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Land Reform, Distribution of Land and Institutions in Rural Ethiopia: Analysis of Inequality with Dirty Data[1]

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Abstract

There are two either explicitly or implicitly and widely accepted ideas about the distribution of land in Ethiopia after the reform of 1975. First, land distribution in rural Ethiopia is highly equitable, for example compared to other African countries where private ownership exists. Second, the land distribution pattern currently observed is basically explained by what happened after the reform; hence, pre-reform tenures do not help us understand post-reform land distribution. This paper questions both these ideas. Using formal inequality indexes and a methodology that explicitly considers measurement errors, the empirical results indicate that both inter- and intra-regional inequalities are high; inequality in the distribution of land is as high as or even higher than other African countries. The paper also argues that the post-reform distribution is likely influenced by pre-reform distribution and calls for a more detailed historical analysis that attempts to understand the link between old tenure structures and land distribution after the land reform.

1. Introduction

The dependence of a significant proportion of the world's poor on the agricultural sector makes the distribution of land in rural areas an important issue for poverty alleviation. In particular, the access of low income rural households to adequate amount of land is crucial in sustaining their livelihoods. In recognition of this, many countries have undertaken land reform programmes to improve the access of households to land as well as decrease inequality in rural areas. The outcome of many land reform programmes was mixed.

Ethiopia is one of the countries that undertook a land reform programme as part of a larger radical socio-political and economic revolution. In September 1974 Emperor Haile Selassie was overthrown in a military coup that brought an end to a very old dynasty that claimed to descend from the biblical King Solomon. The overthrow of the emperor was followed by a series of measures that changed the political and

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economic landscape of the country from a 'feudal' system towards 'socialism'. Among the many radical measures[2], the land reform proclamation of February 1975 nationalised all rural land. The heterogeneous and age-old land tenure of the imperial period was replaced by a system where all land is owned by the state and given to farmers on use-right (usufruct) basis. Commercial large-scale modern farms were turned into state farms. Peasant associations (PAs) were set up on approximately 800 hectares to allocate land to farmers living in their jurisdiction according to family size. The allocation of land by the PAs includes not only the initial distribution after the land reform proclamation but also further distributions and re-distributions done at various frequencies. After their establishment, PAs effectively functioned as local governments radically transforming the political administration of rural areas from that of the imperial regime dominated by the nobility.

The truly radical nature of the land reform programme and the other economic measures after the revolution of 1974 have created a widespread belief not only among politicians but also researchers that the distribution of land in rural Ethiopia is highly equitable, for example, more equitable than other African countries with private and traditional forms of land ownership. The following quotation from a government document illustrates this:

> "The low level of [income] inequality is consistent with the overall picture of Ethiopia as a very poor country, with a low per capita income. In addition, *the egalitarian land holding system* might have contributed to a more equal income distribution in rural Ethiopia." (FDRE, 2002; italics mine)

Even though the above quotation is taken from a government document, it also reflects a widely held view among researchers of rural development in Ethiopia. The following quotation from a paper by one of the leading Ethiopian researchers on rural development reflects this fact.

> "This paper is an attempt to argue, in broad terms, that *the social homogeneity* in rural Ethiopia today, which is in large measure *a consequence of the land system*, is an inhibiting factor for agrarian development." (D. Rahmato, 2005; italics mine)

Rahmato is discussing social homogeneity, a concept that covers more than only land inequality. But the belief that land is distributed in a more equitable manner in Ethiopia is one of the likely reasons for believing in the existence of social homogeneity.

The widespread consensus that land is distributed equitably has partly influenced the nature of the debate on land policy in Ethiopia. For example, most of the debate focuses on other issues like security of tenure. The possible increase in inequality is given as an argument against privatisation of land with the implicit understanding that inequality can only go higher.

[2] In addition to the land reform programme some of the radical and large-scale changes that were introduced after the revolution of 1974 include: nationalisation of all medium and large-scale manufacturing enterprises, banks, insurance and other modern financial institutions; nationalisation of urban land and additional houses than the house families live in; huge villagisation programme that moved millions of people from dispersed settlements to nucleated and centrally planned villages; re-settlement programmes and limited collectivisation of agriculture.

A second widely – either implicitly or explicitly – held view is that the current distribution of land in different localities has no link with pre-reform land tenures. Studies on the current distribution of land focus on changes that happened after the land reform and don't question if the current patterns are at least partially influenced by older tenure systems. That the land reform programme has created a clean break between the current and older tenure systems is a widely accepted viewpoint.

This paper questions the above described two widely accepted views: Is rural land distribution in Ethiopia highly equitable as generally accepted? Is there a link between current land distribution patterns and pre-reform tenures? The first question is addressed by using a methodology that uses formal measures of inequality with 'dirty data'. Properly addressing the second question requires detailed information on pre-reform land tenures and the process of land allocation after the reform; this is beyond the scope of this paper. But some supporting evidence and general discussions on the link between pre-and post-reform land distributions are given.

The following are the main conclusions. Rural land distribution in Ethiopia is not as equitable as generally accepted; it is as inequitable as, if not more inequitable, some other African countries with private ownership and land markets. In addition, it seems inequality in post-reform land distribution is at least partly explained by pre-reform land tenures.

The paper is structured in the following way. Section 2 presents sources of data and some descriptive results. The methodology is described in Section 3. While Section 4 presents the main results on the inequality measures, Section 5 discusses the possible link between pre- and post-reform land distribution. Section 6 gives the conclusions.

2. Data and general patterns of land distribution

This study uses data from the Ethiopia Rural Household Surveys (ERHS) conducted by the Department of Economics of Addis Ababa University, the Centre for the Study of African Economies (CSAE) of Oxford University and the International Food Policy Research Institute (IFPRI). The surveys covered around 1500 households in fifteen different villages (peasant associations) dispersed over the main settled agricultural areas of Ethiopia; the surveys are longitudinal and attrition rates are relatively low. So far, the ERHS has been conducted for six rounds excluding the initial limited survey done by IFPRI in 1989; three rounds in 1994-5, one round each in 1997, 1999 and 2004. This paper uses the data from the two rounds of 1995 and 1997, twenty years after the land reform proclamation.

As indicated in the introductory part, all rural land in Ethiopia is owned by the state allocated to farmers on a use right basis. Hence, land allocation by the peasant associations (PAs) is the main means through which households get access to land; but it is not the only means. In addition to the allocation by PAs, households can rent in land either in the form of fixed rent or sharecropping; they can also borrow and get land as gift. Most of the land used by households is allocated by PAs. This paper

looks at distribution of land allocated by PAs which accounts for the overwhelming majority of land cultivated by households.[3]

The distribution of PA allocated land can be examined at different levels: total household, per capita or per adult land holdings. This paper looks at all the three. Examining the different levels is important as demographic compositions of households vary.

Analysis of the distribution of land is complicated by differences in the quality of land. If PAs allocated land by strictly taking into account quality, land size figures will be misleading; smaller size plots are consistently of better quality than larger size plots and the difference in size distribution would systematically ignore this quality difference that compensates for size. If PAs have consistently considered quality of land in their allocations, one should observe strong systematic correlation between land size and land quality indicators. To examine if the land holdings of households are systematically related to quality measures, the land holdings of households are regressed on quality indicators by controlling for village level effects (**Table 1**).

Table 1: Village level fixed effects regressions of PA allocated land on measures of land quality

Variable	Coefficient	Std. error	t	P>|t|	95% c.i.
Household size	0.1246	0.0121	10.35	0.000	0.1010-0.1482
Perleum	0.1493	0.0911	1.64	0.101	-0.0293-0.3280
Permedda	-0.1678	0.1017	-1.65	0.099	-0.3671-0.0316
Constant	1.0670	0.1112	9.56	0.000	0.8483-1.2857
Sigma_u	1.0594				
Sigma_e	1.6900				
rho	0.2845				

Number of observations = 2620; Number of groups = 15; R-sq: within = 0.0413; between = 0.0576; overall = 0.0117; F(3,2602) = 37.38; Prob > F = 0.0000; corr(u_i, Xb) = -0.1286; F test that all u_i=0: F(14, 2602) = 82.82; Prob > F = 0.0000

	Coefficient	Std. error	t	P>|t|	95% c.i.
Household size	0.1253	0.0120	10.40	0.000	0.1017-0.1489
Perteuf	-0.0499	0.1180	-0.42	0.672	-0.2813-0.1814
Perdaget	0.1291	0.1005	1.29	0.199	-0.0679-0.3261
Constant	0.9991	0.0861	11.62	0.000	0.8308-1.1686
Sigma_u	1.0625				
Sigma_e	1.6809				
Rho	0.2855				

Number of observations = 2620; Number of groups = 15; R-sq: within = 0.0403; between = 0.0753; overall = 0.0115; F(3,2602) = 36.45; Prob > F = 0.0000; corr(u_i, Xb) = -0.1245 ;F test that all u_i=0: F(14, 2602) = 84.45; Prob > F = 0.0000

Soil quality in rural Ethiopia is roughly categorised into *leum, leum-teuf* and *teuf* (fertile, semi-fertile and infertile). The variables designated as 'perleum' and 'perteuf' in the regressions represent the percentages of household land categorised as

[3] Kebede (2004) indicates that the rental market –fixed rent and sharecropping –has an equalising effect, i.e., inequality of PA allocated land is higher than that of inequality of cultivated land the difference between the two mainly being rented land.

'leum' and 'teuf' respectively. Another aspect of land quality is its slope. The slope in most areas is classified into three: *medda*, *dagethema* and *gedel* (flat, gentle slope and steep slope). In the regressions, *permedda* and *perdaget* represent the percentages of household land classified as *medda* and *dagethema*. Since these measures of land quality are strongly correlated with village level characteristics, the regressions control for village level fixed effects.

The regression results in **Table 1** indicate that there are no strong statistically significant correlations between total land holdings of households and land quality measures; all the coefficients on the quality measures are not significant at conventional levels.[4] These results indicate that an analysis of inequality that takes total household land holdings will not be systematically biased due to quality differences.

Table 2 presents the mean, median, 1, 5, 95 and 99 percentiles of PA allocated land by all households. The figures in the table clearly show that land holding by the average household is very small. For example, the median land size of a household is only 1 hectare dropping to 0.19 in per capita terms. In addition, while more than 5% of the households are landless, only 5% of the households have more than 5.5 hectares of land.[5]

Table 2: Mean, median and percentiles of PA allocated land for all households

Summary statistics	PA allocated land (ha.)		
	Total	Per capita	Per adult
Mean	1.688	0.335	0.586
Median	1.000	0.188	0.313
1%	0.000	0.000	0.000
5%	0.000	0.000	0.000
95%	5.500	1.125	2 .000
99%	9.688	2.125	4 .000

The average figures reported in **Table 2** conceal variations between villages. To see the differences between the average land holdings of households in the different villages, while **Table 3** reports the mean and median PA allocated land by villages, **Figure 1** presents the corresponding histograms.

These descriptive results illustrate both the significant inter- as well as intra-village variations in the distribution of land. For example, the mean household land size in Debre Berhan – with the largest mean – is more than ten times that of Geblen (the smallest). These differences become even more pronounced for per capita and per adult figures. In addition to these significant inter-village variations, the histograms

[4] If quality of land is strictly taken into account by PAs when allocating land, in the regressions we would have got negative and significant coefficients for indicators of high quality land (*perleum* and *permedda*) and positive and significant coefficients for indicators of poor quality land (*perteuf* and *perdaget*). While the proportions of poor quality land – *perteuf* and *perdaget* – are totally insignificant that for good land become significant at around 10%; but note that the coefficient for *perleum* is with the wrong sign.

[5] The land reform proclamation prohibits households to own more than 10 hectares of land; but there are a few households in the sample with more than 10 ha.

for the villages indicate significant variations. The histograms also illustrate that the pattern of distribution between villages is significantly different from each other.[6]

Table 3: Mean and median PA allocated land by survey villages (in hectares)

Village	Total		Per capita		Per adult	
	Mean	Median	Mean	Median	Mean	Median
Haresaw	0.58	0.50	0.19	0.10	0.35	0.17
Geblen	0.38	0.25	0.07	0.05	0.16	0.13
Dinki	1.21	1.25	0.31	0.25	0.47	0.45
Debre Berhan	3.85	3.50	0.80	0.67	1.53	1.25
Yetmen	1.81	1.46	0.40	0.31	0.70	0.57
Shumsheha	1.48	1.25	0.34	0.28	0.61	0.50
Sirbana Godeti	1.41	1.50	0.24	0.22	0.41	0.35
Adele Keke	1.42	1.25	0.28	0.21	0.49	0.38
Korodegaga	3.33	3.25	0.60	0.50	0.96	0.81
Terufe Kechema	1.20	1.00	0.18	0.15	0.27	0.22
Imdibir	0.48	0.15	0.08	0.02	0.11	0.03
Aze Deboa	0.86	0.73	0.12	0.09	0.22	0.15
Adado	1.34	0.48	0.23	0.10	0.46	0.17
Gara Godo	0.79	0.50	0.11	0.08	0.17	0.13
Domaa	2.42	2.10	0.52	0.41	0.81	0.74

The above descriptive results cast a shadow of doubt on the widely accepted view that land distribution in rural Ethiopia is highly equitable. To more deeply examine the issue, formal measures of inequality are required. A more appropriate methodology should take into account the effect of measurement errors on the formal indexes of inequality. The next section outlines the methodology used in this paper that explicitly considers measurement errors.

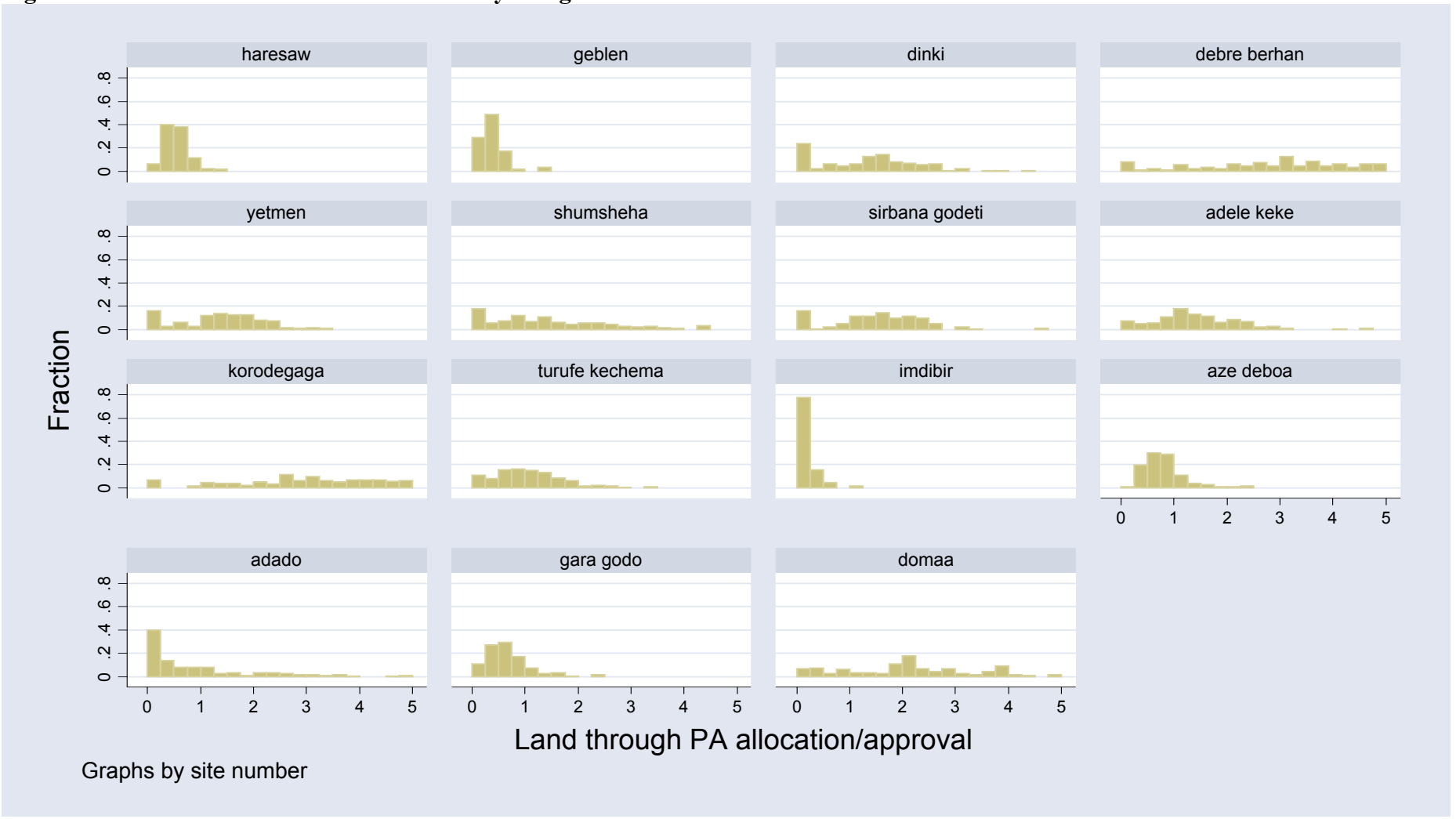
3. Methodology

The relevance and accuracy of any empirical analysis is obviously dependent on quality of data. Evidently, if there are reasons to believe that the available data – in our case land size of households – are completely unreliable one should not use them. Since average land size figures from the data set compare well with figures from other sources[7] there is no apparent reason to make us believe that the data are completely unreliable.

[6] Histograms for per capita and per adult land holdings of villages are also very different from each other.

[7] For example, the mean per household and per capita land reported in Jayne, et al. (2003) that used nationally representative data are respectively 1.17 and 0.24 ha; the corresponding figures for PA allocated land in the data set used here are 1.69 and 0.34 ha. The figures are also similar to other studies; for example, see Amare (1994)

Figure 1: Total household PA allocated land by villages



Unfortunately, the overall reliability of the data alone is not sufficient for the computation of appropriate formal indices of inequality because most inequality indices are sensitive to even minor contamination. The contamination of data can be either in the form of data errors during collection, coding and transcribing or inaccurate reporting (over- or under-reporting) or it could also be due to true outliers – observations with high leverage.

This paper uses the methodology suggested by Cowell and Victoria-Feser (2002) to handle the measurement of inequality using dirty data. The main ideas are summarised in the following paragraphs.

Let X be a random variable with probability distribution F; X is income in the case of income distribution and PA allocated land size in our case. Consider an elementary distribution $H^{(z)}$ with a unit point mass at z and zero mass elsewhere:

$$H^{(z)} = \iota(x \geq z), \qquad \text{..... (1)}$$

where ι is the indicator function ι(D) = {1 if D is true, 0 otherwise}. Suppose there is a small amount of undetectable contamination at z in the income (land) distribution. The distribution observed is no more the true distribution F but a mixture distribution containing the true distribution and the contamination.

$$F_{\varepsilon}^{(z)}(x) = (1-\varepsilon)F(x) + \varepsilon H^{(z)}(x) \qquad \text{..... (2)}$$

The parameter ε represents the importance of the contamination relative to the true distribution; an observation from the contaminated data $F_{\varepsilon}^{(z)}(x)$ has probability of (1 - ε) being generated by F and probability of ε being equal to z (the error). If the contamination of the data is large relative to the true data – i.e., ε is near 1 – one shouldn't expect to do any reasonable analysis by using the data. But one should also be concerned if the inequality measures are not robust for relatively minor contamination. The robustness of inequality measures for minor contamination can be made more precise by using the idea of *influence function*. To identify the effect of minor contamination, the influence function is generated by taking the derivative of the observed distribution, $F_{\varepsilon}^{(z)}$, when $\varepsilon \rightarrow 0$. For any measure of inequality T, the influence function is given as

$$IF(z;T,F) = \frac{\partial T}{\partial \varepsilon}(F_{\varepsilon}^{(z)})\Big|_{\varepsilon \to 0} \qquad \text{..... (3)}$$

The *IF* measures the effect of an infinitesimal amount of contamination at point z on the inequality measure T. If the *IF* is unbounded for some z the inequality measure T is non-robust to the data contamination.

Cowell and Flachaire (2002) and Cowell and Litchfield (1999) show that contamination at the tails of the distribution rather than elsewhere are more likely to significantly influence the values of the inequality index. Hence, an analysis of inequality with contaminated data must examine how much sensitive the index is to the inclusion and exclusion of outliers. Trimming the distribution at different levels on either one or both sides and re-calculating the inequality index to see its robustness is one of the practical ways to overcome the problem. In general, inequality measures are more sensitivity to data at high and low levels (more at high than low levels), while middle level values have only small influence. In addition, the influence on different inequality measures also varies (Cowell and Victoria-Feser, 2002).

The next section summarises the main results from the analysis that used the methodology outlined above.

4. Inequality in the distribution of land: Empirical results

A cursory look at the box-and-whiskers plots (see **Figure 2**) for total, per capita and per adult PA allocated land show some values – on the upper end – outside the adjacent lines ('whiskers'); given the discussion in the methodology section, if there are influential observations, these are likely to be the ones. Another important feature of the plots is that because land size is bounded by zero from below and most land sizes are small (near zero) there are no significant outliers on the lower end of the distributions.[8]

Disaggregating the data into village level plots also give a similar picture (see **Figure 3** for the box-and-whiskers plot for total PA allocated land by survey villages). The few outliers in the village distribution are more starkly illustrated in these plots.[9]

In this paper the Gini coefficient and four versions of the Generalised Entropy (GE) index are computed for total, per capital and per adult PA allocated land; the four GE indexes are the Theil index (with $\alpha = 1$), mean log deviation ($\alpha = 0$), entropy index ($\alpha = -1$) and half of the coefficient of variance ($\alpha = 2$). First, the whole data are used to compute the five indexes. Then, the same indexes are re-computed after trimming the distribution in the following ways:

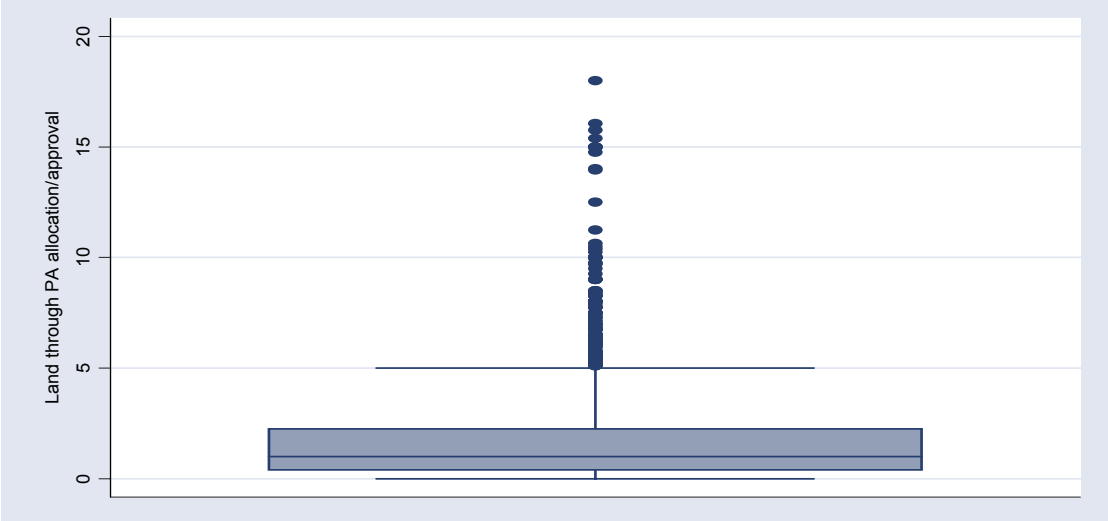
1. trimming 1% from the top
2. trimming 5% from the top
3. trimming 1% from both top and bottom
4. trimming 5% from both top and bottom
5. trimming 10% from both top and bottom and
6. dropping zeros (landless).

[8] Other graphical representations of distributions like Penn's parade of dwarfs and few giants in addition to box-and-whiskers plots also show a similar picture.

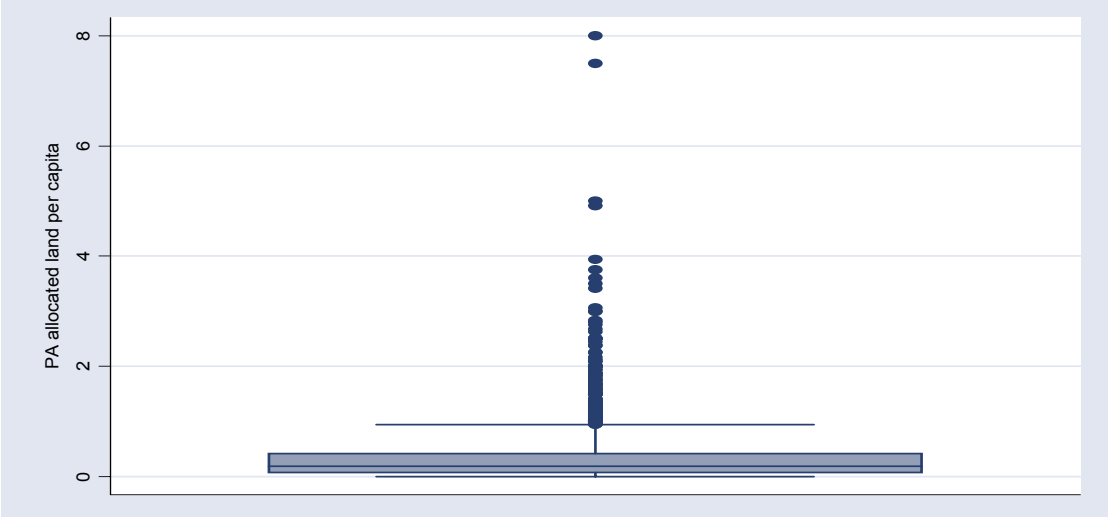
[9] In addition to the potential significant outliers, the positions of the box-and-whiskers plots for each village indicate significant inter-regional variation which was brought out by the village-level histograms presented in Section 2.

Figure 2: Box-and-Whisker plots for total, per capita and per adult PA allocated land

(2.1) Total PA allocated land



(2.2) Per capita PA allocated land



(2.3) Per adult PA allocated land

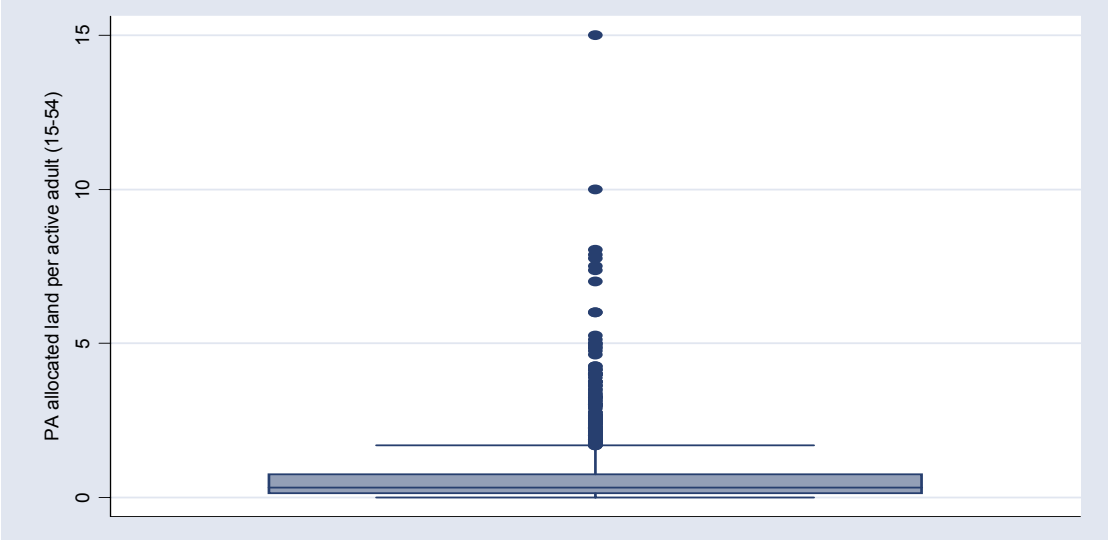
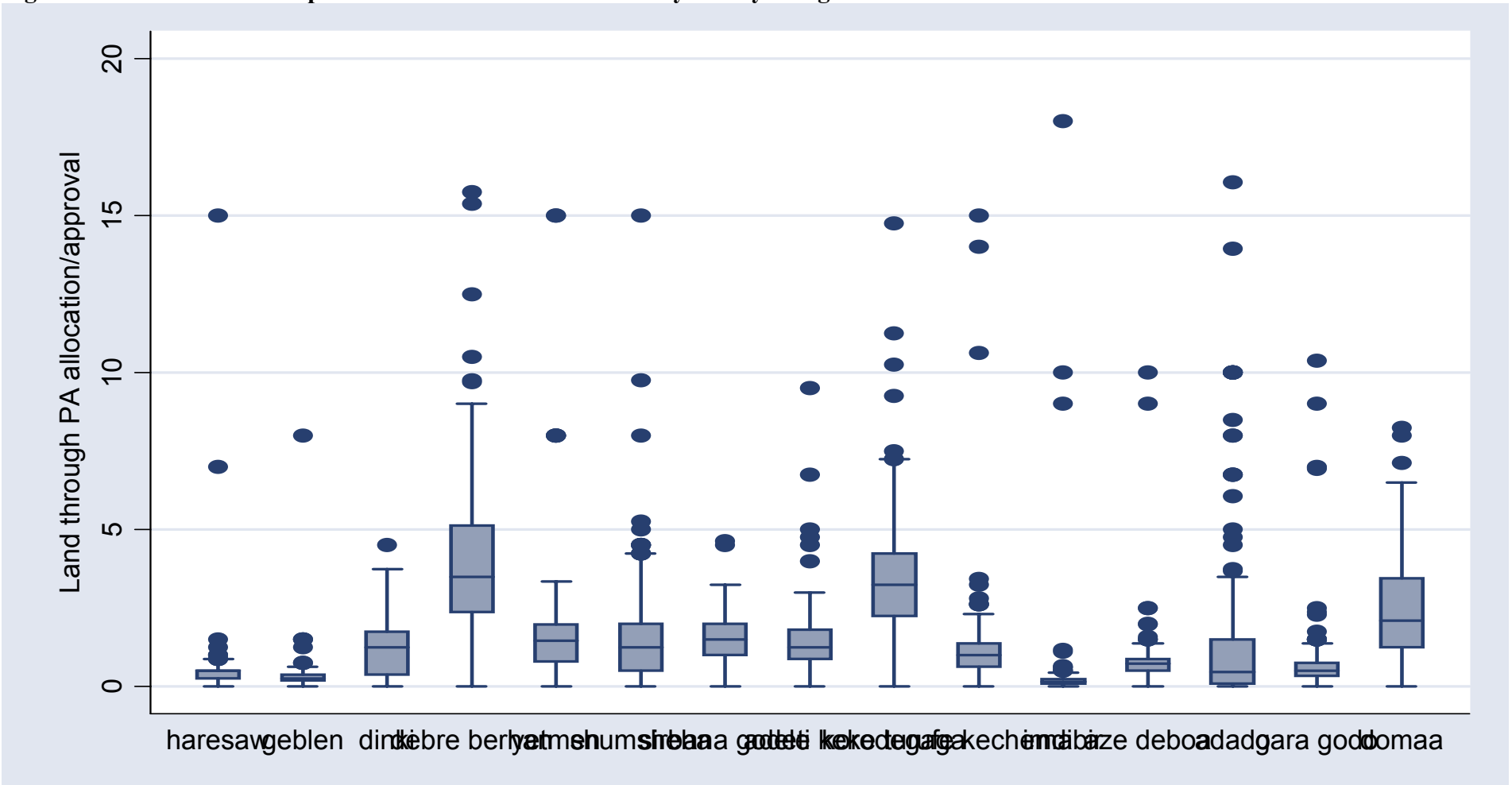


Figure 3: Box-and-Whisker plots for total PA allocated land by survey village



The inequality indexes for total, per capital and per adult PA allocated land with or without trimming are given in **Table 4**.

Table 4: **Inequality measures with and without trimming land distribution**

	Gini coefficient	GE(α=1)	GE(α=0)	GE(α= -1)	GE(α=2)
		Total PA allocated land			
All data	0.5585	0.4717	0.6017	12.0408	0.6215
1% from top	**0.5391**	**0.4198**	**0.5626**	**11.3570**	**0.4899**
5% from top	**0.5068**	**0.3530**	**0.4987**	**10.1209**	**0.3709**
1% from both	0.5004	0.4198	0.5626	11.3570	0.4899
5% from both	0.4635	0.3530	0.4987	10.1209	0.3709
10% from both	0.4193	0.2841	0.3623	0.6825	0.2863
dropping 0s	0.5218	0.4717	0.6017	12.0408	0.6215
		Per capita PA allocated land			
All data	0.5871	0.5574	0.6701	13.9124	0.9084
1% from top	**0.5578**	**0.4596**	**0.6066**	**12.7514**	**0.5610**
5% from top	**0.5222**	**0.3802**	**0.5318**	**11.1878**	**0.4104**
1% from both	0.5207	0.4597	0.6066	12.7514	0.5610
5% from both	0.4802	0.3802	0.5318	11.1878	0.4104
10% from both	0.4363	0.3080	0.3916	0.7630	0.3178
dropping 0s	0.5529	0.5574	0.6701	13.9124	0.9084
		Per adult PA allocated land			
All data	0.5957	0.5826	0.6888	8.3176	0.9572
1% from top	**0.5635**	**0.4763**	**0.6172**	**7.5134**	**0.5942**
5% from top	**0.5230**	**0.3839**	**0.5319**	**6.4667**	**0.4115**
1% from both	0.5285	0.4763	0.6172	7.5134	0.5942
5% from both	0.4829	0.3839	0.5319	6.4667	0.4115
10% from both	0.4392	0.3116	0.3924	0.7370	0.3206
dropping 0s	0.5637	0.5826	0.6888	8.3176	0.9572

Note: GE(α=1) =Theil index; GE(α=0) = Mean log deviation; GE(α= -1) = Entropy index; GE(α=2) =Half coefficient of variance

For distribution of land, trimming only from above is a more appropriate procedure. In the case of income distribution, very low levels of income (or zero incomes) can be treated as errors of data collection as a minimum level is required for survival. For land distribution, zero values represent the landless, a real and important phenomenon. Hence, our preferred estimates are those from distributions trimmed from above.

Similar to the results of Cowell and Flachaire (2002), the Gini coefficient is generally more robust compared to the Generalised Entropy indexes. To illustrate this finding, the decreases in the inequality indexes for different levels of trimming (influence functions) are given in **Figure 4**; the bars indicate by what percentage the indexes decrease compared to the case where the whole data are used. As can be seen from the graph, for total, per capita and per adult land size the Gini coefficient is almost always more robust for different levels trimming.[10] Even after dropping 20% of the

[10] Zero values are dropped in the computation of the Generalised Entropy indexes; this is the reason why when zeros are dropped the indexes do not decrease while the Gini coefficients do. The fact that Gini coefficient considers zero values while the others don't is another reason for preferring the former.

data with 10% trimming from both sides, the Gini coefficient falls by only around 25%.

The figures in **Table 4** clearly indicate that even after handling influential observations, the inequality measure are still relatively high. Gini coefficients range from 42%-56% for total, 44%-59% for per capita and 44%-60% for per adult land holdings; even in the cases where 20% of the data in trimmed, the Gini coefficients are more than 40%. Comparing our results with some estimates of Gini coefficients for African countries illustrates the point. **Table 5** presents the Gini coefficients for Ethiopia and other four African countries for smallholder farms done by another study; these coefficients are computed without trimming the data implying the figures would be lower if trimmed. The Gini coefficient for total land for Ethiopia computed by the study is equal to our estimates without trimming; this indicates that data used here compare well with nationally representative data. Secondly, the coefficients computed here even after trimming the data are either comparable to or higher than the coefficients for the other African countries. Note that these other African countries have much more developed land markets and private ownership in land as compared to Ethiopia where land is in the hands of the state. These results are in strong contrast to the dominant view that inequality of land in Ethiopia is very low.

Table 5: Gini coefficients of smallholder land distribution in selected African countries

Country	Land per household	Land per capita	Land per adult
Kenya	0.55	0.56	0.54
Ethiopia	0.55	0.55	0.55
Rwanda 1990	0.43	0.43	0.41
Rwanda 2000	0.52	0.54	0.54
Zambia	0.44	0.50	0.51
Mozambique	0.45	0.51	0.48

The same procedure of trimming the distribution and computing the inequality indexes is also done on village levels; **Table 6** presents the results for each sample village for total household land holdings. As expected, intra-village inequality is more sensitive to the treatment; this is partly due to lower number of observations. But still significant levels of intra-village inequality exist after the treatment. For example, with 5% trimming from top, the Gini coefficients range from 23%-62% indicating relatively high intra-village inequality in at least some villages.

The village level Gini coefficients imply large variations in inequality between different regions of the country. Inequality indices are summary measures indicating average conditions, hence looking at the whole distribution is important. To do that **Figure 5** presents the Lorenz curves for each village with 5% trim from the top. As the figures illustrate, the Lorenz curves of some villages clearly dominate others indicating first order stochastic dominance; this implies, inequality in some villages are definitely higher than in other villages.

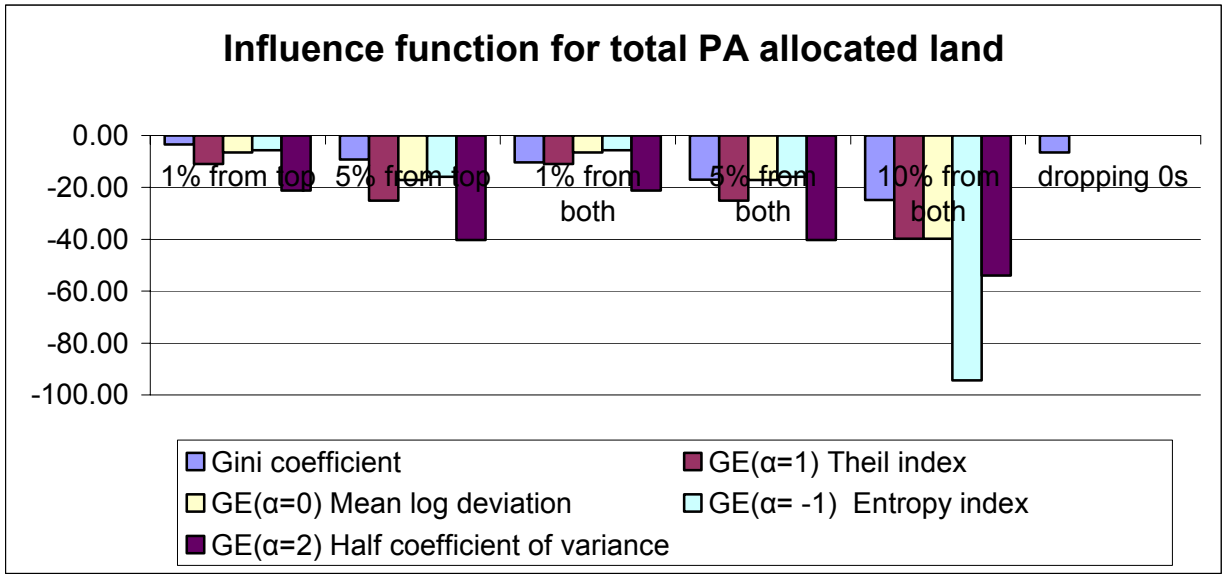
Table 6: Gini coefficients for total land household land holdings with and without trimming land distribution for survey villages

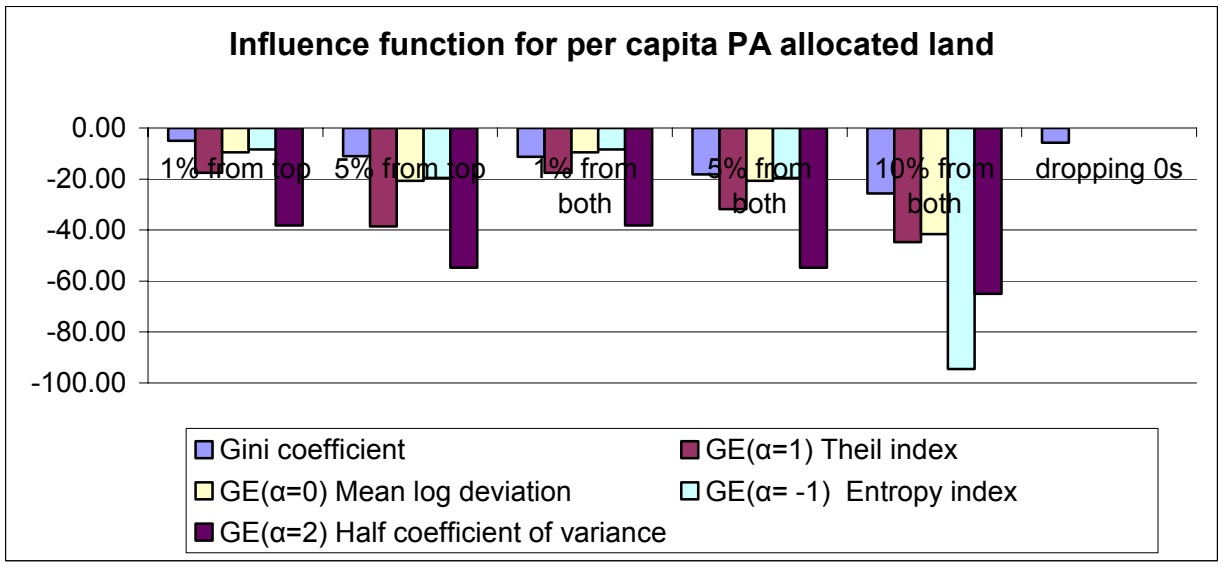
Village name	All data	**1% from top**	**5% from top**	1% from both	5% from both	10% from both	dropping 0s
Haresaw	0.4340	**0.2796**	**0.2510**	0.2504	0.2061	0.0756	0.4171
Geblen	0.4704	**0.3323**	**0.3097**	0.2737	0.2475	0.1013	0.4255
Dinki	0.4289	**0.4221**	**0.4205**	0.2418	0.2132	0.2132	0.2535
Debre berhan	0.3396	**0.3274**	**0.3125**	0.2856	0.2671	0.2132	0.2991
Yetmen	0.4745	**0.4144**	**0.3428**	0.3642	0.2842	0.2454	0.4303
Shumsheha	0.4954	**0.4669**	**0.4495**	0.3712	0.3456	0.3276	0.4061
Sirbana godeti	0.3394	**0.3305**	**0.3247**	0.2017	0.1869	0.1776	0.2140
Adele keke	0.3644	**0.3376**	**0.3046**	0.2872	0.2481	0.2112	0.3166
Korodegaga	0.2989	**0.2799**	**0.2640**	0.2441	0.2257	0.1813	0.2645
Turufe kechema	0.4398	**0.3768**	**0.3297**	0.3572	0.2939	0.2420	0.4222
Imdibir	0.7430	**0.5667**	**0.3713**	0.5563	0.3418	0.2900	0.7369
Aze deboa	0.3654	**0.2734**	**0.2309**	0.2473	0.2016	0.1701	0.3611
Adado	0.7015	**0.6549**	**0.6224**	0.6381	0.6001	0.5417	0.6875
Gara godo	0.5017	**0.4440**	**0.3172**	0.4057	0.2663	0.2363	0.4678
Domaa	0.3825	**0.3708**	**0.3502**	0.3453	0.3174	0.2555	0.3578

The inequality differences between villages can also be examined while simultaneously considering mean land holdings by using generalised Lorenz curves.[11] If some villages have higher average land size and lower inequality, inhabitants of these villages on the average are much better off. **Figure 6** presents the generalised Lorenz curves of each village and it is clear that the curves for some villages dominate the others (second order stochastic dominance). This is an indication that the land distribution system maintains a situation where some regions enjoy the best of both worlds compared to others – low inequality and larger mean land size.

[11] Generalised Lorenz curve is generated by multiplying the ordinary Lorenz curve by the mean land size.

Figure 4: Influence functions for total, per capita and per adult PA allocated land





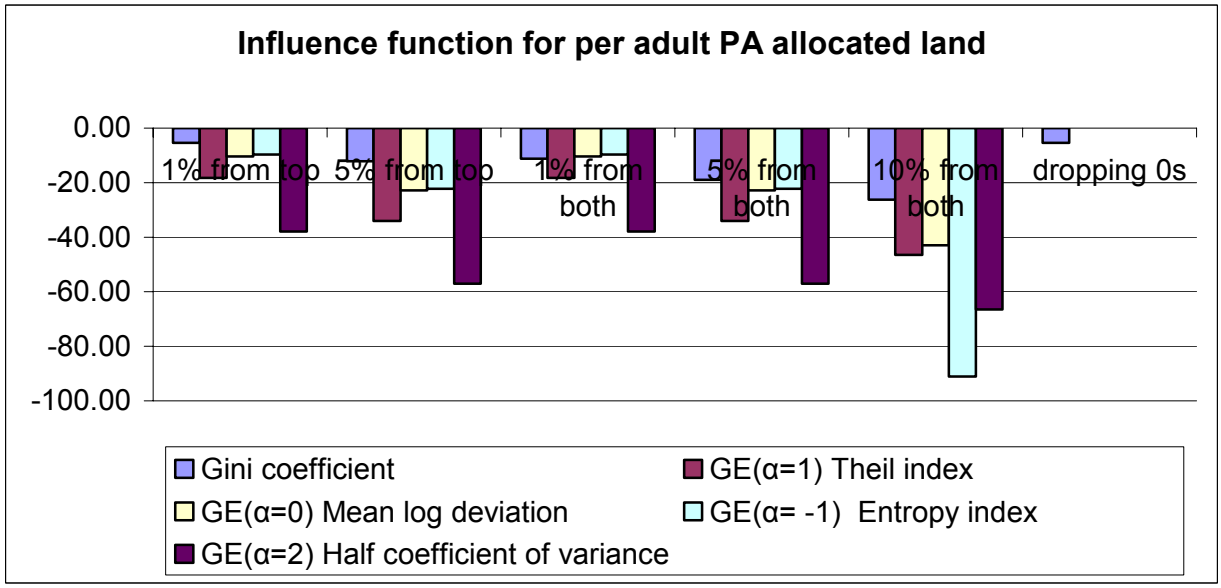


Figure 5: Village level Lorenz curves after 5% trim from the top

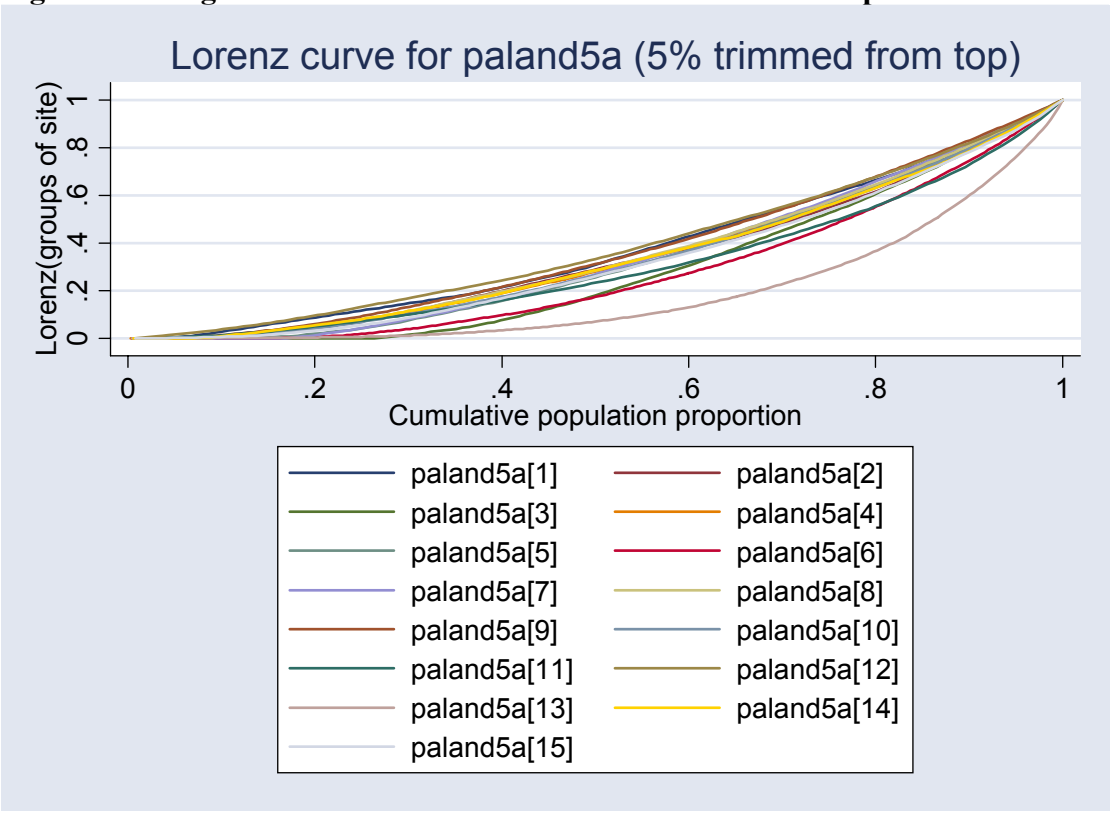
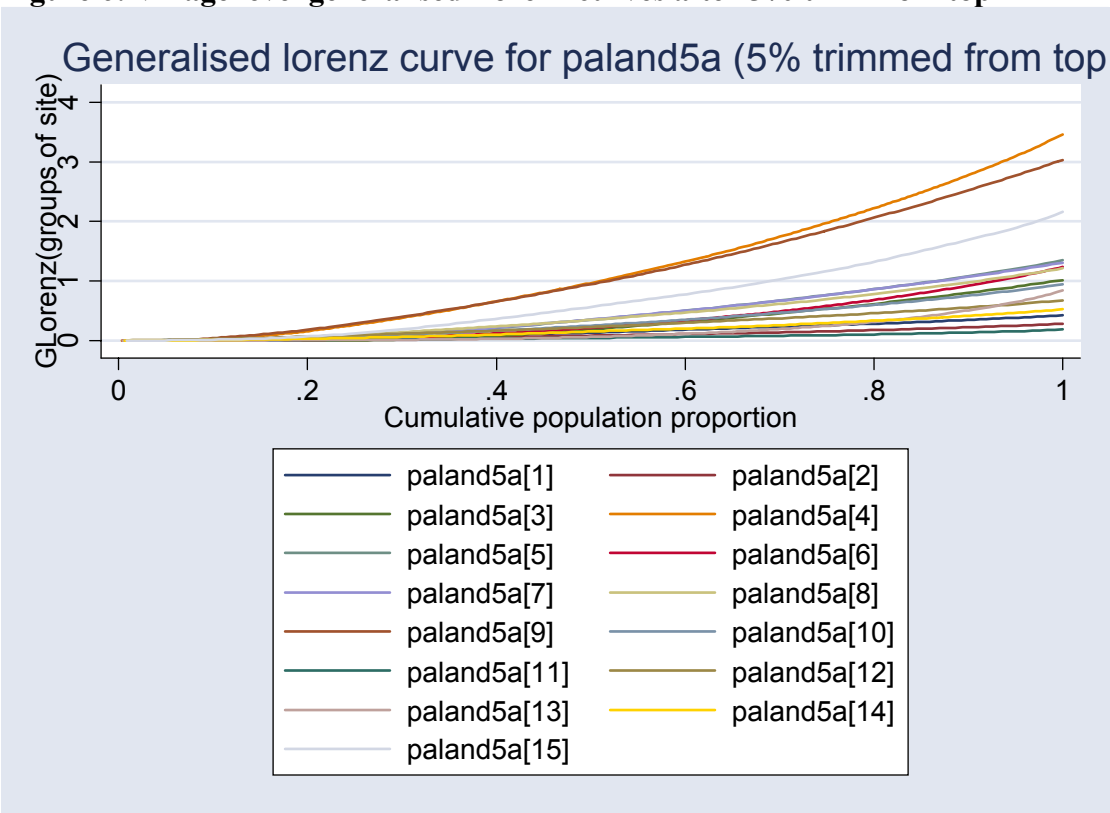


Figure 6: Village level generalised Lorenz curves after 5% trim from top



To summarise, the reform of 1975 has not created a highly equitable distribution of land as generally accepted; the level of inequality is either equal or higher than those found in other African countries. Hence, the widely held consensus that land is more equitably distributed in Ethiopia doesn't seem to hold even when analysing the data taking measurement errors into account.

As indicated in the introductory part, another either explicitly or implicitly widely held view is that the pre-reform land tenures have no influence on post-reform distribution of land. The next section discusses the possible link between pre- and post-reform land distribution.

5. Was the revolution a clean break from the past?

When analysing the distribution of rural land in Ethiopia, researchers mainly or only consider changes after the reform with the implicit or explicit assumption that pre-reform land tenure systems don't affect post-reform distribution. The radical social, economic and political transformation brought about by the land reform programme makes it difficult to assume otherwise. But in this section, it is argued that pre-reform land tenures probably have a significant influence on post-reform land distribution.

As indicated previously, after the land reform proclamation of February 1975 PAs were set up in rural areas to allocate land among their members (in addition to other responsibilities). Obviously, the PAs would start with the existing distribution that was determined by pre-reform land tenures; it is not like a resettlement programme on uninhabited land where one can start with a desired distribution because there is no previous tenure system. Since PAs didn't take all land from their members and distribute it afresh, one should logically expect a lot to be carried over from the past into post-reform distribution.

The empirical evidence from the Ethiopian Rural Household Survey (ERHS) confirms the above. In one of the survey rounds, households were asked how they acquired each plot of land. In 1995, from the total land holdings of surveyed households 36.6% was acquired through inheritance and purchases made in the pre-reform period. From the fifteen surveyed villages in two – Adele Keke and Adado – more than 90% of their land was acquired before the reform; in other two villages – Imdibir and Aze Deboa – the figures range between 80% and 90% and the corresponding percentages for Gara Godo and Haresaw are 70% and 41%. From the fifteen survey villages, in six of them at least 40% of their land holdings were acquired before the land reform. These results show that even 20 years after a radical land reform programme the hang-over from older tenure systems is substantial for a significant number of villages. This casts a shadow of doubt on the usual implicit assumption that older tenure structures do not affect current distribution.

The second reason which makes one doubt the assumption of a clean break with the older tenures is that implementation of the land reform was heterogeneous. There was no national and detailed guideline on how to allocate land and PAs were basically left to their own device to decide on the 'allocation rule'. The proclamation provides that any person who is "willing to personally cultivate land shall be allotted rural land sufficient for his maintenance and that of his family" (Rahmato, 1984). What is meant by 'maintenance' and 'family' can mean different things and hence even in the

case where PAs tried to follow the proclamation to the letter it can be implemented in different ways. This is in fact what actually happened as illustrated by the following quotation from Rahmato (1984):

> "The method of land distribution, and the criteria used varied not only from one locality to another but within each locality as well. Indeed, each PA adopted its own formula and decided how and to whom to apportion land within its jurisdiction".

If actual distributions were not homogenous across regions of the country, it is very likely that these heterogeneous allocations were influenced by tenure structures in the pre-reform period. The farmers elected to PAs are people that grew-up within the older tenure systems; it is highly likely that the allocation rule they followed was influenced by the nature of the tenure structures they know about – land tenure systems that existed in their localities. The heterogeneity in the implementation of the land reform programme is likely related – at least partly – to the heterogeneity of the pre-reform land tenure systems.

The third reason to expect a link between pre- and post-reform land distribution is related to the institutional constraints created by the land reform proclamation itself. The proclamation nationalised all rural land and abolished the land market. It prohibited the hiring of labour abolishing the legal labour market until 1990 when the 'mixed economy' policy was proclaimed. PAs were allocating land only to farmers within their jurisdiction; people from outside the PA – either from other rural or urban areas – cannot ask for land. If farmers migrate from a PA they are bound to lose their land. All these institutional changes are bound to decrease mobility and consequently slow down changes in relative factor endowments in different regions; for example, it is difficult to move from densely to sparsely populated regions and get access to land. For households with access to land, it is also difficult to migrate to other areas (urban or rural) due to fear of losing land. All these dampened possible changes in land-to-labour ratios in different parts of the country. These institutional constraints probably have exacerbated inter-regional inequalities.

The institutional constraints listed above have constrained some of the dynamic changes that were significantly transforming traditional tenures before the land reform at least in some regions of the country. For example, rural land markets were developing fast in many regions of the country including those with more 'communal' type of tenures undermining traditional systems; more and more urban dwellers were purchasing rural land with formal titling. Even though it is very difficult to speculate in what direction land inequality would have changed if these processes were allowed to continue for a long time, it is probably evident that these changes were significantly affecting the pattern of land distribution. By stopping these developments the land reform has probably helped to preserve a lot of pre-reform land distribution patterns. By both warding off outsiders from the land within the jurisdiction of individual PAs and creating a disincentive against out-migration of local people, the land reform programme created an institutional framework that protects localities from outside forces and correspondingly trapped them in previous conditions.

To properly analyse the link between pre- and post-reform land distribution, detailed information on pre-reform land tenures in each village and how post-reform

distribution was done over time is required; this is not available. In the data set used here only information on post-reform distribution is available. To have a very rough idea of the possible link between pre-and post-reform distribution, the post-reform distribution is related to general and main features of pre-reform tenure systems in the surveyed villages. To do that, the fifteen survey villages are classified into four groups depending on the nature of their pre-reform land tenures.

One of the important land tenure systems in pre-reform Ethiopia was the *rist* system which depended on ambilineal (cognatic) descent; people can inherit land from both their parents.[12] The first group ('group 1') of villages are those where the *rist* system was dominant at the time of the reform proclamation; these include Haresaw, Geblen, Debre Berhan, Yetmen and Shumsheha. The second group of villages ('group 2') are located in areas where non-*rist* land tenure systems were dominant but these traditional tenures were undermined by the emergence of land markets with more formal titling; Dinki, Sirbana Godeti, Adele Keke, Korodegaga and Turufe Kechema are included in this category. The third group of villages ('group 3) more or less maintained their traditional non-*rist* tenure structures; Imdibir, Aze Deboa, Adado and Gara Godo are included here. The fourth group ('group 4') is constituted of only one village (Domaa) that was set up after the reform as a re-settlement village.

The Gini coefficients for the four groups of villages are computed for all the data as well as after trimming from top at 1% and 5% (see **Table 7**). As expected, the lowest coefficient is for the re-settlement village; because land allocation in re-settlement on uninhabited land starts afresh[13] – no 'baggage' from the past – it is expected to be more equitable. Land distribution in villages located in more traditional tenures (group 1 & 3) is more inequitable as compared to those where traditional systems have been undermined (group 2). A similar conclusion is arrived if Lorenz curves on the whole distribution instead of summary statistics (Gini coefficient) are used (see **Figure 7**); while the Lorenz curve for the re-settlement village first order dominates all the rest, the one for villages where traditional systems have been undermined dominates the two for more traditional tenure systems.

Table 7: **Gini coefficients for villages grouped according to pre-reform land tenures**

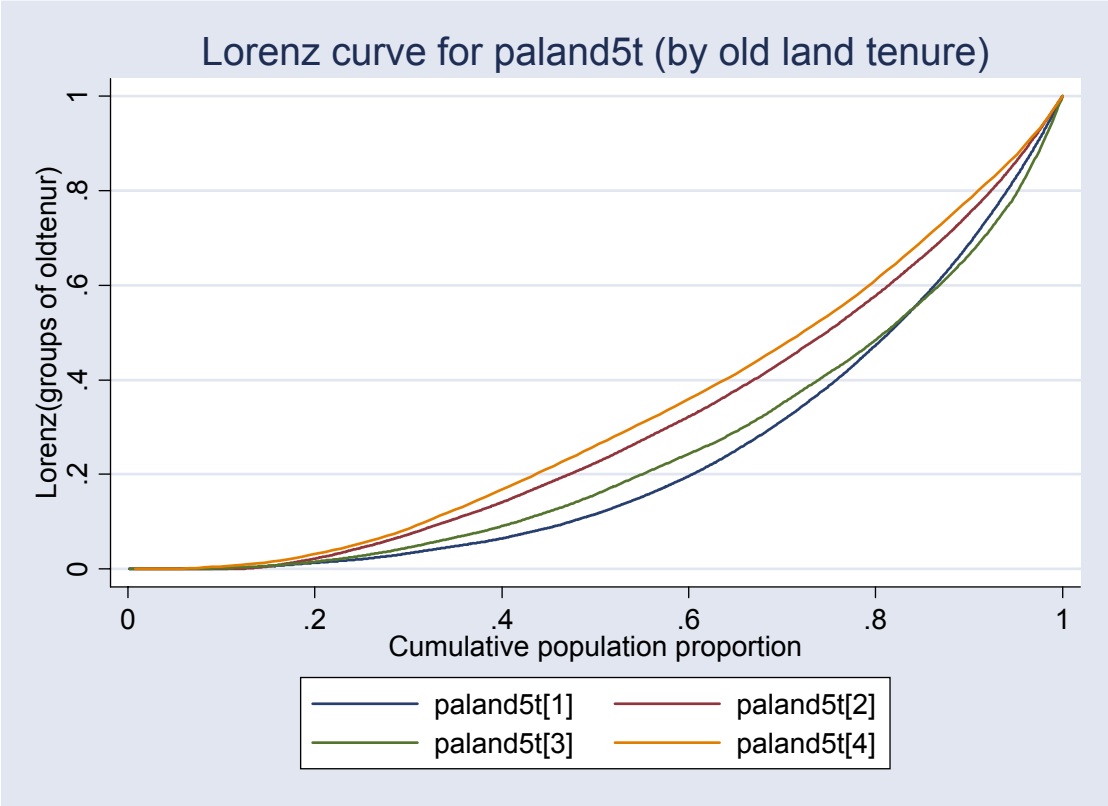
	Group 1	Group 2	Group 3	Group 4
All data	0.5618	0.4425	0.6465	0.3825
1% from top	0.5468	0.4180	0.5850	0.3708
5% from top	0.5268	0.3951	0.4981	0.3502

Note: Group 1= *rist* tenure; Group 2 = non-*rist* with significant changes; Group 3 = non-*rist* with traditional tenures; Group 4 = post-land reform re-settlement village

[12] The classic reference for the *rist* system is Hoben (1973).

[13] In many instances in Ethiopia re-settlements have occurred in officially 'unsettled' but actually land used by the original inhabitants.

Figure 7: Lorenz curves of villages classified by pre-reform tenures



Note: Group 1= *rist* tenure; Group 2 = non-*rist* with significant changes; Group 3 = non-*rist* with traditional tenures; Group 4 = post-land reform re-settlement village

As argued previously, if some of the inequality in post-reform distribution reflects conditions before the reform, the above results imply that land was distributed more equitably in those areas where traditional structures were undermined. This probably should not be surprising because even those 'communal' types of traditional land tenure systems, like the *rist*, were characterised by competition and differentiation.[14]

In addition, if the thesis that pre-reform tenures significantly affect post-reform distribution is true, the relatively high level of inequality observed in post-reform Ethiopia compared to other African countries can be a reflection of the historical difference in land distribution; if distribution of land in pre-reform Ethiopia was more inequitable than the other African countries, the hangover from previous tenures is still observed in post-reform Ethiopia mainly as historically inherited inequality.

As indicated above, to definitely address these issues, knowledge on local pre-reform land tenures and detailed information on the process of post-reform land allocation in PAs is required – this requires a research in economic history. This inquiry would not only be an exercise in pursuit of historical curiosity but also an important component to understand the current land distribution system.

The next section presents some conclusions.

[14] See Hoben (1973).

6. Conclusion

This paper examines two widely accepted ideas about the distribution of land in rural Ethiopia. Contrary to widely accepted views, the empirical results using the formal indexes of inequality that take measurement errors into account indicate that inequality in the distribution of land in rural Ethiopia is relatively high. In addition, the paper argues that the post-reform land distribution probably is affected by pre-reform land tenure systems and calls for a detail historical analysis of old tenure structures and the process of land distribution after the land reform programme.

Most debates and researches on land related issues in rural Ethiopia mainly revolve around questions of security of holdings, degradation of soil quality, fragmentation of farms and similar problems. This paper attempts to highlight a relatively neglected area of research – inequality in distribution of land. In addition, it argues that a proper understanding of current land distribution requires an understanding of the evolutionary link with the older tenure structures. Further research, particularly in the form of economic historical analysis, to understand the link with older tenure systems is probably one of the fruitful avenues that can lead to a more profound understanding of current land distribution patterns – and this knowledge is an important input to policy analysis.

Reference

Amare, Y. (1994), "Land distribution and socio-economic change in Ethiopia: The case of Wagda, northern Ethiopia", Boston University, African Studies Center working paper, no. 190

Cowell, F. A. and E. Flachaire (2002), "Sensitivity of inequality measures to extreme values", mimeographed

Cowell, F. A. and J. A. Litchfield (1999), "Income inequality comparisons with dirty data: The UK and Spain during the 1980s", London, The Toyota Centre, London School of Economics

Cowell, F. A. and M.-P. Victoria-Feser (2002), "Welfare rankings in the presence of contaminated data" *Econometrica* **70**(3): 1121-1233

FDRE (Federal Democratic Republic of Ethiopia)(2002), "Ethiopia: Sustainable development and poverty reduction programme", Addis Ababa, Ministry of Finance and Economic Development

Hoben, A. (1973), *Land tenure among the Amhara of Ethiopia: The dynamics of cognatic descent*, University of Chicago Press, Chicago

Jayne, T. S., T. Yamano, et al. (2003), "Smallholder income and land distribution in Africa: Implications for poverty reduction strategies," *Food Policy* **28**: 253-275

Kebede, B. (2004), "Administrative allocation, lease markets and inequality in land in rural Ethiopia: 1995-97", ESRC Research Group on Wellbeing in Developing Countries, working paper 07

Rahmato, D. (2005), "From heterogeneity to homogeneity: Agrarian class structure in Ethiopia since the 1950s", Forum for Social Studies, August 2005

Rahmato, D. (1984), *Agrarian reform in Ethiopia*, Scandinavian Institute of African Studies, Uppsala, Sweden