female	0					
Medium						
Number of holders	89					
Average land (ha.)	2.74					
Age of holder (mean)	47.20					
Percent of Female	20					
Average land of male (ha)	2.8					
Average land of female (ha)	2.72					
Poor and Youth						
			Priority status			Youth
			1st	2nd	3rd	
Number of holders	1045	187	55	106	45	37
Average land(ha)	0.5	0.5	0.38	0.39	0.52	0.41
Average household Size			6.45	3.66	1.72	1.35
Age of holder (mean)	31.45	30.71	36.2	30.4	35.5	24.24
Percentage of female	30.7	25.6				
Average land of female (ha)	0.48	0.46				

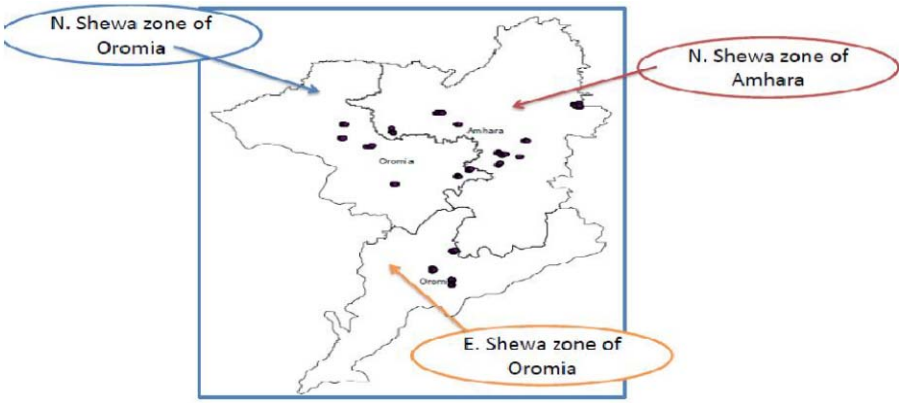
Source: Computed based on archieved records of the woredas implemented redistributive land reform inAmhara region in 1996/97.

Note: Woynam -yetenb PA is in the Enemay district of East Gojjam and has seven villages. In some of the PAs of the Awi administrative zone, large family size households get priority during the land allocation. The archived records are not put in proper order so that it is not possible to produce the summary data for before and after the reforms. For some PAs only pre-reform data is available and for others only the post reform data is available. Moreover, the officers are highly reluctant to allow the records because of the sensitivity of the data.

Annex 3: Geographical location of the study areas

Panel (A) Gojjam vs Wellega

Panel (B): North Shewa (Amhara) vs North and East Shewa (Oromia)



Source: Based on United Nations Office for the Coordination of Humanitarian Affair (UN-OCHA, 2013).

Note: The dotes in Panel (B) show the distribution of RePEAT (2014) sample households used for analyzing the transmission mechanism of the land reform.

Annex 4: The average percentage share of major cereal and legume crops in the total crop area and production volume, 1997-1999

Crop type	E.Gojjam		West Gojjam		Awi		East Wellega	
	%area	% prod.	%area	%prodn.	%area	% prod.	% area	% prod.
Cereals								
Teff	37.41	36.83	29.07	19.57	30.75	23.54	33.7	20.52
Barley	7.36	7.7	3.96	2.53	8.88	8.51	4.04	3.4
Wheat	9.38	11.74	1.74	1.4	1.48	1.12	5.47	7.06
Maize	14.43	15.51	24.09	49.73	16.66	33.78	25.41	47.95
Sorghum	5.94		3.36	3.02	3.16		11.22	8.2
Millet	5.94		14.74	12.55	21.74	22.24	5.18	4.14
Oats	0.02		0.26		0.04		0.02	
Pulses								
Horse Bean	3.84	3.45	3.04	2.45	1.42	0.82	3.88	3.11
Field Peas	1.93	1.29	2.2	1.26	1.29	0.72	1.86	0.94
Hair coat B.	1.62	1.18	1.49				0.1	
Chick Peas	3.62	5.18	1.93	1.24	0.38		0.05	
Lentils	0.07		0.07				0.07	
Vetch	7.61	5.24	2.69	0.47				

Source: Computed based on CSA's Annual Reports (1997-1999). The elements in the table are percentage shares of land area and production volume of each crop.

Annex 5: The summary statistics for intermediate inputs, irrigation, and crop yield, 1995-1999

Variables	East Wellega		West Gojjam vs. East Wellega			West Gojjam and Awi vs. East Wellega		
	Obs	Mean	Obs	MD	p-value	Obs	MD	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Before the Land Redistribution								
Inorganic total (kg/ha)	352	16.744	246	-20.2[a]	0.0000	346	-13.238	0.0000
Organic fertilizer (ha)	352	0.210	246	-0.132	0.0570	346	-0.196	0.0030
Imp. seed crop area (ha)	352	0.050	246	0.030	0.0910	346	0.030	0.0790
Pesticide applied area (ha)	352	0.027	246	0.011	0.4210	346	0.015	0.2330
Irrigated area (ha)	352	0.001	246	0.000	0.8050	346	-0.007	0.1280
Yield (100kg/ha)	241	9.69	193	-0.98	0.0900	269	-0.68	0.1860
Value of yield (Eth Birr)	125 [b]	745.01	106	-234.5	0.0000	141	-171.07	0.0040
After the Land Redistribution								
Inorganic total (kg/ha)	726	11.422	673	-10.79	0.0000	1211	-5.594	0.0000
Organic fertilizer (ha)	729	0.265	680	0.013	0.7270	1227	-0.203	0.0110
Imp. seed crop area (ha)	729	0.183	680	0.079	0.1390	1227	0.104	0.0470
Pesticide applied area (ha)	729	0.038	680	0.006	0.6940	1227	0.017	0.2270
Irrigated area (ha)	729	0.005	680	0.001	0.8320	1227	-0.025	0.0000
Crop yield (100kg/ha)b	580	9.81	537	0.28	0.4550	1001	0.81	0.0100
Value of crop yield (ETB)	291	1456.3	324	37.66	0.7760	680	100.25	0.4130

Source: Based on AGSS (1995 - 1999).

Notes: East Wellega is used as a control group whereas West Gojjam and Awi zones are the treated groups. The values of each variable are aggregated at EA level for each crop type. MD denotes the mean difference which is obtained by subtracting the average in Amhara zones from the mean in the control group (i.e., East Wellega) ***a*** - the inorganic fertilizer data of West Gojjam has some outliers for the year 1995. When values that exceed three times the standard deviations are excluded, the mean difference increased from -20 kg/ha to -10kg/ha. ***b*** - the discrepancy in the number of observations between crop yield and the value of crop yield is because of missing prices.

Annex 6: The marginal effects from the Tobit regressions for the logarithm of inorganic fertilizer (kg/ha), 1995 - 1999

VARIABLES	-1	-2	-3	-4
DAmhara*T	1.018***	0.361	0.510*	0.249***
	(2.715)	(1.064)	(1.681)	(3.385)
The proportion of male landholders	0.591	-0.948	-0.683	0.652***
	(0.793)	(-1.077)	(-0.929)	(4.429)
ln(Average hhsize)	2.451***	1.708**	1.780***	-0.059***
	(3.038)	(2.374)	(2.894)	(-8.259)
The proportion of uneducated	-1.077	-0.483	-0.611	-1.303***
landholders	(-1.206)	(-0.564)	(-0.799)	(-6.906)
The proportion of grade 1-3	2.872**	2.671**	2.967***	-1.880***
landholders	(2.21)	(2.21)	(2.864)	(-9.069)
Mono crop (=1)	0.356*	0.690***	0.619***	0.827***
	(1.818)	(4.111)	(4.306)	(4.886)
The proportion of crop plots that	-0.857	-0.771	-0.669	-0.385***
experienced shortage of rains	(-1.289)	(-1.096)	(-1.059)	(-8.717)
The proportion of crop plots that	0.597	-0.294	0.283	0.612***
experienced excessive rains	(1.607)	(-0.947)	(1.034)	(4.084)
Observations	1,384	1,984	2,616	2862
Log-likelihood	-2218	-3175	-4144	-3679

Notes: The notes in parenthesis are z-statistics computed using robust standard errors. Standard errors are clustered at an enumeration area level for each year.

*** shows significance at 1%, ** at 5%, and * at 10%. District, crop and year fixed effects are controlled in each regression.

The proportion of female landholders is the reference category for the proportion of male landholders; the proportion of grade 4 and above completed landholders is the reference group for the proportions of uneducated , and grade 1 to 3 landholder categories; mixed crop is the reference group for the mono-crop dummy; and finally the proportion of crop plots which were affected neither by shortage nor by excessive rainfall is the reference category for the proportions of crop plots affected by shortage of rainfall, and the proportion of crop plots affected by an excessive rainfall. The results in Column (1) are from the "nearby group", and in Column (2) the results obtained using the entire West Gojjam (from the affected side) and East Wellega (from the control part), the results in Column (3) are obtained using the entire West Gojjam and Awi zones (from the affected) and East Wellega zone (from the control), and the Column (4) shows the results for North Shewa (Amhara) using North and East Shewa of Oromia as a control group.

Annex 7. The OLS regression results for crop yield and value of crop yield, 1995-1999

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(yield)	Ln (vyield)	Ln (yield)	Ln (vyield)	Ln (yield	Ln (vyield)	Ln (yield)	Ln (vyield)
DAmhara*T	-0.30***	-0.363**	-0.163*	-0.414***	-0.146*	-0.387***	-0.0865	-0.209*
	(0.0977)	(0.152)	(0.0839)	(0.132)	(0.0794)	(0.125)	(0.0810)	(0.109)
Prop. Male	0.0830	0.187	0.248	-0.0343	0.189	0.132	-0.0187	0.201
holders	(0.197)	(0.262)	(0.208)	(0.341)	(0.186)	(0.283)	(0.183)	(0.238)
Ln(average	0.283	0.0403	-0.0756	-0.0346	0.0730	0.0716	0.136	-0.270
hhsize)	(0.209)	(0.290)	(0.174)	(0.282)	(0.157)	(0.213)	(0.164)	(0.225)
Prop.	-0.315	0.0318	-0.185	0.158	-0.218	-0.165	-0.67***	-0.778**
Uneducated landholders	(0.270)	(0.371)	(0.185)	(0.312)	(0.170)	(0.257)	(0.253)	(0.333)
Prop. Grade 1 to	0.0709	0.169	-0.458	0.0947	-0.202	-0.0576	-0.570*	-0.757*
3 landholders	(0.367)	(0.428)	(0.311)	(0.442)	(0.266)	(0.343)	(0.334)	(0.435)
Mon crop(=1)	0.13***	0.111	0.086**	0.158**	0.111***	0.133**	0.0763*	0.112
	(0.0450)	(0.0775)	(0.0425)	(0.0744)	(0.0357)	(0.0615)	(0.0450)	(0.0745)
the proportion of crop plots affected by major crop damages types								
Crop disease	-0.519	-1.00***	-0.275	-0.507*	-0.199	-0.412	-0.256	-0.526*
	(0.315)	(0.324)	(0.196)	(0.295)	(0.185)	(0.283)	(0.216)	(0.318)
Frost and flood	-0.373*	0.122	-0.0774	0.307	-0.0655	0.517	0.117	-0.494
	(0.213)	(0.472)	(0.245)	(0.491)	(0.233)	(0.395)	(0.295)	(0.402)
Insects and pests	0.307	0.347	-0.158	-0.571*	-0.129	-0.558**	-0.156*	0.0546
	(0.329)	(0.644)	(0.167)	(0.333)	(0.149)	(0.265)	(0.0874)	(0.176)
Shortage of rain	-0.187	-0.183	-0.270	-0.146	-0.241	-0.114	-0.50***	-0.57***

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(yield)	Ln (vyield)	Ln (yield)	Ln (vyield)	Ln (yield	Ln (vyield)	Ln (yield)	Ln (vyield)
	(0.287)	(0.437)	(0.228)	(0.369)	(0.215)	(0.344)	(0.0923)	(0.133)
Excessive rain	-0.117	-0.252	-0.289**	-0.265*	-0.205*	-0.226	-0.48***	-0.51***
	(0.146)	(0.196)	(0.114)	(0.147)	(0.109)	(0.145)	(0.106)	(0.128)
Wild Animals	0.0838	-0.450	0.158	0.280	0.133	0.114	-0.414	-0.739
	(0.288)	(0.460)	(0.156)	(0.227)	(0.174)	(0.353)	(0.412)	(0.684)
Birds	-0.956	-0.213	-0.643	0.215	-0.710	0.0750	0.0959	-0.168
	(0.693)	(2.009)	(0.530)	(0.214)	(0.495)	(0.222)	(0.242)	(0.312)
Other damages	-0.168	-0.207	-0.181*	-0.130	-0.25***	-0.214	-0.26***	-0.0603
	(0.116)	(0.189)	(0.0962)	(0.147)	(0.0817)	(0.131)	(0.0987)	(0.137)
Constant	5.80***	6.12***	6.51***	4.823***	6.309***	6.172***	7.07***	7.440***
	(0.623)	(0.677)	(0.291)	(0.797)	(0.267)	(0.495)	(0.406)	(0.567)
Observations	1,122	708	1,563	854	2,099	1,244	2,170	1,205
R-squared	0.410	0.352	0.484	0.449	0.411	0.345	0.334	0.336

Notes:

1) Figures in parenthesis are robust standard errors that are clustered at an enumeration area level for each year.
2) *** shows significance at 1%, ** at 5%, and * at 10%.
3) District, year and crop fixed effects are controlled in all the regression. The proportion of female landholders is the reference category for the proportion of male landholders; the proportion of grade 4 and above completed landholders is the reference group for the proportions of uneducated and grade 1 to 3 landholders categories; mixed crop is the reference group for the mono-crop dummy; and the proportion of crop plots with no crop damage is the reference category for the proportion of crop damage categories.
4) The results in Columns (1) & (2) are obtained from the "nearby group", and in Columns (3) & (4) the results are obtained using West Gojjam (from the affected) and East Wellega (from the control), and finally the results in Column (5) &6 are obtained using the entire West Gojjam and Awi (from the affected) and East Wellega zone (from the control), and Columns (7) and (8) shows the results for North Shewa (Amhara) using North and East Shewa of Oromia as a control group.

Annex 8: The marginal effects from the Placebo Tobit regression results for the EA level determinants of inorganic fertilizer use (kg/ha) in logarithm, 1995-1999

VARIABLES	(1) Gojjam provinces (Highlighted part of the province in Annex 3 =PTG)	(2) West Gojjam versus Awi (WGojjam=PTG)	(3) East Wellega (woredas in the highlighted part of the zone in Annex 3 =PTG
PlaceboGroup* T	0.0619	-0.779	-0.364
	(0.180)	(-1.624)	(-1.113)
Observations	2,500	1,544	1,072

Note: Gojjam province includes East Gojjam, West Gojjam, and Awi administrative zones. PTG denotes the Placebo Treated group. In parenthesis are robust standard errors that are clustered at an enumeration area level for each year.

*** shows significance at 1%, ** at 5%, and * at 10%. District, crop and year fixed effects, the proportions of male holders, average household size, the proportions of illiterate, and those through 1-3 years of school, mono-crop dummy, and the vectors of crop damage indicators are controlled but not reported to save space.

Annex 9. The placebo regression results for the EA level determinants of crop yield and value of crop yield, 1995 - 1999

VARIABLES	Gojjam provinces (Highlighted part of the province in Annex 3 =PTG)		West Gojjam versus Awi (WGojjam=PTG)		East Wellega (woredas in the highlighted part of the zone in Annex 3 =PTG	
	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(yld)	Ln(vyld)	Ln(yld)	Ln(vyld)	Ln(yld)	Ln(vyld)
PlaceboGroup*T	-0.0787	0.0142	0.0632	-0.149	0.108	0.141
	(0.0974)	(0.109)	(0.109)	(0.120)	(0.169)	(0.197)
Observations	1,286	1,286	825	825	419	419
R-squared	0.316	0.370	0.327	0.283	0.576	0.522

Notes: Gojjam province includes East Gojjam, West Gojjam, and Awi administrative zones. PTG means the Placebo Treated group. In parenthesis are robust standard errors that are clustered at an enumeration area level for each year.

*** shows significance at 1%, ** at 5%, and * at 10%. District, crop and year fixed effects, the proportions of male holders, average household size, the proportions of illiterate, and those through 1-3 years of school, mono-crop dummy, and the vectors of crop damage indicators are controlled but not reported to save space.

Acknowledgments

This manuscript is extracted from the corresponding author's PhD. dissertation entitled Essays on the effects of land redistribution, agricultural extension, and social learning on technology adoption and agricultural productivity in Ethiopia. This work was supported by MEXT (Ministry of Education, Culture, Sports, Science and Technology) JSPS KANENHI Grant Number 25101002. We would like to thank Professor Keijiro Otsuka (GRIPS), Professor Chikako Yamauchi (GRIPS), and Professor Yoko Kijima (Tskuba University) for their helpful comments and suggestions. Habtamu Neda (Colombia University) and Kasim Ggombe (GRIPS) helped in editing this draft. All errors are ours.

Notes

[1] Studies on other topics related to the reform include: Ali *et al*. (2015) found negative effect of the reform on fertility rate; Ege (1997) studied the state vs farmer relations from the view point of the farmers during the reform. Gelaye (1999), on the other hand, documented the poets and poetries related to the reform.

2 The agro-ecologies of East Gojjam is relatively dissimilar in terms of the major type of crops area coverage and production share than the control groups. Thus, only the districts of this zone which are closer to East Wellega (control group) are used in the analysis.

3 According to CSA definition, an EA is an area containing 150-200 households; and agricultural household refers to households that have at least one member that engages in crop cultivation or rearing livestock.

4 RePEAT Stands for Research on Poverty, Environment, and Agriculture Technologies. This survey was conducted three times in Ethiopia between 2004 and 2014 by the research team in the National Graduate Institute for Policy Studies (GRIPS) in collaboration with International Livestock Research Institute (ILRI) in 2004 and 2006 and with Ethiopian Development Research Institute (EDRI) in 2014.

5The data for crop area under HYV seeds, organic fertilizer, and irrigation have excessive number of zeros and hence the results are not reported because the estimates are less precise and unstable.

References

Ali, D. A., Deininger, K., and Kemper, N. 2015. Pro-natal Property Rights Over Land and Fertility Outcomes: Evidence from a Natural Experiment in Ethiopia. The World Bank.

Askale, T. 2005. Land Registration and Women's Land Rights in Amhara Region, Ethiopia. Securing Land Rights in Africa. International Institute for Environment and Development, Research Report 4, London.

Benin, S. 2006. Policies and Programs Affecting Land Management Practices, Input Use, Productivity in the Highlands of Amhara Region, Ethiopia. In: John Pender, Frank Place, and Simeon Ehu (Eds), *Strategies for sustainable land management in the East African Highlands*, 217-256. IFPRI, Washington DC.

Benin, S., and Pender, J. 2001. Impacts of Land redistribution on Land Management and Productivity in the Ethiopian highlands. *Land Degradation & Development*, *12*(6): 555-568.

Besley, T., and Burgess, R. 2000. Land Reform, Poverty Reduction and Growth: Evidence from India. *Quarterly Journal of Economics*, *115*(2): 389-430.

Bezabih, M., Holden, S., and Mannberg, A. 2016. The role of land certification in reducing gaps in productivity between male-and female-owned farms in rural Ethiopia. *The Journal of Development Studies*, *52*(3): 360-376.

Central Statistical Authority of Ethiopia (CSA). 1995, 1996, 1997, 1998, and 1999. Annual Agricultural Sample Survey (database).www.csa.gov.et.

Chang, H. J. 2009. Rethinking public policy in agriculture: lessons from history, distant and recent. *The Journal of Peasant Studies*, *36*(3): 477-515.

Cornia, G. A. 1985. Farm Size, Land Yields and the Agricultural Production Function: An Analysis for Fifteen Developing Countries. *World Development*, 13 (4): 513-534.

Deininger, K., Jin, S., and Yadav, V. 2008. Impact of Land Reform on Productivity, Land Value and Human Capital Investment: Household Level Evidence from West Bengal. In A*nnual meeting of the American Agricultural Economics Association, Orlando, FL.*

Deininger, K., and Jin, S. 2006. Tenure Security and Land-Related Investment: Evidence from Ethiopia. *European Economic Review*, *50*(5): 1245-1277.

D'Haultfoeuille, X., Hoderlein, S., and Sasaki, Y. 2013. Nonlinear difference-indifferences in repeated cross sections with continuous treatments (No. CWP40/13). cemmap working paper, Centre for Microdata Methods and Practice.

Endale, K. 2015. 'Essays on the Effects of Land Redistribution, Agricultural Extension, and Social Learning on Technology Adoption and Agricultural

Productivity in Ethiopia.' PhD Dissertation, National Graduate Institute for Policy Studies (GRIPS), Tokyo, Japan.

Ege, S.1997. The Promised Land: The Amhara Land Redistribution of 1997. Working Papers on Ethiopian Development No.12. Norwegian University of Trondheim.

Gelaye, G. 1999. Peasant Poetics and State Discourse in Ethiopia: Amharic Oral Poetry as a Response to the 1996-97 Land Redistribution Policy. *Northeast African Studies*, *6*(1): 171-206.

Gebremedhin, B., and Swinton, S .2003. Investment in soil conservation in northern Ethiopia: the role of land tenure security and public programs. *Agricultural economics*, *29*(1): 69-84.

Hagos, H.G., and S. Holden. 2014. Efficiency and productivity differential effects of the land certification program in Ethiopia: Quasi-experimental evidence from Tigray. ESSP Working Paper 64, Addis Ababa, Ethiopia.

Heckman, J., and Robb, Jr. 1985. Alternative Methods for Evaluating the Impact of Interventions (An Overview). *Journal of Econometrics* 30 (1): 239-267.

Imbens, G. M., and Wooldridge, J. M. 2008. Recent developments in the econometrics of program evaluation: *Working Paper Series* No. 14251. NBER.

Khairo, S. A., and Battese, G. E. (2005). A study of technical inefficiencies of maize farmers within and outside the new agricultural extension program in the Harari region of Ethiopia. *South African Journal of Agricultural Extension*, Vol. 34 (1): 136-150.

Lee , D. S. and Lemieux, T. 2010. Regression Discontinuity Designs in Economics. *Journal of* Economic Literature vol. 48: 281–355

Matsumoto, T and Yamano, T. 2010. The Impacts of Fertilizer Credit on Crop Production and Income in Ethiopia. National Graduate Institute for Policy Studies (GRIPS). GRIPS Policy Research Center, Discussion Paper: 10-23

Melesse, M. B., and Bulte, E. 2015. Does land registration and certification boost farm productivity? Evidence from Ethiopia. *Agricultural Economics*, *46*(6): 757-768.

Obasi, P., Henri-Ukoha, A., S. Ukewuihe, I., & M. Chidiebere-Mark, N. 2013. Factors Affecting Agricultural Productivity among Arable Crop Farmers in Imo State, Nigeria. *Journal of Experimental Agriculture International*, *3*(2): 443-454.

Tsegaye, A., Adgo, E., and Selassie, Y. G. 2012. Impact of land certification on sustainable land resource management in Dryland Areas of Eastern Amhara Region, Ethiopia. *Journal of Agricultural Science*, *4*(12), 261-268.

Woldehanna, T., Gebreegziabher, T., Endale, K. 2018. A Review of Rural Employment Creation Programs in Ethiopia with Emphasis on Self-Employment program. A Study prepared for the World Bank and Irish Aid.