Potential Impact of Land Certification on Rural Households' Land-related Investment Intentions in Southern Ethiopia

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POTENTIAL IMPACT OF LAND CERTIFICATION ON HOUSEHOLDS' LAND-RELATED INVESTMENT INTENTIONS IN SOUTHERN ETHIOPIA

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LIST OF ABBREVIATIONS

GPS	Global Positioning System
LAC	Land Administration Committee at community (Kebele) level
SNNPR	Southern Nations and Nationalities Peoples Region
TPLF	Tigrian People Liberation Front

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ABSTRACT

This study analyses the effect of land registration and certification on rural farm households' intention to engage in tree planting, an indicator used as a proxy to measure land-related investments in the Oromia and Southern nations and nationalities people (SNNP) regions, Ethiopia. I used cross-sectional data from Wollaita and West Arisi zones collected in 2012. Maximum Likelihood probit model was employed for estimation. Results suggest that there is indeed a positive and highly significant correlation between possession of land certificates and tree planting intention among rural households in the study areas. Other estimates for variables such as households' farming experience, size of work force and farm size tend to positively affect the probability of planting trees.

***Key Words**: Land certification, Land-related investments, Farm households, tree planting*

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INTRODUCTION

A core objective of development actors and policy makers consists in striving to increase poor people's access to economic opportunities and assets. In developing countries, where the economy is predominantly rural and agrarian, such efforts revolve around ensuring access to land, which in turn is a key asset and an all too crucial factor of production. Generally, efforts aimed at facilitating access to land revolve around ensuring land titling and registration and moving away from traditional or informal systems, which are seen to thwart agricultural development. Land registration is understood to 'encourage land transfers to more productive farmers, improve farmer access to credit, and create incentives for investment in land improvement, soil conservation and new technology' (David A 1990).

In fact a secure and well-documented land title is considered a precondition for well-functioning land markets (L.J Alston 1999). Accordingly, lack of the same would diminish land prices and constrain supply of land to rental markets. In addition, lack of titling affects access to formal credit, thereby diminishing demand in the land sales market by those who already own some land.

Tenancy has a long history in Ethiopia. The feudal system, known as 'geber', entrenched an exploitative landlord-tenant relationship where the majority of the population, up to 40% in the south, worked the land through various sharecropping arrangements (Rahmato 1984). For the most part, oral contracts were used to seal the deal. The landlords wielded a strong power over their tenants by exercising threat of expulsion (Rahmato 1984). The practice was only curtailed with the socialist revolution in 1974, after which the government adopted an ambitious land redistribution policy that encompassed a more equitable system. Another coup in 1990 saw the end of the socialist regime and witnessed the culmination of land redistribution. Instead, land certification along with inheritance rights was put in place.

In 1998, Ethiopia embarked on a significant exercise of land certification, which has since resulted in issuance of 5 million certificates (Holden et al.); this represents the 'largest delivery of non-freehold rights in such a short time period in Sub Saharan Africa' (Deininger 2003). There are a lot of expectations riding on this move, amongst which are: improving land tenure security, enhancing women's right to land ownership and encouraging more sustainable use of land resources.

This paper sets out to assess the impact of land registration and certification on land related investment in Oromia and SNNP regions in Ethiopia, where registration took place in 2004. The project also seeks to explore factors that affect land investments, such as tree planting which is a proxy measure for land related investment in this specific study. Hence, the study will build up on previous studies that have assessed the same phenomena in other regions of the country, by providing insights from a different region as to implementation of the policy and its consequences; basically representing a contrasting social, economic, political, cultural and regional contexts.

Background

Evolution of Ethiopia's Policies

The 1994 military coup in Ethiopia revolutionized the land tenure system of the country. While in the past the land holding system was characterized by a feudal, traditional system in the north and absentee, private land ownership in the south, the Derg regime annulled all forms of private land ownership and placed land under state ownership (Holden et al. 2008). Once land was made state property, it was then redistributed amongst communities according to household size and need. Land owners under the new proclamation could neither sale nor transfer land and holding size was capped at 10 hectares. While this act was commendable in terms of creating a more egalitarian approach to land ownership, strict laws against transfer or sale resulted in some constraints (Nantongo 2011). Peasant Associations were formed and collective agriculture became the norm under the communist regime. Despite these reforms however, the agricultural system remained backward and inefficient (Nantongo 2011).In 1991, another coup introduced a new set of land ownership laws. The Derg regime was overthrown and the new leadership Tigrian People Liberation Front (TPLF), composed of guirella fighters from the northern part of the country, seemed to embrace more market driven economic policies (Holden et al. 2008). Even though land remained under the government's ownership, the rural population found the new laws more flexible given that they were allowed to rent and hire labor (Holden et al. 2008).

Several proclamations under the new regime have attempted to create a more flexible land use arrangement. For example, Proclamation No. 89/1997 part one, article (2)(3), lays out provisions for marginalized groups to access land (Holden et al. 2008). Similarly, a critical step has been the inclusion of land certification under Land Use Proclamation No. 456/2005.

Review of Oromia and SNNP regions Land administration and Utilization Proclamations

Below I have provided relevant text from the proclamations for the two regions of interest, Oromia (State 2007) and SNNP regions (SNNPR 2007).

Land Right

Oromia: Article 5(1): "Any resident of the region, aged eighteen years and above, whose livelihood depends on agriculture and/or wants to live on, have the right to get rural land free of charge."

SNNP: Article 5(2): "Any resident of the region, eighteen years old or more, who wants to engage in agriculture, has the right of getting rural land holding and use."

Duration of Use Right

Oromia: Article 6(1): "Any peasant or pastoralist, or semi pastoralists who have the right to use rural land shall have the right to use and lease on his holdings, transfer it to his family member and dispose property produced there on, and to sell, exchange and transfer the same without any time bound."

SNNP: Article 7(1): "The rural land use right of peasant farmers, semi-pastoralists and pastoralists shall have no time limit."

Land Measurement, Registration and Holding Certificate

Oromia: Article 15(4): "Any holder of rural land shall be given a holding certificate by Oromia Agricultural and Rural Development Bureau describing the size of holding use and coverage, fertility status and boundary, and also the right and obligation of the holder."

SNNP: Article 6(3): "Any holder of rural land shall be given land holding certificate prepared by the competent authority *which* describes the size of the land, land use

type and cover, level of fertility and boarders, as well as the obligation and right of the holders."

Transfer of Rural Land Use Right

Oromia: Article 10(1): "Without prejudice to Article 7(1) any peasant, pastoralist or semi pastoralist has the right to rent out up to half of his holding.

Article 10(2): "Duration of the agreement shall not be more than three years for those who apply traditional farming, and fifteen years for mechanized farming."

SNNP: Article 8(1): "Peasant farmers, semi-pastoralist and pastoralist who are given land holding certificates can rent out land for farmers or investors from their holding of a size sufficient for the intended development in a manner that it shall not displace them. The duration of the contract: -

a) From peasants to peasants, the duration shall be up to five years.

b) From peasants to investors, the duration shall be up to ten years.

c) From peasants to investors who cultivate perennial crops shall be up to 25 years

d) Land described in this article sub article 1. a, b, c, shall be returned to the land holders when the duration terminates based on civil code."

Article 8(6): "Any legal person who is given the right to use land has the right to sale, lease, bequeath and pledge the property produced by his labor or capital on his land."

Land Distribution

Oromia: Article 14(1): "Redistribution of peasant or pastoralist or semi pastoralist's land holding shall not be carried out in the region, except irrigation land."

SNNP: Article 9(3): "Where peasant farmers, semi pastoralist or pastoralists are evicted from their holdings for the purpose of constructing irrigation structure, land re-allocation shall be undertaken to make them get equitable benefit from the irrigation development to be established. Details shall be

determined by the regulation."

Obligation of Land User

Oromia: Article 19(1): "Any rural land user who has got the use right shall be obliged to work on proper management and conservation of land individually and in cooperation with his neighbours."

SNNP: Article 10(1): "A holder of rural land shall be obliged to properly use and protect his land. When the land gets damaged the user of the land shall lose his user right. Details shall be determined by the regulation."

Minimum Holding

Oromia: Article 7(1): "Maintaining the existing farm plot size as it is, the holding size for the future shall not be less than 0.5 hectares for annual crops, and 0 .25 hectares for perennial crops."

SNNP: Article 11(1): "Without prejudice to the existing farmer holding or farm plot size of the family, the farm plot to be given in the future shall be as follows:

(a) If the plot is meant for rain fed agriculture its size shall not be less than half a hectare.

(b) If it is irrigable land constructed by the expense of the government, which is to be given to peasants. Pastoralists or semi pastoralists, the size shall not be larger than half a hectare."

Inheritance

Oromia: Article 9(1): "Any peasant, pastoralist, or semi pastoralist landholder, shall have the right to transfer his land use right to his family member who have inheritance right according to the law."

SNNP: Article 8(5): "Any holder shall have the right to transfer his rural land use right through inheritance to members of his family."

Land-related investments

Oromia: Article 13(1): "In accordance with the existing investment law of the Region, any private investor shall have access to rural land and is obliged to conserve accordingly."

SNNP: Article 15(a): Subject to giving priority to peasants, semi-pastoralists and pastoralist.

a) Private investors that engaged in agricultural development activities shall have the right to use rural land in accordance with the investment policies and laws at federal and regional levels."

Tree Planting

Oromia: Article 25(1): "Any land user is obliged not to plant tree species that can cause damage on agricultural production or water sources, and shall also be obliged to eradicate noxious weeds from his holdings."

SNNP: N/A

User Rights

Oromia: Article 6(16): "Without prejudice Sub-Article (1) of this Article, any rural land user shall be deprived of his land use right under the following conditions: leaving the land unused for two consecutive years, leaving the holding on his own reason, or neglect conserving the land. The detail shall be decided by Oromia Agricultural and Rural Development Bureau."

SNNP: Article 13(13): "When any land user leaves the land uncultivated beyond the time limit given by the competent authority without sufficient reason, he shall lose his fight of using the laid. Details shall be determined by the regulation."

Land Certification Systems and process

Planning of land certificate issuance was conducted in two stages, which included activities such as issuance of certificates with names and photos of the land holder, list of land parcels, parcel size, location, names of neighbours, soil fertility status and land use, while the second stage of certification included maps of parcels, GPS positions and registration in cadastral maps (Holden et al.).

Below are some of the land registration and certification procedures undertaken by Oromia and SNNP regions summarized from (Zevenbergen 2005) observations:

Oromia Region

- Training of wereda staff by regional experts
- Establishment of kebelle level LACs
- Training of LAC members
- Demarcation of Kebele and sub kebele boundaries in order to commence registration
- Demarcation of lands owned by the community and public institutions
- Individual plots demarcated
- Assessment of of results through community meetings
- Handling of complaints through legal procedures
- Register books and certificates prepared and given to woredas
- Landholders are given certificates signed by LAC and Wereda for a fee of 5 Ethiopian Birr.

SNNP Region

- Dissemination of information on certification by trained woreda stuff
- Organization of workshops to create awareness
- LAC established at Kebele and sub-keble level
- Provision of trainings to LAC members
- Individual plots demarcated
- Demarcation results were discussed with the community
- Dealing with complaints through legal procedures
- Certificates signed and stamped by the woreda were handed to landholders at a cost of 2 Ethiopian Birr.

LITERATURE REVIEW

Theoretical Basis and empirical evidence

A strong argument could be made for advocating tenure security with the expectation that if farmers own the rights to their land, they are more likely to make long term investments. This theory is backed by a number of scholars who have written extensively on the topic (Ault & Rutman 1979; Barzel 1989; Binswanger et al. 1995; Demsetz 1967; Feder 1987; Feder & Feeny 1991; Zimmerman & Carter 1996) . This goes not only to farmers' desire to invest but also to their ability to make those investments (Brasselle et al. 2002). In the Sub-Saharan context especially, economists have stipulated the need to secure property rights in order to boost farm investment (Johnson 1972).

According to the research, the benefits of tenure security extend beyond an increase in farm investment. Land that is secure and liquid incentivizes farmers to make efficient use of their resources through flexible allocation of resources (Deininger & Jin 2006). In addition to economic benefits, for which many economists have made a case for (De Soto 2000), there exist considerable social spillovers (Conning & Robinson ; Nugent & Robinson 2010).

One of the most difficult issues with regards to assessing the impact of tenure security on land investment is endogeneity, i.e., proving the direction of the causal link between the two variables has not been rigorously studied. For example, (Carter 1994) found that in Kenya, title status is systematically related to farm size and mode of access to land to the point that true title effects vanish once mediating factors such as farm's market access are duly taken into account. Moor (1996) concludes that land registration has a positive effect on investment. The results are puzzling since the area of study was a newly occupied area where prior, traditional forms of land ownership are absent thereby muddying the conclusion that registration was the cause for higher investment on land. Similarly, Feder (1987) concludes that land titling leads to higher investment on farms in Thailand. However, it is unclear how one can reach such a conclusion without taking into account endogeneity issues. Was it investment that led to land security or vice versa? Indeed, authors of a number of studies have failed to control for tenure security when investigating the relationship between the two variables.

The effect of land titling on agricultural investment and output is far from conclusive. Particularly in the Sub-Saharan context, the evidence from studies points to varying conclusions. In Kenya, Migot-Adholla et al. (1994) find that tenure security does not have a significant impact on improved agricultural practices, with the exception of Lumukanda district. Similarly Migot-Adholla et al. (1991) find no correlation between tenure security and investment on land. In some instances, such as Pinckney and Kimuyu (1994) findings, local land rights were found to be sufficient in catalyzing farm investments. Roth et al. (1994a) and Roth et al. (1994b) find in studies both in Uganda and Somalia no significant relationship between titling and investments, albeit showing a positive relationship between short-term investments such as fencing and titling. More interestingly, (Harrison 1992) from a study in Zimbabwe finds that smallholder farmers without any legal ownership rights have increased agricultural yield on par with commercial farms.

Other researchers have looked at the issue from a slightly different angle. For example, Gavian and Fafchamps (1996), find that communal vs. individual ownership does not bear significant difference when it comes to long term investment on land. Finally, both Saul (1993) and De Zeeuw (1997) have found that land ownership is no different a determinant than borrowing when it comes to long term investment.

Hypothesis

i. Land certification positively determines land related investments by way of planting trees amongst rural households of the study population.

Theoretical Model Specification

This study will assess impact of land certification on land related investments and identify the relationship of other determinant variables to land related investments in Oromia and SNNPR. Data containing information on whether households intend to undertake new land-related investments, specifically tree planting, on their registered, certified or in-the-process of certification lands.

I will try to reveal Alemu's hypothesis testing (Alemu 1999), as has been employed by (Holden & Yohannes 2002), which stipulates that relatively larger farm sized households feel more tenure insecure than those with relatively less land, to my particular case analysis. The intention of tree planting can be demonstrated in a simple model as:

I= N(C),

Where ***I*** is the probability of households' intention to invest i.e. plant trees and ***C*** is households' ownership of a certificate. Hence, if the intent to invest is influenced by possession of certificate, the above hypothesis implies that;

$$\frac{\partial I}{\partial C} > 0$$

Hence, taking into account the possible impacts of additional variables such as total farm size, household characteristics and incorporating Kebele level control dummies for location specific heterogeneity, the model can be summarized as follows;

$$I = f(C, F, D_k, Z^h)$$

Where

I denotes investment intention of a household (dependent variable). A Dummy Variable 1 if household intends to plant trees and 0 otherwise.

C denotes a dummy variable for ownership of a land certificate as a proxy for tenure security and takes value 1 if household possesses certificate and 0 otherwise. A positive effect is expected if the variable results in tree planting intentions; the more tenure secured they are the more they invest on their land.

F denotes farm size, may have Positive relationship as farm size increases.

D_k denotes kebele dummies to control for location specific heterogeneity.

Z^h denotes household characteristics such as:

- *Household head age(HHage), may have* negative coefficient if older household heads tend not to invest and positive otherwise
- *Sex of household head, may have* positive effect if male household feels more secure and intends to invest and negative otherwise
- *Educational level of household head, may have* positive effect if a household possesses more years of schooling compared to less or no level of education
- *Total work force,* the sign for this variable may be positive since households who have a high number of individuals in the age group between 16-65 i.e., total work force as defined for this literature, tend to acquire enough labor at their disposal to invest in tree planting.

Econometric Estimation

I used maximum likelihood fixed effect probit models for estimation by creating 17 Kebele dummies to control for village level omitted variables or unobserved factors that affect investment. To correct for cluster sampling, robust estimation has been employed. .

Since the investment variable I_i is a binary, i.e. having two possible outcomes denoted by 1 and 0, and if X_i represents vector regressors (i.e.$C_i, F_{i,} Z_{i,}$ and D_i) the general probit equation takes the form

$$Pr(I_i = 1 \mid C_i, F_i, Z_i, D_i) = \phi(\beta_1 + \beta_2 C_i + \beta_3 F_i + \beta_4 Z_i + \beta_5 D_i)$$

Where,

β is a vector of parameter estimates

ϕ is a cumulative distribution function which is normal in this case

Pr is probability of the response

And if X_i represents vector regressors (i.e $C_i, F_{i,} Z_{i,}$ and D_i) , the Maximum Likelihood Function is,

$$\ln(\beta) = \sum_{i=1}^{n} (I_i ln\, \phi\, (x_i'\beta) + (1 - I_i) \ln[1 - \phi(x_i'\beta)])$$

Maximum likelihood estimator $\widehat{\beta}$, if the model is correctly specified, is consistent, asymptotically, normally distributed and efficient as long as E (XX') exists.

DATA AND DESCRIPTIVE STATISTICS

The empirical estimation is based on a representative survey of 470 farm households conducted in Oromia and Southern Nations and Nationalities in Ethiopia in 2012. Households from 17 kebeles were covered during this specific analysis. As mentioned in (Holden et al. 2008) Wollita is one of the most densely populated areas in Ethiopia. Arsi Negel, a district in the Oromia Region, has been included in the survey due to the prevalence of high sense of tenure insecurity in the area as previous studies have revealed (Holden & Yohannes 2002). The general survey was conducted in three zones i.e. West Arisi, Sidama and Wollaita. However, due to convenience and availability of information for analysis, in line with the study topic, 470 households in Wollita and West Arisi from SNNP and Oromia regions respectively were considered for analysis in this study.

Table 1: Overview of Variables

	Region					
	1. Oromia (West Arisi Zone)		**2. SNNP (Wollita Zone)**		**Total**	
Variables	***Mean***	***N***	***Mean***	***N***	***Mean***	***N***
Farm size	0.77	278	0.44	192	0.63	470
Has certificate	0.86	278	0.79	192	0.83	470
Incentive of certificate on tree planting	0.72	278	0.58	192	0.66	470
Household head sex	0.55	278	0.88	192	0.69	470
House hold head age	46.49	278	43.68	192	45.34	470
Household family size	7.40	278	7.30	192	7.36	470
Family status	1.17	278	1.07	192	1.13	470
Land type *	1.18	124	1.00	1	1.18	125
Fertility *	1.94	127	.	0	1.94	127
Distance from home	28.08	109	2.60	92	16.42	201
Education	3.25	278	2.66	192	3.01	470
Farm experience	26.87	278	24.85	192	26.04	470
Tree planting interest on any plots	0.90	278	0.64	192	0.79	470
Male work force	2.12	278	2.08	192	2.10	470
Female work force	1.86	278	1.99	192	1.91	470
Total work force	3.95	278	4.04	192	3.99	470

* The data for these variables was missing in the Wollaita dataset; hence, no analysis has been made at this point.

Table 1 above illustrates general household characteristics and attributes which may suggest that changes in these arrangements could have an important impact in their decision on land related investments, specifically tree planting. It displays households' profile from different regions in Oromia and SNNP (Wolliata Zone).

Accordingly, the average household is composed of 7.4 and 7.3 persons for Oromia and Wollita regions respectively; while households in Wollita are primarily male-headed with 88% (only 12% are female-headed). The average household head age is comparable for both at 43.68 years old for Wollita and 46.49 for Oromia. Household heads in both regions have attended on average 3.1 years of schooling. However, the data shows that 45.96 % of household heads are illiterate. Not surprisingly, the data also suggests that households headed by the older generation comprise the majority of the illiterate.

With regards to land certificates, 86% and 79% percent of the households in Oromia and Wollita regions respectively, possess land certificates. In Oromia, 90% of the households are more likely to plant trees on any plot and 86% of the households believe that legalizing land ownership through certification will encourage them to plant trees on their land. Though the margin is quite small, the difference between the existing intention of tree planting (79%) and impact of certificate ownership on tree planting (66%) triggers an interesting question with regards to the direction of causality i.e., whether households invest to guarantee tenure security or rather, whether tenure security leads to on farm, long term investment. Similarly in Wollita, 79% of households are likely to plant trees on any plot and 64% believe that certification would have a positive impact on tree planting.

The average land holding for a family in Oromia is 0.77 hectares while a household in Wolitta has an average farm size of 0.44 hectares. This would imply the difference in the nature of population distribution in the two regions and hence can be attributed to the higher population density of Wollitta. Accordingly, the average farm distance from home in Oromia is 28 minutes of walking, which is considerably higher compared to Wollita's 2.6 minutes. A household farm experience is almost similar in both regions with a combined average of 26.04 years.

Finally, the distribution of work force among the household in both regions is very similar. The average household in the total sample is comprised of 2.1 men to 1.9 female work forces and a combined average work force of 3.99 persons per household.
In general, at the descriptive, statistical analysis level, there seems to be enough evidence from respondents suggesting that a formal land tenure arrangement can potentially lead to a higher level of confidence for farmers to increase their engagement in land related investments.

Some of the household characteristic variables mentioned in the above table such as *land type, fertility* and *distance from home* have not been taken into account in the econometric analysis, which will be discussed in the next chapter, because values for most of the observations in the data set have been found to be missing.

ECONOMETRIC RESULTS AND DISCUSSION

The result from maximum likelihood probit model estimation indicates that the *certificate* variable significantly and positively determines household intention to plant trees which confirms the hypothesis of the study. The coefficient indicates that households who possess certificates are more likely to plant trees on their land, which in turn may imply a boost in the sense of tenure security and engagement in long term investment.

One can argue that the *certificate variable* is endogenous since its allocation across households is less likely to be random. A previous study (Deininger et al. 2008) used an indicator of certification at the community level and argued that there is little reason to worry about endogeneity because the sequence of rolling out of the program was determined at the Woreda level based on non-economic criteria. This argument may not however carry over to household level analysis since certificate allocation within Kebeles may depend on community and household characteristics. However, since the estimated model in this study controls for these potentially confounding variables, endogeneity caused by correlation with certificate ownership is not an issue. Furthermore, a pairwise correlation matrix presented in the appendix 2 shows that *certificate* has no significant relationship with most of the independent variables in the model except with *total workforce,* which is only significant at the 10% level. Meanwhile, household level unobserved heterogeneity may be another source of endogenous certificate ownership. However, given the cross sectional nature of the data, it is not possible to adequately address this problem.

TABLE 2: Probit Model of Determinants of Investment

	Probit	
	Marginal Effect	
Certificate	0.229***	(3.37)
sex ("1 if male headed, 0 otherwise")	-0.0410	(-0.61)
hhhage (Age of household head)	-0.00308	(-1.03)
Education (Household head education in years)	0.00265	(0.37)
farmexp (Household head experience in farming years)	0.00572+	(1.80)
totwf (Total 15-65 years old)	0.0391**	(3.25)
area-2 (Farm Size)	0.0641*	(2.14)
dkebelle2012==1. Abaro	0.0153	(0.12)
dkebelle2012==3. Shere Borena	0.191*	(2.35)
dkebelle2012==4. Maja Dema	0.105	(0.89)
dkebelle2012==5. Bulcha Deneba	0.0857	(0.70)
dkebelle2012==6. Ashoka	-0.00853	(-0.08)
dkebelle2012==7. Gorbi Derera	0.0355	(0.30)
dkebelle2012==8. Makoda	0.144	(1.57)
dkebelle2012==9. Gembelto	0.190*	(2.46)
dkebelle2012==10. Gununo	0.0596	(0.62)
dkebelle2012==11. Doge Shakisho	0.0515	(0.49)
dkebelle2012==12. Doge Mashido	-0.0627	(-0.58)
dkebelle2012==14. Damba Zamine	-0.294	(-1.53)
dkebelle2012==17. Medo	0.111	(0.92)
dkebelle2012==19. Ebicha	0.0269	(0.19)
dkebelle2012==20. Gununo 01	0.0412	(0.30)
dkebelle2012==21. Gununo02	0.105	(0.57)
Observations	470	

Marginal effects; z statistics in parentheses

(d) for discrete change of dummy variable from 0 to 1

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Total work force is another variable which has a result statistically significant at the 1% level. This seems to suggest that those farm households possessing abundant levels of work force are more likely and capable of engaging in land related investments in general, and tree planting specifically. Likewise, the significant correlation highlights the labor intensive nature of tree planting activities. The *female and male work* force variables were omitted from inclusion in the model during regression for they resulted in insignificant values. Household size was also found to have high correlations with total work force and hence was dropped from the analysis in the regression. Furthermore, taking into account the highly laborious nature of tree planting, it is more sensible and logical to take into consideration household's work force availability rather than family size.

Another variable that is significant at the 5% level and showing a positive correlation is *farm size*. This implies that a marginal increase in farm area size, leads farmers to more likely engage in tree planting. Furthermore, as the study area profile suggests, households' land size is relatively small compared to other parts of the country and hence, implying less available area for farmers to engage other than crop production. However, there seems to be a keen interest from farmers to still engage in tree planting.

Households' head farm experience, as can be seen from the result, indicates a 10% level of significance. It suggests that the more farm experience a household accumulates, the more he/she is likely to be engaged in land related investments. This could be either to better manage the land or reap profit from long term investments.

Results for other variables such as *household head sex* and *age* came out insignificant and seem to suggest that these variables matter less or play no role in households' decision to engage in land related investments. However, the statistically insignificant result for households' level of education can be attributed to the prevalence of very high number of observations who are illiterate or possess low level of education status in the areas under study.

CONCLUSION

The Ethiopian government's recent venture in provision of land certificates to rural households was carried out with the assumption that they would provide increased tenure security. Indeed, some of the above mentioned studies reveal that increased tenure security would result in higher farm investments and better management of land either through conservation, or ultimately boosting productivity. To that end, this paper attempted to assess how big of a role certification plays in determining farmers' intentions towards enhancing their involvement in investment amid other factors such as farm size and household characteristics.

The key result from this study is that certification significantly increases the probability that individuals will plant trees on their land, suggesting that certification does indeed provide an important incentive for increased and long term land investment. Hence, if coupled with other important components for investment to actually prevail on the ground, such as access to credit, certification would encourage farmers to venture in areas that could enhance productivity, thereby resulting in strengthened livelihoods.

In conclusion, the value of certification to farm households from this study is evident through increased tree planting and the ultimate accrual of any benefits from such investments. However, from a broader level of investment perspective, it's difficult to surmise that certification is a determinant factor in land investment decisions, and hence, a more detailed study is essential. Furthermore, given that recent proclamations prohibit farmers from planting trees on arable land due to food security concerns, the impact of certification on tree planting is ambiguous at best, i.e., are farmers planting trees despite the certificate or because of it? If time and resource allows, a more differentiated research that takes into account the time dimension nature of investment and the opportunity cost of resources used is required.

REFERENCES

Alemu, T. (1999). *Land tenure and soil conservation: Evidence from Ethiopia*: Göteborg University.

Ault, D. E. & Rutman, G. L. (1979). The development of individual rights to property in tribal Africa. *Journal of Law and Economics*, 22 (1): 163-182.

Barzel, Y. (1989). *The Economics of Property Rights*: Cambridge University Press Cambridge.

Binswanger, H. P., Deininger, K. & Feder, G. (1995). Power, distortions, revolt and reform in agricultural land relations. *Handbook of development economics*, 3: 2659-2772.

Brasselle, A.-S., Gaspart, F. & Platteau, J.-P. (2002). Land tenure security and investment incentives: puzzling evidence from Burkina Faso. *Journal of Development Economics*, 67 (2): 373-418.

Carter, M., Wiebe, K. (1994). B. Blarel, 1994,'Tenure Security for Whom? Differential Effects of Land Policy in Kenya'. *Bruce and Migot-Adholla*.

Conning, J. & Robinson, J. Land Reform and the Political Organization of Agriculture, 2002. *CEPR, London*.

David A, A. (1990). Land registration in Africa: The impact on agricultural production. *World Development*, 18 (5): 659-671.

De Soto, H. (2000). *The mystery of capital: Why capitalism triumphs in the West and fails everywhere else*: Basic books.

De Zeeuw, F. (1997). Borrowing of land, security of tenure and sustainable land use in Burkina Faso. *Development and Change*, 28 (3): 583-595.

Deininger, K. (2003). Land policies for growth and poverty reduction. *A publication of the world bank and Oxford University Press, The World Bank.*

Deininger, K. & Jin, S. (2006). Tenure security and land-related investment: Evidence from Ethiopia. *European Economic Review*, 50 (5): 1245-1277.

Demsetz, H. (1967). Toward a theory of property rights. *The American economic review*, 57 (2): 347-359.

Feder, G. (1987). Land ownership security and farm productivity: evidence from Thailand. *The Journal of Development Studies*, 24 (1): 16-30.

Feder, G. & Feeny, D. (1991). Land tenure and property rights: theory and implications for development policy. *The World Bank Economic Review*, 5 (1): 135-153.

Gavian, S. & Fafchamps, M. (1996). Land tenure and allocative efficiency in Niger. *American Journal of Agricultural Economics*, 78 (2): 460-471.

Harrison, P. (1992). What is going right with African agriculture. *The Challenges of Agricultural Production and Food Security in Africa (Crane Russak, Washington, DC)*: 129-138.

Holden, S., Tefera, T., UNHABITAT, S. B. & Tenure, L. From Being Property of Men to Becoming Equal Owners? Early Impacts of Land Registration and Certification on Women in Southern Ethiopia.

Holden, S. & Yohannes, H. (2002). Land redistribution, tenure insecurity, and intensity of production: A study of farm households in Southern Ethiopia. *Land Economics*, 78 (4): 573-590.

Holden, S., Tefera, T., UNHABITAT, S. B. & Tenure, L. (2008). From Being Property of Men to Becoming Equal Owners? Early Impacts of Land Registration and Certification on Women in Southern Ethiopia. *Unpublished report for UNHABITAT*.

Johnson, O. E. (1972). Economic analysis, the legal framework and land tenure systems. *Journal of Law and Economics*: 259-276.

L.J Alston, B. M., G Libecap. (1999). conflict, and land use: the development of property rights and land reform on the Brazilian Amazon frontier. Economics, cognition, and society series *University of Michigan Press, Ann Arbor*

Migot-Adholla, S., Hazell, P., Blarel, B. & Place, F. (1991). Indigenous land rights systems in sub-Saharan Africa: a constraint on productivity? *The World Bank Economic Review*, 5 (1): 155-175.

Migot-Adholla, S. E., Place, F., Oluoch-Kosura, W. & Bruce, J. (1994). Security of tenure and land productivity in Kenya. *Searching for land tenure security in Africa.*: 119-140.

Moor, G. (1996). Tenure security and productivity in the Zimbabwean small farm sector: implications for South Africa. *PhD diss. Department of Agricultural Economics, University of Natal, Pietermaritzburg, South Africa*.

Nantongo, M. G. (2011). *Impact of legal reform on sustainable land management in Tigray, Ethiopia*. [Ås]: [M.G. Nantongo]. VI bl., 73 s. pp.

Nugent, J. B. & Robinson, J. A. (2010). Are factor endowments fate? *Revista de Historia Economica/Journal of Iberian and Latin American Economic History*, 28 (01): 45-82.

Pinckney, T. C. & Kimuyu, P. K. (1994). Land tenure reform in East Africa: good, bad or unimportant? *Journal of African Economies*, 3 (1): 1-28.

Rahmato, D. (1984). *Agrarian reform in Ethiopia*: Nordic Africa Institute.

Roth, M., Cochrane, J., Kisamba-Mugerwa, W., Bruce, J. & Migot-Adholla, S. (1994a). Tenure security, credit use, and farm investment in the Rujumbura pilot land registration scheme, Uganda. *Searching for land tenure security in Africa.*: 169-198.

Roth, M., Unruh, J., Barrows, R., Bruce, J. & Migot-Adholla, S. (1994b). Land registration, tenure, security, credit use, and investment in the Shebelle region of Somalia. *Searching for land tenure security in Africa.*: 199-230.

Saul, M. (1993). Land custom in bare: agnatic corporation and rural capitalism in western burkina. *Land in African agrarian systems*: 75-100.

SNNPR. (2007). *SNNPR Rural Land Administration and Utilization Proclamation*, 110/2007.

State, O. N. R. (2007). Proclamation to amend the proclamation No. 56/2002, 70/2003, 103/2005 of Oromiya Rural Land Use and Administration.

Zevenbergen, J. (2005). Implementing new land legislation in Africa. *Tenure security and certification in rural Ethiopia*.

Zimmerman, F. & Carter, M. R. (1996). Rethinking the Demand for Institutional Innovation Land Rights and Land Markets in the West African Sahel: University of Wisconsin Madison, AAE.

APPENDIX 1: FIXED EFFECT PROBIT REGRESSION

```
. probit  treeplanteffect certificate sex hhhage education farmexp totwf area_2 dkebelle20121 dkebelle20122 dkebelle2
> 0123 dkebelle20124 dkebelle20125 dkebelle20126 dkebelle20127 dkebelle20128 dkebelle20129 dkebelle201210 dkebelle201
> 211 dkebelle201212 dkebelle201213 dkebelle201214 dkebelle201215 dkebelle201216, r

Iteration 0:   log pseudolikelihood = -300.07736
Iteration 1:   log pseudolikelihood =   -268.171
Iteration 2:   log pseudolikelihood = -268.02992
Iteration 3:   log pseudolikelihood = -268.02991

Probit regression                                 Number of obs   =        470
                                                  Wald chi2(23)   =      58.25
                                                  Prob > chi2     =     0.0001
Log pseudolikelihood = -268.02991                 Pseudo R2       =     0.1068
```

treeplanteffect	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
certificate	.6054199	.1750445	3.46	0.001	.262339	.9485009
sex	-.1163012	.1919808	-0.61	0.545	-.4925768	.2599743
hhhage	-.0086314	.0083998	-1.03	0.304	-.0250946	.0078319
education	.0074317	.0202052	0.37	0.713	-.0321697	.0470332
farmexp	.0160411	.0088904	1.80	0.071	-.0013837	.0334659
totwf	.1097032	.0338705	3.24	0.001	.0433182	.1760881
area_2	.1797946	.0841362	2.14	0.033	.0148908	.3446985
dkebelle20121	.0433595	.3744796	0.12	0.908	-.6906071	.7773261
dkebelle20122	.6446226	.3541614	1.82	0.069	-.049521	1.338766
dkebelle20123	.3193694	.3967665	0.80	0.421	-.4582786	1.097017
dkebelle20124	.2559584	.392867	0.65	0.515	-.5140467	1.025963
dkebelle20125	-.0238408	.3060527	-0.08	0.938	-.6236932	.5760115
dkebelle20126	.10189	.3472683	0.29	0.769	-.5787434	.7825233
dkebelle20127	.4517528	.3316738	1.36	0.173	-.1983159	1.101821
dkebelle20128	.6374917	.3296737	1.93	0.053	-.0086568	1.28364
dkebelle20129	.1736361	.2926521	0.59	0.553	-.3999515	.7472237
dkebelle201210	.1494851	.3169893	0.47	0.637	-.4718025	.7707727
dkebelle201211	-.1709177	.2852732	-0.60	0.549	-.7300428	.3882075
dkebelle201212	-.7588757	.4992594	-1.52	0.129	-1.737406	.2196547
dkebelle201213	.3422389	.4150155	0.82	0.410	-.4711765	1.155654
dkebelle201214	.0767163	.4213912	0.18	0.856	-.7491952	.9026278
dkebelle201215	.1188602	.4072364	0.29	0.770	-.6793085	.9170289
dkebelle201216	.3208635	.6296724	0.51	0.610	-.9132717	1.554999
_cons	-.7191462	.364499	-1.97	0.048	-1.433551	-.0047414

. mfx

Marginal effects after probit
      y = Pr(treeplanteffect) (predict)
         = .68280207

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
certif~e*	.2293477	.06814	3.37	0.001	.0958	.362896	.831915
sex*	-.0409829	.06684	-0.61	0.540	-.171994	.090028	.687234
hhhage	-.0030753	.00299	-1.03	0.304	-.008944	.002793	45.3383
educat~n	.0026478	.00719	0.37	0.713	-.011453	.016749	3.00851
farmexp	.0057153	.00317	1.80	0.071	-.000497	.011927	26.0447
totwf	.0390861	.01201	3.25	0.001	.015549	.062623	3.98936
area_2	.0640589	.02988	2.14	0.032	.005502	.122616	.632906
dk~20121*	.0153038	.1309	0.12	0.907	-.241251	.271858	.055319
dk~20122*	.1907469	.08129	2.35	0.019	.031414	.35008	.053191
dk~20123*	.1050134	.11839	0.89	0.375	-.12703	.337057	.055319
dk~20124*	.0857345	.12244	0.70	0.484	-.154245	.325715	.059574
dk~20125*	-.0085343	.11006	-0.08	0.938	-.224253	.207185	.078723
dk~20126*	.0355089	.11818	0.30	0.764	-.196122	.26714	.070213
dk~20127*	.1439781	.09159	1.57	0.116	-.035534	.323491	.085106
dk~20128*	.190239	.07735	2.46	0.014	.038628	.34185	.065957
dk~20129*	.0596339	.0965	0.62	0.537	-.129512	.248779	.095745
d~201210*	.051508	.10529	0.49	0.625	-.15485	.257866	.068085
d~201211*	-.0626795	.1073	-0.58	0.559	-.272974	.147615	.104255
d~201212*	-.2939179	.19183	-1.53	0.125	-.669907	.082071	.019149
d~201213*	.1111254	.12044	0.92	0.356	-.124934	.347185	.02766
d~201214*	.0268572	.1448	0.19	0.853	-.256955	.310669	.040426
d~201215*	.0411562	.13672	0.30	0.763	-.226806	.309118	.029787
d~201216*	.1046153	.18405	0.57	0.570	-.256107	.465338	.014894

(*) dy/dx is for discrete change of dummy variable from 0 to 1

APPENDIX 2: PAIRWISE CORRELATION MATRIX

```
. pwcorr  sex hhhage education farmexp  totwf certificate, star(.10)
```

	sex	hhhage	educat~n	farmexp	totwf	certif~e
sex	1.0000					
hhhage	-0.0708	1.0000				
education	0.0223	-0.3466*	1.0000			
farmexp	-0.0345	0.8197*	-0.3473*	1.0000		
totwf	0.0159	0.3777*	-0.0226	0.3701*	1.0000	
certificate	-0.0087	-0.0140	0.0620	-0.0011	0.0773*	1.0000