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Role of Social Norms in Natural Resource Management: The Case of the Communal Land Distribution Program in Northern Ethiopia

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Abstract: The increasing population pressure in the rural areas of Sub-Saharan Africa has caused land degradation as well as an increase in the number of landless farmers. To promote a conservation-oriented utilization of communal lands and increase the livelihood of poor farmers, the Ethiopian government introduced a program to distribute less-utilized communal lands to landless farmers. This study identified the social norms related to natural resource conservation that affect the participation in this program. Using data from 477 farmer households in northern Ethiopia, we estimated probit models with endogenous regressors for the determinants of social norms and their impacts on program participation. The results show that social norms related to conservation positively affect program participation. Regarding policy implication of the findings, an intervention to improve the social norms of local farmers leads to sustainable resource conservation without reducing intrinsic motivation of the local people. A conservation-oriented utilization of the communal lands would be more effective if the land distribution program was accompanied by other programs to improve the social norms in the villages.

Keywords: natural resource management; norms; collective action; hillside distribution

1. Introduction

Population pressure on arable land is a global issue, although it occurs differently in different contexts. In this study, we analyzed it in the Ethiopian context, which is characterized by significant dilemmas about how to bring simultaneous improvements to both natural resource management and rural well-being [1]. Such challenges have mainly arisen due to rapid increases in rural populations, and numerous countries are struggling to increase their per capita farm incomes [2,3]. The high population pressure on arable land has caused farmland scarcity. In developing countries, poverty and improper land management institutions increase the negative impact of population growth [4–6]. Social norms have had a continuing impact on human well-being and environmental condition across the globe. This study identified the social norms related to natural resource conservation in the Ethiopian context and how they affect participation in conservation-oriented government programs.

In Ethiopia, the total population increased by four times between 1965 and 2015; as a result, per capita arable land decreased to about one third of what it was in 1965 [7]. This has resulted in a lack of opportunity for people to improve their livelihoods in areas where non-farm employment opportunities are limited. In particular, the population pressure has created many landless farmers in

the Ethiopian highlands [8,9] and increased animal grazing and firewood collection from the communal lands, resulting in the degradation of natural resources [3,10].

To solve the problem of land shortages in rural areas while conserving the communal lands, the government of the Tigray region in Ethiopia introduced a program in 2011 to distribute communal lands to landless farmers [11,12]. This program encourages farmers to conduct productive activities that contribute to land conservation, such as forestry, agroforestry, and fruit cultivation, on less-utilized communal lands. Although this program is expected to benefit farmers, lead to income growth, and achieve soil and water conservation, participation rates differ among the communities. Using the survey data from various environments, including lowlands and highlands, in the Tigray region, Berhe and Hoag [12] showed that social and administrative factors affect program participation. However, the participation rates vary even between districts where natural and socioeconomic conditions are almost identical; thus, the participation rates must be affected by other factors.

Ostrom [13,14] and other social scientists argued that norms are important sources of collective action for natural resource conservation. Chen, et al. [15] showed that social norms have a positive impact on the participation in a farmland set-aside program for conservation in China. Without social norms, conservation cannot be sustained in the long term [16]. According to this study, participation rates are affected by the social norms in communities regarding natural resource conservation. Social norms are customary forms of behavior to which individuals in a society try to conform [17], and they dictate the behavior of individuals in similar environments [18]. They are collaboratively adopted rules by people in a society [19] and come from a shared understanding of behavior and attitudes [20].

While there are numerous studies on the determinants of soil and water conservation in the rural areas of Sub-Saharan countries, especially in Ethiopia [10,21–25], few studies explicitly investigate the role of social norms in soil and water conservation [26,27]. Since Weber [28], social norms have been considered as a potential impetus to economic development. Social norms influence collective action with regard to public goods through considerations of fairness [29], reciprocity, and trust [14], and they are key drivers of cooperative behavior with respect to common-pool resources [30]. In areas with high moral norms, villagers actively help in the preparation for land distribution, which results in higher demand for distributed land. Delaney and Jacobson [31] argued that a social-norms-based approach is more efficient for the management of common-pool resources than an economic-incentive-based approach. As benefits from land conservation extend to all downstream areas, land conservation affects not only people in the targeted area but also others within the same watershed. Moreover, natural resource management is related to social preferences such as altruism and reciprocity in a community [32–34]. The problem addressed by this study is determining whether social norms for communal land conservation contribute to the participation in Ethiopian conservation programs. This is important because, if such social norms do not matter, participation will not continue in the long term.

Norms also affect the motivation to provide public goods [35–38]. In their laboratory experiment, Delaney and Jacobson [31] persuasively showed that communal resource management results in more efficient outcomes than monetary subsidies do. The field experiments of Ansink, Tesfaye, Bouma and Brouwer [32], Bouma, Bulte and van Soest [33] also showed the positive effects of social norms. Beekman and Bulte [39] attempted to ascertain the effects of social norms, including altruism, on soil and water conservation in Burundi. They found that trust is correlated with investment in erosion management while altruism is not. Conversely, Akresh, et al. [40] argued that altruism reduces incentives to cooperate. Thus, looking at past studies, the effects of social norms on conservation are rather ambiguous, and there is insufficient evidence to clearly identify the effects of social norms on conservation work.

The main objective of this study was to conduct a quantitative investigation of whether social norms affect the participation in the Ethiopian communal land distribution program. We first estimated the major determinants of conservation program participation to identify whether social norms also affect the participation.

If social norms were found to have a positive impact on the conservation participation, it would provide possible implications for the development of conservation programs. Although many conservation programs are based on monetary subsidies—for instance, the provision of per-diem compensation for conservation activities in developing countries such as those in Sub-Saharan Africa—researchers have found that, thus far, such strategies have not been sustainable in the long term [41]. This study showed that an improvement in social norms leads to an increase in the participation in conservation activities, which would present an effective alternative to development strategies that depend on monetary incentives.

2. Theoretical Framework

Social norms are customary or formal rules formed by the consensus of the people in a community [17], which are required for common-pool resource management [14].[1] Norms increase the reduction of transaction costs in a community [42,43] and contribute to economic development [44–51]. Some studies on consumers' preference for environmental conservation show that norms have certain impacts on people's behaviors [36,52,53].[2] In terms of natural resource management, Mango, et al. [57] showed that local people's awareness contributes to natural resource conservation, although it is limited to personal norms. Most previous studies on the factors affecting natural resource management use frameworks under which conservation activities are determined by the individual characteristics of local people; social characteristics of communities, such as land property rights; and geographical characteristics [22,23,58,59]. In these cases, social norms are implicitly assumed to be one of the many noise factors that do not have significant effects on conservation activities and are independent of other factors such as individual and social conditions. However, it is more realistic to consider that social norms are not innate in a society, but rather they are formed or changed according to the characteristics of individuals and conditions of the society [14]. In terms of communal land management, social norms are possibly affected by the characteristics of communal lands, such as the availability or accessibility of resources.

Figure 1 is a conceptual diagram showing the factors of land conservation activity in this study. The major determinants of land conservation activity are personal characteristics of community members; social and geographical conditions, including institutional factors; and the social norms regarding communal land conservation in the community. While personal characteristics and social and geographical conditions are exogenous, conservation-related social norms are affected by the characteristics of communal land as well as individual, social, and geographic conditions.

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[1] There are various definitions of social norms. To enable quantitative analysis, we use the rather narrow definition employed by Burke et al. [17].

[2] Recently, much research attention in social psychology has been given to the role of social identity in the formation of social norms for pro-environmental behaviors [54–56].

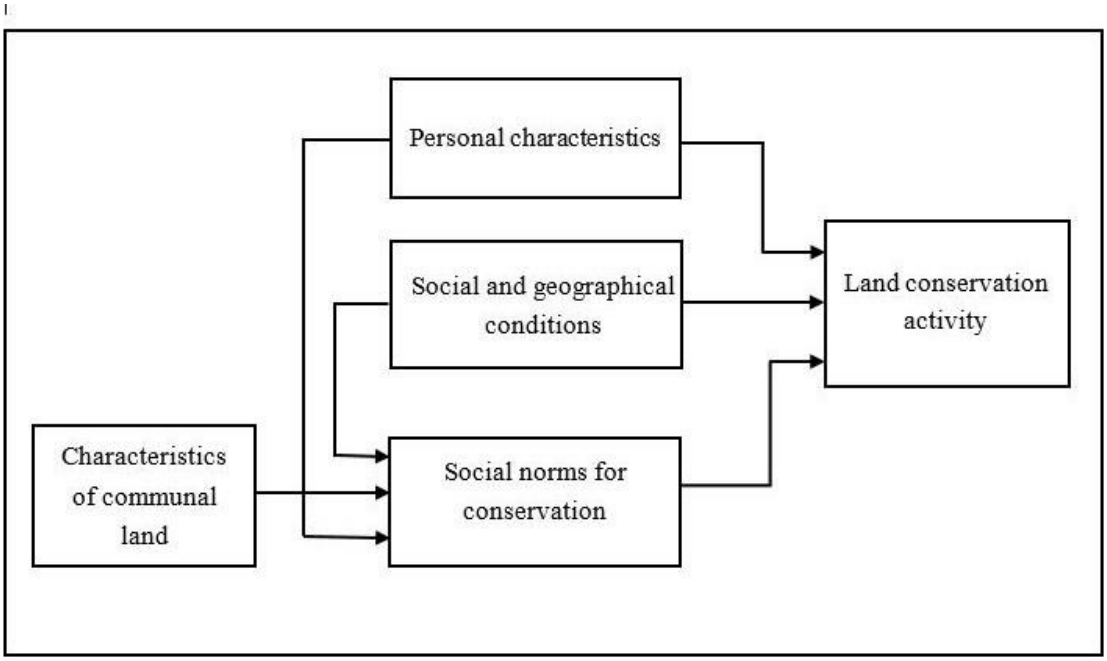

Figure 1. Conceptual framework for factors of conservation activity.

3. Communal Land Distribution in Ethiopia

Land is a state property in Ethiopia. The government allocated lands to individual farmers during the transition from a socialist regime in the 1990s [60]. The first regional land proclamation in Ethiopia was established in the Tigray region in 1997, and rural land registration and certification were then implemented [8]. However, numerous farmers who were not registered during the allocation period, or who were not yet born, do not own farmlands. Although farmlands that belonged to deceased people were given to landless, young farmers, the rapid increase in local population has kept such land transfers from addressing landlessness. This resulted in the creation of young, landless farmers. Note that landless farmers are those who do not have their own farmland but are engaged in farming through share-cropping or renting the farmlands of others [9]. Since a land title was given not to a household, but to an individual, a spouse or another family member of a landless farmer was allowed to have a farmland.

Nevertheless, Ethiopia, as with other Sub-Saharan African countries, has many communal lands controlled by local communities, especially in the Tigray and Amhara regions [61–63], many of which now face severe soil and water erosion, requiring conservation [5,64]. Soil and water conservation contributes to the improved livelihood of a community [65]. While communal lands provide fodder and firewood for cooking and heating, there is no active timber wood forestry or agroforestry production in the Tigray region [11]. Since numerous communal lands are enclosed for protection, and animal grazing and firewood collection are prohibited, opportunities for economic utilization have become limited, with large areas reserved only for manual fodder collection. Jagger and Pender [66] recommended allocating less-utilized lands for timber tree plantations to enhance farmer incomes.

To mitigate issues related to landlessness, a communal land distribution program, officially called the "Directives on Area Closure (Hillside and Gully) Development and Utilization", was begun in 2011. The program also aims to provide incentives for land conservation and income sources for landless farmers by allowing them to use communal lands for specific purposes [11,12,67]. The program covers all districts in the Tigray region and extends to some areas in other regions in Ethiopia. The program provides landless farmers with a portion of communal lands in hillside or riverside areas (called gully areas). Basically, all applications are approved by the village administration. Sometimes, there are more applicants than available land; in such cases, applicants are selected by each village (tabia)

office. Each village makes its own bylaws about how to distribute communal lands through its own assembly, and implements related programs according to its bylaws. This process is also monitored by a district (woreda) office, and no instance of corruption has been reported. While some villages select participants using their own criteria, for example, giving high priority to poorer people, other villages select them by lottery. The amount of land distributed per person varies, depending on the communal land availability. The distributed land parcels in the study area are 0.5 ha in hillside areas and 0.25 ha in the riverside ones, as riverside lands are more productive.

Economists have investigated the effects of land tenure security on productivity and investment by the farmers in Sub-Saharan Africa [21,68–72]. Some empirical studies show that the institution of land management influences land conservation activities in the Tigray region of Ethiopia [22,63,73]. This communal land distribution is a type of land tenure reform that protects natural resources, but is not similar to previous approaches, such as land privatization. While communities maintain initiatives and the authority to control communal lands, farmers have individual rights to use specific areas. As such, those allocated communal lands must be managed in accordance with the rules and regulations pre-determined by the farmers' communities and approved by their village (tabia) and district (woreda) offices. The land distribution program is administrated by villages under consultation with experts from the natural resource department in the district office. The villages decide how and where to allocate land, including the type of production for which the distributed land can be used.

The allocated land can be used throughout a participant's life as long as he/she conducts the designated conservation activity. Land utilization is pre-determined before allocation. Village administration and natural resource management experts of a district office confirm that the utilization conforms to land and water conservation. Farmers who obtain the land must follow the guidelines and maintain production that contributes to conservation of the land, such as timber tree plantation, fruit growing, agroforestry, fodder grass growing, or apiculture. Whereas most lands for distribution are located in abandoned or degraded areas not suitable for cropping, they can earn incomes from other activities which also contribute to conservation, such as tree planting and fruit or fodder grass growing. Participants and other people in their communities are willing to make structures for soil and water conservation, such as stone-bunds, terraces, and deep trenches before starting the activities. The local offices monitor the utilization after allocation. Those who use land for other purposes than initially planned or do not engage at all after distribution must return the distributed lands to their villages. Farmers do not obtain any subsidies or payments to maintain the land, but they have incentives to do so in order to increase their own incomes.

While the communal lands are allocated to individual farmers, the community decides on how the allocated land will be utilized. This is an epoch-making policy, as it can provide productive land to landless farmers while maintaining the status of a communal land. Although researchers recommend land privatization to incentivize productivity improvement [74] as well as investment in trees, farmland, and conservation [21,75,76], a communal land has the advantages of risk reduction [61] and investment in community infrastructure [77]. The communal land distribution program in Ethiopia is expected to solve this dilemma between the two types of land institution.

Those who obtain lands do not have to pay rent. While this free land distribution is likely to benefit landless farmers, many such farmers still do not apply to the program. The proportion of participants in the program varies among communities within a small area, each with similar natural and social conditions. While all eligible farmers apply for the program in the highlands in the southern zone of the Tigray region, most areas in this region, including the sites analyzed in this study, have fewer applicants.

Individuals other than the landless do not benefit from this land distribution, and even bear certain costs. The communal lands are used for animal grazing or grass collection in a cut-and-carry system. Although cutting trees for firewood on communal lands is prohibited, some individuals collect dead trees or fallen branches. If communal lands are given to landless farmers, people living around the communal lands must utilize other communal lands located farther away. Nonetheless,

everyone in a community must work to prepare the land for distribution to the program participants. If the social norms of people in a community, with respect to soil and water conservation, are higher and people are more aware of the importance of conservation activities, they are more cooperative in offering communal lands to landless farmers, and thus help with construction of structures for soil and water conservation and irrigation, or persuading others to participate. Since most village inhabitants do not benefit from the program, its implementation requires social norms related to natural resource conservation and support from the local communities.

4. Materials and Methods

The focus areas of this study are the Kilte Awelaelo (KA) District (Woreda) and Atsbi Wenberta (AW) District in the eastern part of the Tigray region in northern Ethiopia. These districts are located 40–80 km from the regional capital city, Mekelle (Figure 2). The altitude of KA is approximately 2000–2500 m and that of AW is approximately 2500–3000 m.

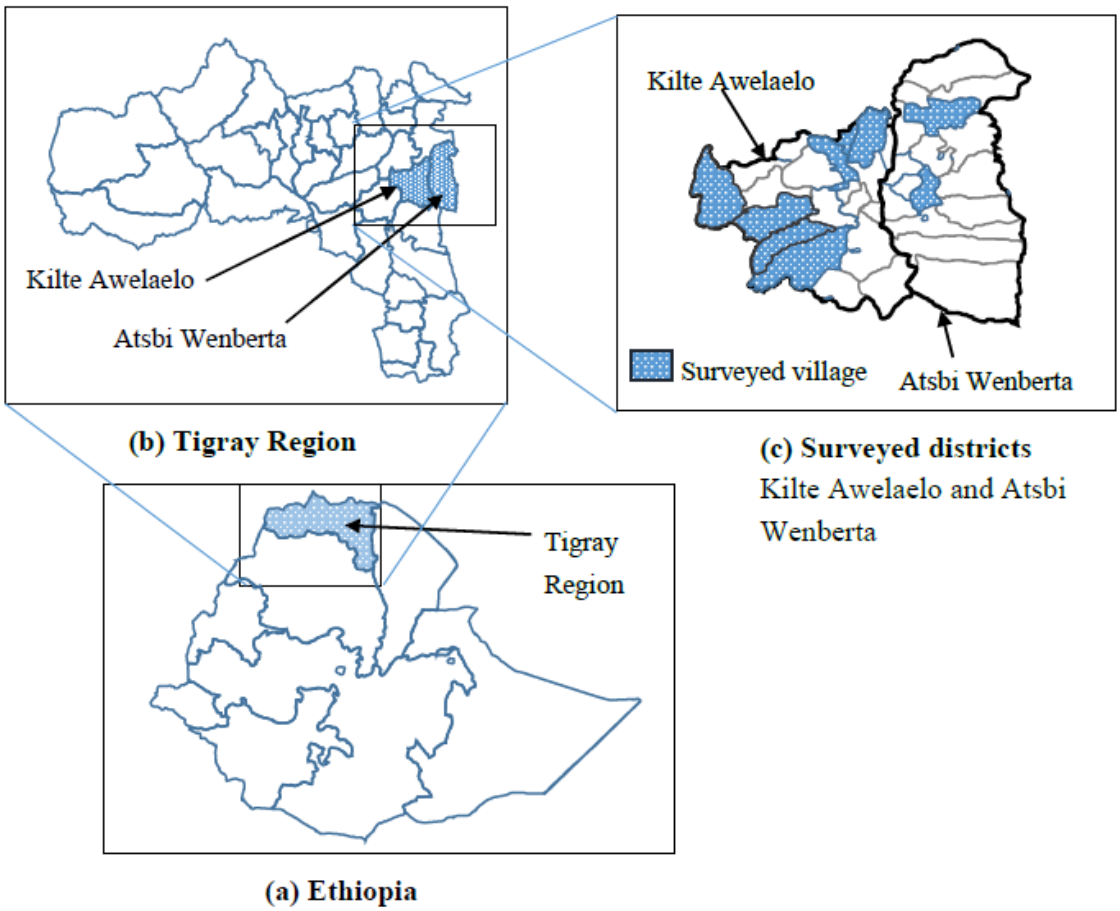

Figure 2. Survey site. (**a**) Ethiopia; (**b**) Tigray Region; (**c**) Surveyed districts.

We conducted preliminary surveys from June to October 2016 and sample surveys from February to March 2017. During the preliminary surveys, we conducted personal interviews with farmers, community (kushet) leaders, village (tabia) leaders, and district (woreda) officers in all villages and district centers. We chose villages where no priority was introduced in the participant selection process, and excluded villages that place a higher priority on poor farmers, as these would involve some arbitrariness in selection. First, we made a list of all farm households that have adults who do not have their own registered farmlands, except communal lands distributed by this program in each village. Then, we selected sample households using random numbers from the population of landless farmers; we excluded landless farmers dependent on parents, because household incomes may be significantly

different if they are not independent. We also excluded landless farmers who reside outside their villages, which would make them ineligible to participate in the program. The sample size is 477.

5. Variable Definition

The definitions of our variables are presented in Table 1. The endogenous variable, participation, is a dichotomous variable for program participation, which takes the value 1 if a farmer engaged in a program activity during the previous year, and 0 otherwise. If a program participant does not participate in any activity, even if he/she has a land, he/she is considered a non-participant.

As the community's social norms with regard to natural resource conservation, we used two types of proxy variables, following Beekman and Bulte [39]: *Enclosure* and *Activity*. *Enclosure* indicates the proportion of the total enclosure area in a village's total communal land area. Enclosure of the communal land restricts animal grazing by farmers, thus they must take their animals to the communal lands far from their homes, or they must cut grass on a communal land by hand and carry it home. This can be very time consuming. If many farmers believe that enclosing communal lands will not increase their long-term income, or even reduce their income, local communities will be unlikely to decide to close their communal lands [78]. On the other hand, if more people believe that protection of communal lands increases their long-term income, the ratio of enclosure of communal lands should be higher. Therefore, this variable is a proxy to measure the social norm of communal land conservation. Meanwhile, *Activity* is an indicator to show the working days for natural resource conservation activities per person in a village. Conservation activities include construction of structures for soil and water conservation, so-called stone bunds, soil bunds, half-moons, and eyebrows. To compute total conservation, the amount (i.e., length, volume, or number) of each structure is divided by the standard amount per person and by the population of working-age adults (above 16 years old). Then, the working days for all types of structures are summed. The standard amount of conservation activity per person is determined by the regional government and is commonly used: for example, one person can build a four-meter stone or soil bund, a three-meter hillside terrace, a deep trench with a capacity of one-cubic meter, two sets of half-moon, or an eyebrow-type structure for planting nursery trees per day. Using the record for structures built in the previous year in each village, we computed the total amount of working days per person.

Table 1. Descriptive statistics of variables.

Variable	Definition of Variables	Mean	S.D.	Minimum	Maximum
participation	Participated in the communal land distribution program	0.64	-	0	1
enclosure	Proportion of area enclosure in the communal land	0.94	0.06	0.85	1.00
activity	Working days for conservation per person	0.74	0.71	0.11	2.84
family size	Number of dependent family members	4.98	1.98	1.00	11.00
female	Female-headed household	0.09	-	0	1
age	Age of household head	35.6	7.7	20.0	66.0
educ1–4	Head completed 1–4 years education	0.32	-	0	1
educ5–8	Head completed 5–8 years education	0.30	-	0	1
educ9–16	Head completed more than 8 years education	0.14	-	0	1
livestock	Number of animals (TLU)	3.02	2.12	0.00	13.60
equipment	Total value of farm equipment and asset (1000 ETB)	0.24	1.07	0.00	20.33
own-land	Area of own farmland in hectares	0.23	0.28	0.00	1.75
shared-land	Area of share-cropping farmland (hectares)	0.29	0.33	0.00	1.69
irrigation	Any farmland is irrigated	0.06	-	0	1
safety net	Working for the safety-net program	0.75	-	0	1
working outside	Off-farm employment outside of village	0.07	-	0	1
remittance	Received remittance	0.02	-	0	1
distance	Walking distance to a village center (km)	4.10	3.50	1.0	18.0
highland	Altitude is more than 2500 m,	0.22	-	0	1
peri-urban	Located 40 km from the regional capital	0.14	-	0	1
communal land	Area of communal land (hectares)	4184	2692	756	9652

Note: ETB, Ethiopian birr; TLU, tropical livestock unit. S.D.: standard deviation.

As for the variables related to household characteristics, *family size* denotes the number of family members living in a household; *female* is the dummy variable for a female-headed household; *age* is the age of a household head; *educ1-4*, *educ5-8*, and *educ9-16* are the schooling years of the household head, that is, 1–4, 5–8, and 9–16 years, respectively. There are two types of assets: livestock and physical capital. *Livestock* is the total number of animals in terms of tropical livestock unit [79], and *equipment* is the total value of farm equipment in Ethiopian currency (1 Ethiopian birr (ETB) was 0.0364 US dollars on 5 January 2018 [80]). *Own-land* is the area of land owned by each household, and *shared-land* is the area farmland used for sharecropping. Although the program allocates communal land to landless farmers, spouses may have farmland as well. Those who have farmland may have less interest in additional work. Additionally, we included a dummy variable for *irrigation*. We also used three kinds of dummy variables for non-farm income: income from the Productivity Safety-Net Program, which is a food-for-work or cash-for-work program (*safety-net*), off-farm employment income outside of one's own village in Ethiopia (*working-outside*), and remittance primarily from another country (*remittance*). The variables representing geographical information are distance from home to a district center (*distance*); a dummy variable for an area higher than 2500 m above sea level (*highland*); a dummy variable for a peri-urban area within 50 km of the center of regional capital, Mekelle (*periurban*); and the area of communal land in a village (*communal-land*).

6. Data

The average, maximum, minimum, and standard deviation of each variable are listed in Table 1. The proportion of participation is approximately 0.64. That is, about one third of eligible individuals have never participated in the program since it began in 2011. Note that the sample includes only landless farmers who stay in their villages, and excludes those who have migrated to urban areas and other countries, such as Saudi Arabia. The maximum and minimum values of the participation rates are 1 and 0; the standard deviation of participation is 0.48, making the coefficient of variation 0.75. Thus, the participation rates vary widely, even within this small area.

The average proportion of enclosed land per village is fairly high, ranging from 85% to 100%. Over the past decade, the district office has tried to enclose all communal lands, following a policy put in place by the regional government. However, many farmers or communities have opposed this policy; hence, many villages have not achieved 100% enclosure. Thus, although the average proportion of enclosure is high, it can be regarded as an indicator of people's awareness of natural resource management.

The amount of conservation work in the communal lands varies widely among villages. While the minimum is 0.11 days per person, the maximum is as much as 2.84 days. This number is fairly small because we calculated the average days using the total working population aged above 16 years, including those who did not participate in any community work. Nonetheless, it can be used to show the differences between villages.

There is a significant difference in the net incomes among households. Some have negative incomes because we assumed that loss of livestock without consumption or sale is negative income. Household heads are generally young (36 years old on average), since the program targets landless farmers who did not obtain their own land in the early 1990s. A small number of people (14%) have education that spans more than nine years. Around 76% of them do not have secondary level education, and approximately 23% of the households have farmland from spouses or other family members.

Few of the landless households are female headed. Most landless farmers (90.4%) have animals, but they only own a few. The average number of animals per household is 3.0 cattle units (equivalent to a tropical livestock unit). People have limited physical assets (equipment)—equivalent to around ETB 242 on average. No one in the sample has machinery, except for one farmer with a diesel generator.

The average area of owned farmland is 0.23 ha and that of sharecropped farmland is 0.29 ha. The proportion of those engaged in the productive safety net program is 75% because priority is given

to the poor and landless people in the program. Those working outside of their villages and gaining remittances are few—7% and 2%, respectively.

We examined whether the mean values of the norm variables and net incomes vary according to participation. Table 2 shows a comparison of the means of each variable between participants and non-participants. The table also provides the t-test values using Welch's method [81], which allows for non-equal variances for both groups. It indicates higher norm variables for participants than non-participants. Net incomes are not significantly different between the two groups.

Table 2. Comparison of variables between participants and non-participants.

	Participant	Non-Participant	T-test for Mean Difference
Enclosure	0.954 (0.003)	0.928 (0.005)	4.545 ***
Activity	0.801 (0.045)	0.624 (0.040)	2.928 ***

Note: Standard deviations are in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

7. Model

As mentioned above, participation in conservation activities may be affected by the social norms in the community, in addition to individual and regional characteristics. Moreover, social norms may be determined endogenously by the characteristics. These relationships are expressed by

$$p_i = \mathrm{f}(x_i,\ z_i,\ r_i) \tag{1}$$

$$x_i = \mathrm{g}(q_i,\ r_i,\ z_i) \tag{2}$$

where x_i is the social norm for conservation, z_i is the vector of household characteristic i, r_i is the vector of regional household characteristic i, and q_i is the characteristics of the communal land for individual i.

A linear approximation of the participation and norm models may be expressed as follows:

$$p_i^* = \alpha_1 + \beta_1 \hat{x}_i + \sum\nolimits_{j=1} \gamma_{1j} z_{ji} + \sum\nolimits_{k=1} \delta_{1k} r_{ki} + \varepsilon_{1i} \tag{3}$$

$$p_i = 0 \text{ if } p_i^* < 0 \qquad p_i = 1 \text{ if } p_i^* \geq 0,$$

$$x_{si} = \alpha_2 + \beta_2 q + \sum\nolimits_{s=1} \gamma_{2s} z_{si} + \sum\nolimits_{k=1} \delta_{2k} r_{ki} + \varepsilon_{2i} \tag{4}$$

where p_i* is the latent variable for participation for household i and p_i is the dichotomous variable. $\hat{x}_i$ is the predicted value of x_i, ε_{1i} and ε_{2i} are the error terms, and i indicates the household.

The model is instrumented by variable q, which is the communal land area of the village, and is estimated by a probit regression with the endogenous variable. Since the norms are endogenous variables, the probit models are estimated using an instrumental variable, the area of communal lands, with other exogenous variables. The model is estimated by the maximum likelihood method.

In this study, p_i is the variable of ***participation*** and x_i is the proxy variable for social norms: ***enclosure*** or ***activity*** (Table 1). We estimated two types of models using one of these variables. The conceptual model in the previous section shows that the coefficient of the social norm variable is positive. In terms of the other control variables, z_{ji} includes those in the categories of demographics, assets, farmland, and non-farm incomes; the variables of r_i include those in the category of location in Table 1.

8. Results

Table 3 presents the results of the estimation for the models using the independent variables of enclosure (Model I) and activity (Model II), and these models are compared with one without the

social norm variable (Model III). The dependent variable of all the models is the binary variable for participation. The null hypothesis of exogeneity is rejected by the Wald test for Models I and II at the 1% level, thereby supporting the instrumental variable model with endogenous regressors.

The estimate for enclosure is positive and significant at the 1% level. That for activity is also positive and significant at the 1% level. This shows that individuals are more likely to participate in the program if natural resource conservation is more active, implying higher social norms for conservation. Endogeneity of the variable for enclosure and activity in the first equation can be tested by checking if the error terms of the equations and its reduced form for these variables are correlated ([82], p.472). The Wald test for endogeneity rejects the null hypothesis of exogeneity for Models I and II, indicating the endogeneity of the social norm variables.

In terms of the other coefficients, the estimate of age is significantly negative for Model I, suggesting that younger people are participating in the program more actively. Contrary to expectation, the coefficients of education (edu1-4, edu5-8, and edu9-16 in Models I and II) are negative, which means education reduces the participation rate when the social norms and other conditions are the same. One explanation for this is that educated people are seeking off-farm employment opportunities, even if they are not currently employed. The coefficients of own-land are negative for Models I and II because households that have their own farmland may have less incentive to obtain additional lands that are not productive. The coefficient of the safety-net program on participation is negative for Model I, implying that other income opportunities reduce incentives to participate in the hillside distribution program. In terms of location, distance is significantly positive for Models I and II. The most feasible reason for this is that households living far from the village center are located closer to the hillside areas, making it more convenient for them to manage the allocated lands. In addition, the proportion of participation is higher in highland areas because the highlands are more suitable for growing timber trees and are more profitable in this respect. The proportion is lower in southern areas near the regional capital, where land is less productive. In terms of the reduced-form model, some variables have opposite signs from the other models, implying possible estimation bias for the omitted variable.

Table 4 shows the estimated determinants of the social norms on conservation. The coefficients of age of the household head and education variables are positive in Models I and II—that is to say, older individuals and educated people have higher consciousness. The coefficients of own farmland are negative. Thus, the social norms for conservation are lower for those who have more farmlands. The reason for this may be that those who have larger areas of farmland are less dependent on communal lands. In terms of location, the coefficient of distance is negative. It may be inferred that local government officers cannot go to remote areas to provide extension services very often, thus the awareness of people in those areas is lower. The coefficients of highland and peri-urban areas have mixed results. This is due to the nature of the proxy variables: favorable conditions for forestry in highlands have positive impacts on the introduction of land enclosures but negative impacts on conservation activities. Larger areas of enclosure around the regional capital may be explained by more frequent monitoring by the government. In terms of conservation activities, peri-urban areas have more demand for non-farm workers, thus people may be reluctant to work for conservation even if they are currently unemployed. Thus, various external conditions, such as demographics as well as social and geographical situations, affect farmers' decisions to participate.

Table 3. Determinants of participation in the hillside distribution project: coefficient estimates of the probit models with endogenous regressors.

	Participation		
	I	**II**	**III**
Social norms			
enclosure	22.01*** (24.95)		
activity		1.598*** (13.94)	
Demographics			
family size	0.021 (0.57)	0.021 (0.56)	−0.046 (−1.00)
female	3.9×10^{-4} (−0.00)	−0.057 (−0.28)	−0.047 (−0.19)
age	−0.033** (−3.20)	−0.016 (−1.57)	0.027* (2.33)
educ1–4	−0.306* (−2.22)	−0.349** (−2.83)	−0.101 (−0.60)
educ5–8	−0.146 (−1.08)	−0.161 (−1.23)	−0.047 (−0.28)
educ9–16	−0.551** (−3.16)	−0.321 (−1.93)	0.039 (0.18)
Assets			
livestock	0.036 (1.29)	0.019 (0.77)	−0.013 (−0.39)
equipment	-1.01×10^{-4} (−2.29)	-1.49×10^{-5} (−0.52)	-6.70×10^{-5} (−1.47)
Farmland			
own-land	1.189*** (5.53)	0.580** (3.04)	−0.405 (−1.62)
shared-land	−0.135 (−0.67)	−0.102 (−0.62)	−0.442* (−1.98)
irrigation	−0.312 (−1.32)	−0.153 (−0.70)	0.148 (0.53)
Non-farm income			
safety-net	−0.299* (−2.27)	−0.114 (−0.93)	−0.141 (−0.96)
working outside	−0.053 (−0.29)	−0.086 (−0.42)	−0.092 (−0.39)
remittance	0.015 (0.04)	0.201 (0.83)	−0.327 (−0.68)
Location			
distance	0.083*** (5.08)	0.068*** (4.86)	−0.014 (−0.79)
highland	−1.364*** (−12.56)	1.118*** (11.31)	0.154 (0.98)
periurban	−0.577*** (−3.47)	0.690*** (4.87)	−0.432* (−2.22)
constant	−19.38*** (−23.11)	−1.034** (−3.10)	0.167 (0.42)
Statistics			
Observation	477	477	477
Wald test	1045.91***	378.04***	38.26
Exogeneity	25.16***	41.00***	not applicable
Log-likelihood	−542.0	−688.7	−291.7

Notes: t-statistics are between parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. The dependent variables are binary variables of participation for all equations. Models I, II, and III are estimated by the probit models with endogenous regressors, using the total area of communal land as the instrument. Model IV is estimated by the probit model.

Table 4. Determinants of social norms.

	I			II		
	Enclosure Model			**Activity Model**		
family size	−0.0011		(−0.680)	−0.0142		(−0.680)
female	−0.0010		(−0.130)	0.0203		(0.190)
age	0.0017	***	(4.120)	0.0125	**	(2.350)
educ1–4	0.0100	*	(1.720)	0.1634	**	(2.140)
educ5–8	0.0026		(0.440)	0.0444		(0.580)
educ9–16	0.0228	***	(3.080)	0.1708	*	(1.760)
livestock	−0.0015		(−1.270)	−0.0099		(−0.630)
equipment	3.4×10^{-6}	*	(1.670)	-7.3×10^{-6}		(−0.270)
own-land	−0.0569	***	(−6.670)	−0.4015	***	(−3.590)
shared-land	0.0019		(0.250)	0.0035		(0.030)
irrigation	0.0154	*	(1.670)	0.1114		(0.920)
safety-net	0.0103	**	(1.980)	0.0257		(0.380)
working outside	−0.0006		(−0.070)	0.0111		(0.100)
remittance	−0.0054		(−0.350)	−0.1886		(−0.910)
distance	−0.0038	***	(−6.060)	−0.0432	***	(−5.220)
highland	0.0817	***	(11.190)	−0.4209	***	(−4.390)
periurban	0.0259	***	(3.580)	−0.4415	***	(−4.650)
communal land	-4.0×10^{-6}	***	(−3.550)	-5.5×10^{-5}	***	(−3.780)
constant	0.9015	***	(62.200)	0.9355	***	(4.920)
n	477			477		
F-stat	21.1	***		11.53	***	
R-squared	0.45			0.31		

Note: t-statistics are in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. The table shows the coefficient estimates of for all equations the instrumental variables are the total area of communal land and the dependent variables are the binary variables of participation.

9. Conclusions

Hitherto, economic studies on natural resource management in Sub-Saharan Africa [10,21–25] have not paid significant attention to the role of social norms in natural resource management and have conducted estimations by omitting the norms variable. This study successfully reveals the positive impacts of social norms on conservation participation. The evidence in this study shows that social norms related to conservation contribute to a rise in the participation rates. The social norms include enclosure of the communal lands, which reduces farmers' opportunity of animal grazing and may increase labor work for cut and carry fodder from the communal lands, and soil and water conservation work, which also increase farmers' labor work without compensation. Even when the social and geographical situation and household characteristics are the same, the participation rate may be lower if the social norms are lower. This is probably because higher social norms contribute to the increased awareness of local farmers with regard to conservation of the communal lands and promote community volunteer work to improve the quality of the communal lands before distribution. Note that the results of the estimation without social norms (Model III) have different signs for the coefficient estimates from the models that include them (Models I and II). This shows that models that do not include these norms may generate biased estimates when the effects of social norms are significant.

The positive effects of social norms underline the importance of policies for improving social norms related to conservation. This study provides new evidence to show the importance of social norms for economic development [20] and payment for ecosystem services [15] in terms of a land conservation program in a less developed area. The results herein are similar to those of studies showing the importance of people's awareness about soil and water conservation [57,83]; however, our results suggest the relative importance of social norms across the whole community compared with the awareness of individuals. Intervention using price incentives often deteriorate people's intrinsic motivation or norms, which reduces the effects of the intervention [84,85]. The results of this study also suggest modification of econometric models to identify the determinants of soil and water conservation in developing countries [22,25–27]. The inclusion of social norms variables may reduce problems related to omitted variables and improve the fitness of the models. In terms of development projects in Africa, per diem payments for project activities are inclined to reduce the motivation of the local people, so that it negatively affects the outcome of the projects [86]. The results of this study suggest another intervention approach than price incentive: intervention to improve social norms leads to sustainable resource conservation without reducing the motivation of the local people. An improvement of the social norms, for example, by training or public relations, may activate land conservation activity. While the activity is determined by personal characteristics, social conditions, and geographical location, in addition to social norms, these conditions change very slightly through policy interventions. However, social norms can be changed by improving the local awareness of conservation. Since there is limited economic evidence on the role of these norms, we should revisit their role in the development of conservation programs.

Nonetheless, this study has some limitations. The major limitation is the reliability of the proxy variables representing the social norms related to natural resource management. Future related studies should find more appropriate variables to represent social norms. Economic experiments on altruism or trust may provide more accurate indicators for such sensitive variables.

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References

1. De los Santos-Montero, L.A.; Bravo-Ureta, B.E. Natural resource management and household well-being: The case of POSAF-II in Nicaragua. *World Dev.* **2017**, *99*, 42–59. [CrossRef]
2. Pender, J. Rural population growth, agricultural change, and natural resource management in developing countries-A review of hypotheses and some evidence from Honduras. In *Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing World*; Birdsall, N., Kelley, A.C., Sinding, S.W., Eds.; Oxford University Press: New York, NY, USA, 2001.
3. Place, F.; Otsuka, K. Population, tenure, and natural resource management: The case of customary land area in Malawi. *J. Environ. Econ. Manag.* **2001**, *41*, 13–32. [CrossRef]
4. Pender, J.; Jagger, P.; Nkonya, E.; Sserunkuuma, D. Development pathways and land management in Uganda. *World Dev.* **2004**, *32*, 767–792. [CrossRef]
5. Pender, J. Development pathways for hillsides and highlands: Some lessons from Central America and East Africa. *Food Policy* **2004**, *29*, 339–367. [CrossRef]

6. Holden, S.T.; Otsuka, K.; Deininger, K. *Land Tenure Reform in Asia and Africa: Assessing Impacts on Poverty and Natural Resource Management*; Palgrave Macmillan: New York, NY, USA, 2013.
7. World Bank. *World Development Indicators*; World Bank: Washington, DC, USA, 2017.
8. Holden, S.T.; Ghebru, H. Welfare impacts of land certification in Tigray, Ethiopia. In *Land Tenure Reform in Asia and Africa: Assessing Impacts on Poverty and Natural Resource Management*; Holden, S.T., Otsuka, K., Deininger, K., Eds.; Palgave Macmillan: London, UK, 2013; pp. 137–161.
9. Belay, M.; Abegaz, A.; Bewket, W. Livelihood options of landless households and land contracts in north-west Ethiopia. *Environ. Dev. Sustain.* **2017**, *19*, 141–164. [CrossRef]
10. Pender, J.; Gebremedhin, B. Determinants of agricultural and land management practices and impacts on crop production and household income in the highlands of Tigray, Ethiopia. *J. Afr. Econ.* **2007**, *17*, 395–450. [CrossRef]
11. Oniki, S.; Negusse, G. Communal land utilization in the highlands of northern Ethiopia: Evidence of transaction costs. *Jpn. J. Rural Econ.* **2015**, *17*, 40–45. [CrossRef]
12. Berhe, M.; Hoag, D. The livelihood effects of landless people through communal hillside conservation in Tigray Region, Ethiopia. *J. Dev. Agric. Econ.* **2014**, *6*, 309–317. [CrossRef]
13. Ostrom, E. *Governing the Commons: The Evolution of Institutions for Collective Action*; Cambridge University Press: Cambridge, UK, 1990.
14. Ostrom, E. Collective action and the evolution of social norms. *J. Econ. Perspect.* **2000**, *14*, 137–158. [CrossRef]
15. Chen, X.; Lupi, F.; He, G.; Liu, J. Linking social norms to efficient conservation investment in payments for ecosystem services. *Proc. Natl. Acad. Sci. USA* **2009**, *106*, 11812–11817. [CrossRef]
16. Pretty, J. Social capital and the collective management of resources. *Science* **2003**, *302*, 1912–1914. [CrossRef] [PubMed]
17. Burke, M.A.; Young, H.P. Social norms. In *Handbook for Social Economics*; Benhabib, J., Bisin, A., Jackson, M., Eds.; Elsevier: Amsterdam, The Netherlands, 2011; pp. 311–338.
18. Postlewaite, A. Social norms and preferences. In *Handbook for Social Economics*; Benhabib, J., Bisin, A., Jackson, M., Eds.; Elsevier: Amsterdam, The Netherlands, 2011; pp. 31–67.
19. Bicchieri, C. *The Grammar of Society: The Nature and Dynamics of Social Norms*; Cambridge University Press: Cambridge, UK, 2006.
20. Fafchamps, M. Development, social norms, and assignment to task. *Proc. Natl. Acad. Sci. USA* **2011**, *108*, 21308. [CrossRef] [PubMed]
21. Otsuka, K.; Quisumbing, A.R.; Payongayong, E.; Aidoo, J.B. Land tenure and the management of land and trees: The case of customary land tenure areas of Ghana. *Environ. Dev. Econ.* **2003**, *8*, 77–104. [CrossRef]
22. Gebremedhin, B.; Pender, J.; Tesfay, G. Community natural resource management: The case of woodlots in Northern Ethiopia. *Environ. Dev. Econ.* **2003**, *8*, 129–148. [CrossRef]
23. Gebremedhin, B.; Swinton, S.M. Investment in soil conservation in northern Ethiopia: The role of land tenure security and public programs. *Agric. Econ.* **2003**, *29*, 69–84. [CrossRef]
24. Deininger, K.; Ali, D.A.; Yamano, T. Legal knowledge and economic development: The case of land rights in Uganda. *Land Econ.* **2008**, *84*, 593–619. [CrossRef]
25. Mekuriaw, A.; Heinimann, A.; Zeleke, G.; Hurni, H. Factors influencing the adoption of physical soil and water conservation practices in the Ethiopian highlands. *ISWCR* **2018**, *6*, 23–30. [CrossRef]
26. Adimassu, Z.; Langan, S.; Johnston, R. Understanding determinants of farmers' investments in sustainable land management practices in Ethiopia: Review and synthesis. *Environ. Dev. Sustain.* **2016**, *18*, 1005–1023. [CrossRef]
27. Adimassu, Z.; Kessler, A.; Hengsdijk, H. Exploring determinants of farmers' investments in land management in the Central Rift Valley of Ethiopia. *Appl. Geogr.* **2012**, *35*, 191–198. [CrossRef]
28. Weber, M. *The Protestant Ethic and the Spirit of Capitalism (Translated by Parson, Talcott)*; Allen and Unwin: London, UK, 1930.
29. Platteau, J.-P. *Institutions, Social Norms, and Economic Development*; Routledge: Abington, UK, 2000.
30. Sethi, R.; Somanathan, E. The evolution of social norms in common property resource use. *Am. Econ. Rev.* **1996**, *86*, 766–788.
31. Delaney, J.; Jacobson, S. Payments or persuasion: Common pool resource management with price and non-price measures. *Environ. Resour. Econ.* **2016**, *65*, 747–772. [CrossRef]

32. Ansink, E.; Tesfaye, A.; Bouma, J.; Brouwer, R. Cooperation in watershed management: A field experiment on location, trust, and enforcement. *Resour. Energy Econ.* **2017**, *50*, 91–104. [CrossRef]
33. Bouma, J.; Bulte, E.; van Soest, D. Trust and cooperation: Social capital and community resource management. *J. Environ. Econ. Manag.* **2008**, *56*, 155–166. [CrossRef]
34. Jack, B.K. Upstream–downstream transactions and watershed externalities: Experimental evidence from Kenya. *Ecol. Econ.* **2009**, *68*, 1813–1824. [CrossRef]
35. Frey, B.S. *Not Just for Money: An Economic Theory of Personal Motivation*; Edward Elgar Publishing: Cheltenham, UK, 1997.
36. Araghi, Y.; Kroesen, M.; Molin, E.; van Wee, B. Do social norms regarding carbon offsetting affect individual preferences towards this policy? Results from a stated choice experiment. *Transp. Res. Part D Transp. Environ.* **2014**, *26*, 42–46. [CrossRef]
37. Kinzig, A.P.; Ehrlich, P.R.; Alston, L.J.; Arrow, K.; Barrett, S.; Buchman, T.G.; Daily, G.C.; Levin, B.; Levin, S.; Oppenheimer, M.; et al. Social norms and global environmental challenges: The complex interaction of behaviors, values, and policy. *Bioscience* **2013**, *63*, 164–175. [CrossRef] [PubMed]
38. Anderson, C.L.; Locker, L.; Nugent, R. Microcredit, social capital, and common pool resources. *World Dev.* **2002**, *30*, 95–105. [CrossRef]
39. Beekman, G.; Bulte, E.H. Social norms, tenure security and soil conservation: Evidence from Burundi. *Agric. Syst.* **2012**, *108*, 50–63. [CrossRef]
40. Akresh, R.; Chen, J.J.; Moore, C.T. Altruism, cooperation, and efficiency: Agricultural production in polygynous households. *Econ. Dev. Cult. Chang.* **2016**, *64*, 661–696. [CrossRef]
41. Moss, T.J.; Gelander, P.G.; van de Walle, N. An aid-institutions paradox? A review essay on aid dependency and state building in Sub-Saharan Africa. *CGD Work. Pap.* **2006**, *74*, 11-05. [CrossRef]
42. Danese, G.; Mittone, L. Norms and trades: An experimental investigation. *Ration. Soc.* **2015**, *27*, 259–282. [CrossRef]
43. Gabre-Madhin, E.Z. *Market Institutions, Transaction Costs, and Social Capital in the Ethiopian Grain Market*; IFPRI: Washington, DC, USA, 2001.
44. Putnam, R.D. Bowling alone: America's declining social capital. *J. Democr.* **1995**, *6*, 65–78. [CrossRef]
45. Lin, N. *Social Capital: A Theory of Social Structure and Action*; Chicago University Press: New York, NY, USA, 2001.
46. Burt, R. *Brokerage and Closure: An Introduction on Social Capital*; Oxford University Press: Oxford, UK, 2005.
47. Fukuyama, F. *Trust, the Social Virtues and the Creation of Prosperity*; Free Press: New York, NY, USA, 1996.
48. Uslaner, E.M. *The Moral Foundation of Trust*; Cambridge University Press: Cambridge, UK, 2002.
49. Coleman, J.S. Social capital in the creation of human capital. *Am. J. Sociol.* **1988**, *94*, 95–120. [CrossRef]
50. Matsunaga, Y. Salary commensurate with social capital. *Appl. Econ. Lett.* **2015**, *22*, 1116–1121. [CrossRef]
51. Friedman, B.M. The moral consequences of economic growth. *Society* **2006**, *43*, 15–22. [CrossRef]
52. Bratt, C. The impact of norms and assumed consequences on recycling behavior. *Environ. Behav.* **1999**, *31*, 630–656. [CrossRef]
53. Goldstein, N.J.; Cialdini, R.B.; Griskevicius, V. A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *J. Consum. Res.* **2008**, *35*, 472–482. [CrossRef]
54. Fritsche, I.; Barth, M.; Jugert, P.; Masson, T.; Reese, G. A social identity model of pro-environmental action (SIMPEA). *Psychol. Rev.* **2018**, *125*, 245–269. [CrossRef]
55. Fielding, K.S.; Hornsey, M.J. A social identity analysis of climate change and environmental attitudes and behaviors: Insights and opportunities. *Front. Psychol.* **2016**, *7*, 121. [CrossRef]
56. Barth, M.; Masson, T.; Fritsche, I.; Ziemer, C.-T. Closing ranks: Ingroup norm conformity as a subtle response to threatening climate change. *Group Process. Intergroup Relat.* **2017**, *21*, 497–512. [CrossRef]
57. Mango, N.; Makate, C.; Tamene, L.; Mponela, P.; Ndengu, G. Awareness and adoption of land, soil and water conservation practices in the Chinyanja Triangle, Southern Africa. *ISWCR* **2017**, *5*, 122–129. [CrossRef]
58. Pender, J.L.; Kerr, J.M. Determinants of farmers' indigenous soil and water conservation investments in semi-arid India. *Agric. Econ.* **1998**, *19*, 113–125.
59. Moges, D.M.; Taye, A.A. Determinants of farmers' perception to invest in soil and water conservation technologies in the North-Western Highlands of Ethiopia. *ISWCR* **2017**, *5*, 56–61. [CrossRef]
60. Holden, S.T.; Otsuka, K. The roles of land tenure reforms and land markets in the context of population growth and land use intensification in Africa. *Food Policy* **2014**, *48*, 88–97. [CrossRef]

61. Deininger, K.; Binswanger, H. The evolution of the World Bank's land policy: Principles, experience, and future challenges. *World Bank Res. Obs.* **1999**, *14*, 247–276. [CrossRef]
62. Deininger, K.; Ali, D.A.; Holden, S.; Zevenbergen, J. Rural land certification in Ethiopia: Process, initial impact, and implications for other African countries. *World Dev.* **2008**, *36*, 1786–1812. [CrossRef]
63. Gebremedhin, B.; Pender, J.; Tesfay, G. Community resource management: The case of grazing lands in crop-livestock mixed systems in the high lands of northern Ethiopia. In Proceedings of the Annual Conference of International Association for the Study of Common Property, Victoria Falls, Zimbabwe, 17–21 June 2002.
64. Kassie, M.; Zikhali, P.; Pender, J.; Kohlin, G. The economics of sustainable land management practices in the Ethiopian highlands. *J. Agric. Econ.* **2010**, *61*, 605–627. [CrossRef]
65. Hishe, S.; Lyimo, J.; Bewket, W. Impacts of soil and water conservation intervention on rural livelihoods in the Middle Suluh Valley, Tigray Region, northern Ethiopia. *Environ. Dev. Sustain.* **2018**. [CrossRef]
66. Jagger, P.; Pender, J. *Impacts of Programs and Organizations on the Adoption of Sustainable Land Management Technologies in Uganda*; International Food Policy Research Institute: Washington, DC, USA, 2003.
67. Eggen, M. *The Implications of Interactions among Environmental Rehabilitation, Social Safety Net and Microfinance Programs to Resource Access and Vulnerability in Tigray, Ethiopia*; University of Wisconsin-Madison: Madison, WI, USA, 2012.
68. Holden, S.T.; Otsuka, K.; Deininger, K. Land tenure reforms, poverty and natural resource management: Conceptual framework. In *Land Tenure Reform in Asia and Africa: Assessing Impacts on Poverty and Natural Resource Management*; Palgrav Macmillan: London, UK, 2013; pp. 1–26. [CrossRef]
69. Deininger, K.; Ali, D.A.; Alemu, T. Impacts of land certification on tenure security, investment, and land market participation: Evidence from Ethiopia. *Land Econ.* **2011**, *87*, 312–334. [CrossRef]
70. Holden, S.T.; Deininger, K.; Ghebru, H. Tenure insecurity, gender, low-cost land certification and land rental market participation in Ethiopia. *J. Dev. Stud.* **2011**, *47*, 31–47. [CrossRef]
71. Hagos, F.; Holden, S. Tenure security, resource poverty, public programs, and household plot-level conservation investments in the highlands of northern Ethiopia. *Agric. Econ.* **2006**, *34*, 183–196. [CrossRef]
72. *Land Tenure and Natural Resource Management: A Comparative Study of Agrarian Communities in Asia and Africa*; Otsuka, K.; Place, F. (Eds.) Johns Hopkins University Press: Baltimore, MD, USA, 2001.
73. Gebremedhin, B.; Pender, J.; Ehui, S. Land tenure and land management in the highlands of Northern Ethiopia. *Ethiop. J. Econ* **2003**, *8*, 46–63.
74. Lin, J.Y. Rural reforms and agricultural growth in China. *Am. Econ. Rev.* **1992**, *82*, 34–51.
75. Holden, A. The environment-tourism nexus influence of market ethics. *Ann. Tourism Res.* **2009**, *36*, 373–389. [CrossRef]
76. Brasselle, A.S.; Gaspart, F.; Platteau, J.P. Land tenure security and investment incentives: Puzzling evidence from Burkina Faso. *J. Dev. Econ.* **2002**, *67*, 373–418. [CrossRef]
77. Dong, X.-Y. Two-tier land tenure systems and sustained economic growth in pso-1978 rural China. *World Dev.* **1996**, *24*, 915–928. [CrossRef]
78. Yami, M.; Mekuria, W.; Hauser, M. The effectiveness of village bylaws in sustainable management of community-managed enclosures in Northern Ethiopia. *Sustain. Sci.* **2013**, *8*, 73–86. [CrossRef]
79. International Livestock Research Institute. *Livestock Policy Analysis*; International Livestock Research Institute: Addis Ababa, Ethiopia, 1995.
80. National Bank of Ethiopia. Inter-Bank Daily Foreign Exchange Rate in USD. Available online: www.nbe.gov.et (accessed on 1 December 2019).
81. Welch, B.L. The generalization of 'student's' problem when several different population variances are involved. *Biometrika* **1947**, *34*, 28–35. [CrossRef]
82. Wooldridge, J.M. *Econometric Analysis of Cross Section and Panel Data*; The MIT Press: London, UK, 2002.
83. Desta, H.; Lemma, B.; Stellmacher, T. Farmers' awareness and perception of Lake Ziway (Ethiopia) and its watershed management. *Limnol. Ecol. Manag. Inland Waters* **2017**, *65*, 61–75. [CrossRef]
84. Bowles, S. *The Moral Economy: Why Good Incentives are No Substitute for Good Citizens*; Yale University Press: New Haven, CT, USA; London, UK, 2016.

85. Frey, B.S.; Oberholzer Gee, F. The cost of price incentives: An empirical analysis of motivation crowding-out. *Am. Econ. Rev.* **1997**, *87*, 746–755.
86. Nkamleu, G.B.; Kamgnia, B.D. *Uses and Abuses of Per Diems in Africa: A Political Economy of Travel Allowances*; African Development Bank: Tunis Belvédère, Tunisia, 2014.