

Impact of Land Certification on Sustainable Land Resource Management in Dryland Areas of Eastern Amhara Region, Ethiopia

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Abstract

This study investigates the impact of land certification on sustainable land resource management, long-term investments, and farmers' perception and confidence on land ownership and land use rights in the dryland areas of Eastern Amhara Region, Ethiopia. Fifteen kebeles from three woredas and 20 households per kebele were selected using stratified random sampling techniques with whom face-to-face interviews were carried out. Analysis of the qualitative and quantitative data showed that, 160 households have on average 0.40 ha of farmland on steep slope area; and about 21.0% and 15% of households have fear land redistribution and the government may take their farm plot at any time, respectively. However, respondents believe that land certification reduced landlessness of women, disable and poor of poor where as it increased youths' landlessness. The participation of households in land management practices (LMP) has shown a 15.4% increment after land certification. Nonetheless, the mean comparison of major crop yields per household is insignificant except sorghum which decreased significantly at level of $p < 0.1$ level. Generally, land certification improves tenure security; LMP and land use rights of women and marginal groups of societies but did not crop productivity.

Keywords: impact, land certification, land resource management, dryland area, Ethiopia

1. Introduction

Loss of arable land accounts about 45% and 66% of total land area of Ethiopia and Amhara Region, respectively (Lakew, Menale, Benin, & Pender, 2000). To restore degraded agricultural lands in Ethiopia, an engineering approach or import and distribution of chemical fertilizers, were used in the past but did not solve the problem (Mulugeta, 2004). Amhara Region suffers from serious land degradation and recurrent drought hazards. Among other factors, lack of tenure security is thought to have aggravated land degradation as it discourages farmers to invest in preventing soil erosion (Berhanu & Fayera, 2005). In the Ethiopian highlands, repeated land redistributions has taken place, and caused tenure insecurity (Holden & Tewodros, 2008). For instance, Amhara Regional government has carried out major land redistributions in 1997 and 1998 (Benin & Pender, 2001). Currently, Amhara Region is one of regions that the Government of Ethiopia has been practicing rural land certification to bring land tenure security.

Land titles had significant impacts on investment in Latin America and Asia, where as such interventions in Africa have found insignificant or no investment. For instance, in Kenya, there was no empirical evidence that showed land titling enhancing credit markets, land markets, and investment (Holden, Deininger, & Ghebru, 2009). Whereas, Nedessa, Ali, and Nyborg (2005) reported that one study in Kenya indicates that tenure security is important, however, privatization alone does not guarantee improvement in land and agricultural production. Nonetheless, Holden et al. (2009) in the Southern Ethiopia reported that poverty had a significant negative impact on trees investment but no evidence on tenure insecurity having a negative effect on trees investment.

One of the preambles of the Amhara Region Revised Rural Land Administration and Land Use Proclamation No. 133/2006 states that to bring sustainable development and investment over land establishment of land ownership enhances landholder to use their labor, wealth, and creativity. In the region, any person, granted rural land shall be given the land holding certificate in which the details of the land is registered by the Authority prepared by his name and his photograph fixed thereon. The land holding certification is a legal certificate of the holder (ANRS,

2006). Nonetheless, dryland farming is risky due to drought and low soil fertility. Studies carried out before these times are too early to see the impact of land certification on tenure security and land investment. Most of those studies on impact of land certification on tenure security and land investment were carried out by comparing titled and untitled *kebeles*. On the contrary, this study focused on change brought by individual household on land tenure security and investment before and after certification in the dryland area of Eastern Amhara Region. In addition, it was necessary to verify the aforementioned preambles and scholars suggestion on the benefits of land certification, achieved or not particularly in dryland area of the region. As result, this study pinpoints Amhara National Regional State (ANRS) to identify limitations of the land policy in dryland area, which in turn enables the region to search solutions for limitation of achieving final goals of it. Here, land degradation is severe in Ethiopian highlands particularly in Amhara Region. However, it is believed that land certification enhances land tenure security of small farm holders and has significance impact on sustainable land resource management, productivity and development on dryland area of Eastern Amhara Region, Ethiopia. The objective of this study is to verify the impact of land certification on sustainable cultivated land resource management, farmers' perception and marginalized group of the society in the dryland areas of Eastern Amhara Region.

2. Research Methodology

2.1. Description of the Study Area

Out of 48 *woredas* of Amhara Region which are identified as food insecure and highly drought prone/vulnerable, 32 *woredas* are located in Eastern Amhara Region (Aregay, 1999). Eastern Amhara Region has 62 rural *woredas*. In these *woredas* 1,533,973 households land holdings were registered and out of these 1,139,827 households (HHs) got primary land certification book up to June, 2009 (Bureau of Environmental Protection Land Administration and Land Use, 2009). For this study, three *woredas* (Bati, Kobo, & Tehuledere) were selected purposively. The selection of *woredas* was based on land certification implementation since the Year 2007, vulnerability to drought, and food shortages, as well as better accessibility to main roads.

The data obtained from each sampled *woreda* Office of Environmental Protection Land Administration and Land Use, land certification program started in 2006. At the end of 2010, 100 % in Kobo and Tehuledere *woreda* issued primary book of holding where as 89.51% in Bati *woreda*.

2.2. Selection of Sample Kebeles and Households

The major sources of data were a formal household survey conducted from November to December 2010. From each *woreda*, those *kebeles* more than 60% of HHs certified before 2007 were identified and 5 *kebeles* per *woreda* were selected randomly. From each *kebele*, 20 households were selected by stratified random sampling techniques. Accordingly, a total of 300 HHs were interviewed face-to-face using structured questionnaire by 3 degree holder enumerators who were trained for three days in Bahir Dar.

The information collected from HHs through questionnaire was supplemented by focus group discussion and key informant interviews. Finally, the information collected through survey was supported by collection of secondary data through reviewing of several reports, workshop papers, books, magazines, and newspapers.

2.3. Methods of Data Analysis

In this research, both qualitative and quantitative data analysis techniques were used. Moreover, econometric estimates and tests of significance were computed using Microsoft Office Excel and statistical soft wares. Perceived tenure security and long-term investment on land brought after land certification was evaluated using econometric analysis. In order to investigate the impact of land certification on perceived tenure security and long term investment on land by using the probit model:

$$y_i = \beta_i x_i + u_i \quad i= 1, 2, 3 \dots\dots\dots, n \quad (i)$$

Where: y_i is a dummy variable indicating the dependent variables related as $y_i = 1$ if $y_i > 0$, otherwise $y_i = 0$

X_i - is the variables determining dependant variables

β_i - is unknown parameter to be estimated in the probit regression model

u_i - is random error term.

3. Results

3.1 Farm Plot Characteristics

From the total HHs interviewed 257 HHs have on average 0.70 ha of farmland on flat slope area, 124 HHs have on average 0.48 ha of farmland on moderate slope area and 160 HHs have on average 0.40 ha of farmland in steep slope area. The use of steep slope area for crop cultivation implies absence of land use planning in the study area.

3.2 Perception and Confidence of Farmers on Land Certification

As indicated in Table 1, 14.7% of the sampled HHs interviewed were affected either positively or negatively by the last land redistribution. Whereas, about 21.0% of HHs fear that land redistribution beyond the next 5 years and lose their farm plots. In addition, about 15% of HHs fear that government will take farm plot at any time in the future. According to information obtained from group discussions at each *kebele*, farmers leaving around town administration were highly frustrating dispossession of their farmland.

Table 1. Perception and confidence of farmers on land redistribution after land certification

Variable	Yes		No	
	Frequency	Percent	Frequency	Percent
HH affected in 1997 land redistribution	44	14.7	256	85.3
Fear of land redistribution beyond the next 5 years and lose farm plot	63	21.0	237	79.0
Fear of land dispossession by government at any time	45	15.0	255	85.0

Sample Size=300.

3.3 Impact of Land Certification on Women and Marginalized Groups

As shown in Table 2, about 75% and 82% of HHs included in this survey know landless HHs in their village before and after land certification, respectively. The statistical test shows that there is significant ($p < 0.01$) variation of landless HHs before and after land certification in marginalized groups of societies. Here, the qualitative information gained from HHs response and group discussion revealed that land certification provides land use right protection for women and other marginalized group of the societies more than youths.

The chi-square test shows that there is significant difference ($p < 0.01$) before and after land certification in case of stronger land holding rights of women in jointly led HH. Moreover, according to information obtained from group discussions and key informants, women have full rights to share the land equally during divorce; no one takes the land of women and other marginalized groups, even husbands gives respect for their wife after land certification.

Table 2. Landless household before and after land certification

Variables	Before land certification (%)		After land certification (%)		χ^2
	Yes	No	Yes	No	
Landless HHS	75.0	25.0	82.0	18.0	1.27***
Women	55.3	44.7	33.0	67.0	93.83***
Disabled	44.3	55.7	31.0	69.0	1.21***
Youth	63.7	36.3	81.3	18.7	62.46***
Poorest of poor	53.7	46.3	28.3	71.67	78.05***

Note: *** = Significant at $p < 0.01$;

Sample size=300.

3.4 Impact of Land Certification on Land Management Practices

About 78.3% and 93.7% of the HHs participated in at least in one type of LMPs before and after land certification with $p < 0.01$, respectively. Among LMPs, terracing, planting of tree, application of compost, application of farmyard manure, incorporating crop residue, and construction of water harvesting structures (WHS) have been considered in this study. Each type of LMP has shown high significance difference before and after land certification ($p < 0.01$) (Table 3).

Table 3. Types of LMP before and after land certification in percent

Variable	Before land certification		After land certification		χ^2
	Yes	No	Yes	No	
Land management practices	78.3	21.7	93.7	6.3	46.75***
Terracing on farm plot	77.0	23.0	90.7	9.3	60.99***
Planting of tree on farm plot	42.3	57.7	52.7	47.7	1.79***
Application of compost	38.3	61.7	62.0	38.0	1.14***
Farm yard manure	68.3	31.7	81.0	19.0	1.44***
Incorporating crop residual	41.0	59.0	48.3	51.6	2.02***
Water harvesting structure	13.3	86.7	27.7	72.3	96.94***

Note: ***= significant at $p < 0.01$.

3.5. Impact of Land Certification on Land Productivity and Sustainable Development

The comparison of major crop yields of Eastern Amhara Region in 2010 (after land certification) and 2006 (before land certification) showed no significance difference except for sorghum which was significant difference $p < 0.1$. The average difference between sorghum produced in the year 2010 to sorghum produced in the year 2006 is decreased by 0.99 quintals per HH (Table 4). This result shows that there is no significant improvement of major crop yield per HHs rather shows reduction after land certification. This may be due to fluctuation of amount of rainfall and other variables.

Table 4. Comparison of major crop produced in the study area in the year 2010 and 2006 (quintal/HH)

Major crops	Number of respondents	Difference in Mean	Differences in Std. Deviation	T test
Maize produced in (2010-2006)	68	0.61	3.84	-1.32
Sorghum produced in (2010-2006)	180	-0.99	7.25	1.84*
Teff produced in (2010-2006)	152	-0.41	4.43	1.16
Other crops produced in (2010-2006)	123	-0.08	5.05	0.18

Note: *= significance at $p < 0.1$.

Those HHs who able to produce sufficient food for their families throughout the year have shown 14% decrement after land certification while it shows high significance difference before and after land certification ($P < 0.01$). As information obtained from group discussions and key informants, even if land certification encouraged farmers to elapse more time in their farmland, productivity of farmland were affected by occurrence of frequent drought, and recently prevalence of insect pests.

3.6 Results of the Probit Model

3.6.1 Land Tenure Security

Out of 8 explanatory variables that were entered to the model, three of them, namely educational level of HH head (significant at $p < 0.05$), total land holding size (significant at $p < 0.01$), and HH affected by last land redistribution (significant at $p < 0.01$) were positively and significantly aggravating HHs fear of future land redistribution will come and loses farmland (Table 5). However, results of descriptive statistics shows that land certification highly developed farmers' confidence on land tenure security even though it did not completely stopped fear of future land redistribution. This indicates that those three factors are affecting farmers' perception of land tenure security after four years of land certification.

Table 5. Effect of land certification on fear of future land redistribution

Variables	Coefficient	Z-value	P> z	Marginal effect
LLFHHHead	-0.4696	-0.97	0.334	-0.0987
LLMFHHHead	-0.0950	-0.23	0.819	-0.0236
HHheadAge	-0.0021	-0.18	0.855	-0.0005
EducnLHH	0.2662	2.01**	0.045	0.0649
TotHHSIZE	-0.0157	-0.24	0.814	-0.0038
TotLHo	0.6750	2.82***	0.005	0.1647
HHaffecin89Re	3.6858	7.13***	0.000	0.9216
TLU	0.0091	0.21	0.832	0.0022
constant	-2.3674	-3.44	0.001	

Note: *** and ** indicate significance at less than 1% and 5% probability levels, respectively;

Log likelihood = -66.42575 Number of observations = 300;

Chi squared = 175.52 Pseudo R² = 0.5692.

3.6.2. Land Management Practices before and after Land Certification

As can be seen from Table 6, before land certification, total HH size, total livestock unit and average distance of farm plot from homestead significantly at $p < 0.05$, $p < 0.01$ and $p < 0.01$, respectively affected WHS construction. Whereas, after land certification HH head age and total HH size were affecting WHS construction at significant difference of $p < 0.05$, while average distance of farm plot from homestead, total livestock unit and training and advice of agricultural extension service were affecting WHS construction at significant difference of $p < 0.01$. The descriptive statistics also showed that WHS construction increased more than 14% after land certification.

Table 6. Impact of land certification on WHS before and after land certification

Variable	Construction of WHS before land certification			Construction of WHS after land certification		
	Coefficient	Z-value	Marginal effect	Coefficient	Z-value	Marginal effect
Constant	-0.9555	-1.56		-0.5530	-1.03	
LLFHHHead	-0.3120	-0.84	-0.0513	-0.1590	-0.52	-0.0475
LLMFHHHead	-0.3714	-1.17	-0.0750	-0.3370	-1.23	-0.1087
HHheadAge	-0.0135	-1.44	-0.0025	-0.0166	-2.08 **	-0.0051
EducnLHH	-0.1223	-1.03	-0.0226	-0.1295	-1.34	-0.0401
TotHHSIZE	0.1190	2.28**	0.0220	0.0891	2.01 **	0.0276
TotLHo	-0.0673	-0.30	-0.0125	-0.2770	-1.44	-0.0858
TraingExadv	0.2695	0.79	0.0441	0.8954	2.69***	0.2089
TLU	0.0988	2.50***	0.0183	0.1127	2.68 ***	0.0349
CridtBB99	-0.1024	-0.51	-0.0186			
CridtBS99				0.1215	0.71	0.0379
Aveardistfap	-0.0076	-2.49 ***	-0.0014	-0.0088	-3.33***	-0.0027

Note: ***, ** and * indicate significance at 1%, 5% and 10% probability levels, respectively;

Number of observations = 300;

CreditBB/S99 stands for credit beneficiary before and after land certification respectively;

Construction of WHS before land certification: Log likelihood = -105.6045;

Chi squared = 24.40 Pseudo R² = 0.1035;

Construction of WHS after land certification: Log likelihood = -155.24964;

Chi squared = 43.37 Pseudo R² = 0.1226.

4. Discussion

The 14.7% of the sampled HHs were affected by land redistribution. This result supported by Deininger, Jin, Berhanu, Samuel and Berhanu (2003) in the period 1991-98, 9% of the farmers in Ethiopia, 18% in Tigray and 21% in Amhara region were affected by land redistribution. Similarly, Hibret (2008) found about 43% and 35% of the sampled farmers in titled and untitled *kebeles* in ANRS, respectively were affected by land redistribution in 1997.

About 21.0% of HHs fear land redistribution beyond the next 5 years and lose their farm plots and 15% of HHs fear that government will take farm plot at any time. This implies that fear of land redistribution is still there in the study area. This result agrees with that of Fitsum (2009) in Tigray region who reported that 44% of the respondents who expect land redistribution believed that they will lose land.

Women, disabled, and poorest of poor decreased their landlessness where as for youths it increased after land certification. The findings of this study was similar with the findings of Berhanu and Fayera (2005) who found that only 8.5% of the agricultural holders are younger than 24 years, which shows landlessness was serious problem in Amhara region; particularly for young people who have difficulty of accessing land. This may be due to shortage of farmlands and land law gives last priority for youths among the marginalized group of societies. For instance, revised ARLAU Proclamation No. 133/2006 Article 9 (2) supports land provision land holding in priority order of as orphan children, disabled, women and youngsters who join the new life of independence.

Women have stronger land holding rights after land certification. This result is in line with findings of Getahun (2008) in pilot and non-pilot *woredas* of Amhara Region and Holden and Tewodros (2008) in Southern Ethiopia who found that land certification contributed to increased tenure security of women. Deininger, Daniel, Holden and Zevenbergen (2007) also found that most households (85%) expect land certification improve women's position and incentives to rent out land. Finally, Sabita (2010) reported that 100% in Worja *kebele* in SNNP region and 90% in Beresa *kebeles* in Oromia region showed land certification program to have promoted gender equality.

HHs participation in LMPs showed an improvement in the study area after land certification. This finding agree with the findings of Dagnew, Fitsum and Nicck (2009) in Kilte Awela'elo *woreda* of Tigray region, whereby 85.2% of HHs were involved in different types of long-term land investment practices after land titling which shows about 34.1% growth before titling. Similarly, Deininger et al. (2007) found that large majorities of HHs perceived that rural land certification in Ethiopia increases incentives for investment in trees planting (88%), soil and water conservation structures (86%), and sustainable management of common property resources (66%). However, the tree planting endeavors in Eastern Amhara Region were much lower than that of the national level which could be due to scarcity of water resource in the dryland area. According to Sabita (2010), 77.5 % of farmers of Worja *kebele* in SNNP region and 70% farmers of Beresa *kebeles* in Oromia region completely agree that land certificates increase investments in soil and land management after land certification. According to Getahun (2008), in Amhara Region 96.7% respondents in pilot and 77.5% respondents in non-pilot areas have participated in land improvement activities.

Major types of crop yields showed decrement after land certification except sorghum. The average difference between sorghum produced after land certification to before certification decreased by 0.99 quintals per HH. This result shows that there is no significant improvement of major crop yield per HHs rather shows reduction after land certification. This may be due to fluctuation of amount of rainfall and other crop growth variables. Therefore, crop productivity did not improved by land certification alone in dryland since productivity of farmland were affected by occurrence of frequent drought, and recently prevalence of insect pests and other factors. This result is in line with that of Getahun (2008), where 63.3% HHs in pilot and 50% HHs in non-pilot *woredas* of Amhara region agreed that productivity of farmland has no change after land certification.

5. Conclusion

In this study, land certification highly raised farmers' perception and confidence on land tenure security even though less than 22% of HHs still fear of future land redistribution dispossession by government at any time. Fear of land dispossession by government emanated from the establishment of new town administration and that is embracing rural *kebeles*. Similarly, the result of the probit model showed that educational level of HH head, total land holding size, and HH affected by last land redistribution were found positively and significantly aggravates HHs fear of future land redistribution and loses of farmland. More than 91% of HHs were acknowledged that land certification well protected land use rights of women and marginalized groups of the society except youths. Due to these, youths raise question of land use right after land certification in the study area. On the other hand, stronger land holding rights of women were observed after land certification which showed significance difference of $p < 0.01$ level before and after land certification. Concerning the impact of land certification on long term investment and sustainable land resource management on cultivated land of dryland areas, HHs participation in

LMPs has shown an improvement in the study area after land certification. However, average distance of farm plot from homestead was affecting negatively LMPs while accessibility of training and advices of agricultural extension and total livestock unit affected positively LMP in the study area. Nevertheless, steep slope areas are still used for crop cultivation in the study area. The comparison of major crop yield per HHs after and before land certification showed no significance difference except for sorghum which was significant at $p < 0.1$ level. The average difference between sorghum produced after land certification to before certification decreased by 0.99 quintals per HH. This result shows that there is no significant improvement of major crop yield per HHs rather shows reduction after land certification. This may be due to fluctuation of amount of rainfall and other crop growth variables. Therefore, crop productivity did not improved by land certification alone in dryland since productivity of farmland were affected by occurrence of frequent drought, and recently prevalence of insect pests and other factors.

From the discussions and conclusions, the possible recommendations were drawn. First government and other stakeholders should work on awareness creation on duties and responsibilities that the land certificate has gave for them. Mean while government should seek a clear policies and strategies such as small-scale enterprise and urban agriculture that treat problems of landless youths and farmers whose lands where encroached by expansions of town administration to rural *kebeles*. Secondly the government should implement the land use policy, which was enacted at the same time with land administration. Third the government should create awareness on the benefits of land holdings consolidation. Fourth further studies should be carried out to investigate factors affecting productivity and sustainable development of dryland areas of Eastern Amhara Region. Finally, government should further strengthen implementation of land certification processes of the society. However, to solve landlessness of youths, promoting of intensive farming practice, as result labor needs will increase engage youths. The other options is that revising the land use policy of the region and involve youths in afforestation of steep slope areas and providing Safety-net Program supports to solve the temporary problems of youths.

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