

Determinants and Roles of Social Trust on Income and Food Security Status of Smallholder Farmers in North Shewa Zone Oromia, Ethiopia

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Abstract: Social trust is the major component of cognitive social capital which is one of the most important assets in livelihoods. The levels of social trust have effects on rural household's livelihood strategies and has influence on food and nutrition security and income status of rural households which are usually affected by climatic and non-climatic shocks. This study was identifying the determinants of social trust and analyzing its effects on rural households' income and food security in north Shewa zone Oromia regional state of Ethiopia. Primary data was collected from 400 sample respondents in the 2022 production year. Looking into the estimated coefficients, the results indicated that probabilities of being in the different extents of social trust are significantly influenced by eight explanatory variables. These variables were; media, agro-ecology, education, extension contact, credit, livestock holding, farm income, and weather road distance. However, having high level of social trust in the community significantly increases households' total farm income by 66% over low trusted farm households at a 1% probability level. Similarly, having medium and high level of social trust in the community significantly increases households' food security status by 23 and 46% over low trusted farm households at a 1% probability level. Therefore, the result of this study would be expected to significantly contribute as policy and strategic inputs for policymakers in designing rural livelihood improvement policies and to the beneficiary in enhancing their welfare and living standard.

Keywords: Social Trust, Food Security, Determinants, Multinomial Endogenous Switching, Ethiopia

1. Introduction

1.1. Background and Statements of Problems

Trust is one of the types of social capital which is contained in cognitive social capital. Coleman expressed that a system of mutual trust is an important form of social capital on which future obligations and expectations may be based while Putnam regards trust as a source of social capital that sustains economic dynamism and governmental performance [1-2]. Trust as a key facet in the relational dimension of social capital [3]. In this research we used the assumption that level of trust is based on the how the household is being

trusted in the community with others which is in part relational and bonding types of social capital [4].

Ethiopia in general and North Shoa Zone Oromia Region in particular people are known with their strong social ties. People usually cope-up with unfavorable conditions with the social values and norms they have. Especially, in resource poor areas where external climate and non-climate shocks are high, social trust play great role in enabling household members to support one another. During the most serious times in the history of Ethiopia, trust between different community categories and households have helped the poorest of all to sustain their lives [5-6]. In Ethiopia, various social trusts in forming local institutions like Idir, Equb,

Mehiber, Senbete, Debo, local money lending, etc are used during times of challenges and successes [7]. These trustworthiness and local institutions normally serve as sources of finance, labor, agricultural capital and even land. In most cases, the very resource poor farmers who do not have oxen, farm implements, and cash to buy seed and other inputs are get credit access based on their social capital level (*ibid*). Thus, social trust is found to be crucial in rural areas to improve their livelihood.

During the historical challenges in Ethiopia, even whatever help the government or donors offer them is negligible in comparison to what is needed in their destitute situation. In a situation like this, communities usually use their social trust, i.e. seek the assistance of kin, community, or local elite and traditional local institutions based on their trustworthiness to overcome the situation [6]. Thus, as social trust is an important economic variable for the rural society in Ethiopia, identifying its determinant factors is crucial to clearly direct the focus of development practitioners and give insight for policy makers.

On the other hand, vast bodies of the literature revealed that there are different factors that determine social trust of households which one way or the other affect the choice of livelihood activities, food security and income of the households. Hence, based on the insights gained from the literature, the current study tries to see if what is argued in the different parts of the world holds true or not in the study area where this research is going to be carried out.

Thus, this study is intended to identify determinants of social trust and its effect on food security and income in the North Shoa zone of Oromia region.

1.2. Research Objectives

The specific objectives of the research are:

- 1) To investigate the determinants of smallholder farmers

level of trust in North Shewa zone

- 2) To analyze the role of social trust on livelihood, farm income and food security status

2. Method and Materials

2.1. Description of the Study Area

The research was conducted in Girar Jarso, Wuchale and Aleletu districts of North Shewa zone, Oromia National Regional State. These districts are located 50-100 Kms away from Addis Ababa to the North direction. The Zone has a total land area of about 1893 square-kilometers. The topography of the area is mostly plain with mountains and the altitude of the area ranges between 1300-2500 meters above sea level. The land area of North Shoa zone extends from 9°47' to 10°11'N and 38°27' to 38°43' E [8].

North Shoa zone gets rainfall during both belg and meher seasons. The 'Belg-rain' is between February and April, followed by the Meher rain extending from June to September. According to the report from North Shoa Agriculture office, the average annual rainfall of the Zone ranges from 1400 mm to 1600 mm while the mean annual temperature varies between 15°C and 19°C from the cold temperature of Yaya Dekebora to the relatively warm lower valley of Jema River.

According to CSA (2020), the population of North Shoa is estimated to be 242341, out of which 120472 are female. The average family size of the Zone is estimated to be 6.3 and the average population density is 128 per km². Regarding distribution of the population, 92.2% live in rural areas while the rest 7.8% live in towns [8]. The population of the Zone are followers Orthodox Christian, Evangelical Christians and Muslim religions.

Figure one below shows maps of the study area.

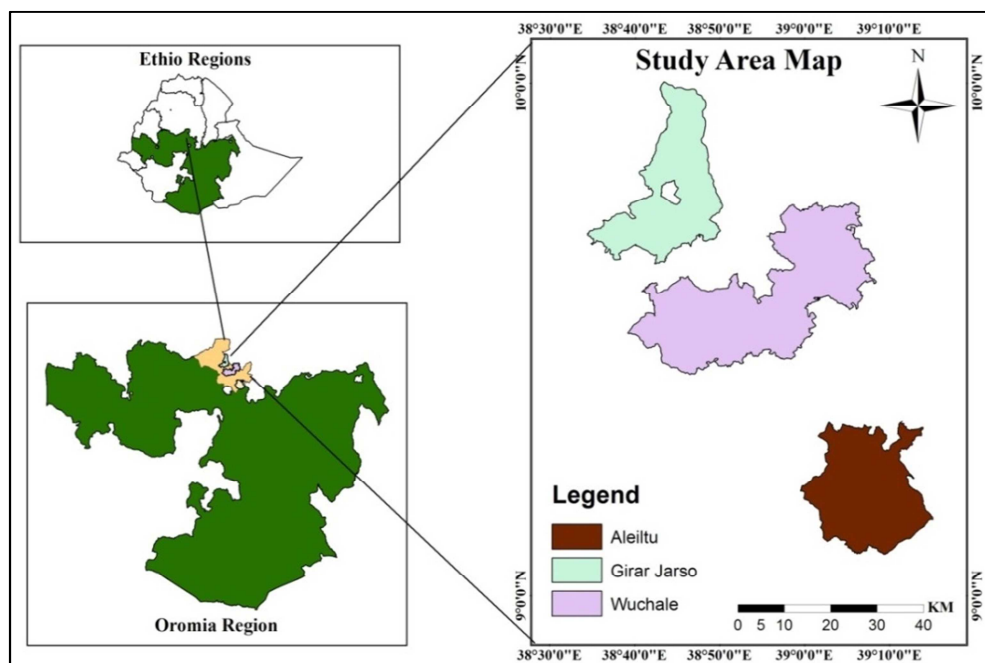


Figure 1. Map that show description of the study area.

2.2. Sample Size and Sampling Techniques

The sampling procedures employed for this particular research were stratified multi stage random sampling. Out of the 17 districts in the Zone, three districts were randomly selected. From each district, four kebeles were randomly selected and from each kebele representative households were selected using simple random sampling approach. As a result the total sample size is determined to be 400 households. A skip factor of k for each Kebele (which is the total households 'N' divided by the samples allocated for a given kebele) was used depending on the total number of households in each Kebeles.

Selection of the first household at random for any value between 1 and K was made, and then every k^{th} households from the lists in each location was selected. This will provide a total sample that is representative of the district as a whole as well as each community.

Table 1. Sample districts and sample households for the study form north shawa zone.

s.no	Districts	Total population	Selected sample
1	Aleltu	75,687	100
2	Wucale	137,830	178
3	Girar jarso	92,448	122
	Total	305,965	400

2.3. Methods of Data Analysis

The quantitative data was analyzed using various analytical tools. These tools include descriptive and inferential statistical tools and econometric models. These tools are outlined and discussed in the following sub-sections.

2.3.1. Descriptive and Inferential

Data on the age, educational levels, land size, herd size, rural institutions participation, gender, types of livelihood, and other important socio-economic variables were analyzed using descriptive tools. Similarly, in order to measure the statistical significance and distribution of some parameters chi-square and t-tests shall be used as found necessary.

2.3.2. Econometric Models

To address the objectives of the study, in addition to descriptive statistics, econometric models was employed. Descriptive statistics such as mean, percentage, chi square and t-test was used. In order to achieve the objectives of the study the ordered logit model and multinomial endogenous switching logit econometric models were employed.

2.3.3. Measurement of Social Trust

Therefore, level of social trust is an ordinal value which takes low medium and high social capital based on responses from the rural households. Level of trust was determined based on the household survey using the combination of different trust variables. These variables include: (1) if the household or any of the family member of his/her household above 18 years old being trusted by other in access to finance during bad times, (2) if others trust him, and number close

friends able to give him credit were asked the respondents were summarized into low, medium and high level of trust to the that farm household.

2.4. Ordered Logit Model

To measure determinants of household level of trust ordered logit model was used. Let Y_i be an ordinal response with q categories (low, medium, high) for observation i , where $i=1, \dots, n$. The ordered stereotype model [9] for the probability that Y_i takes the category k ($k=1, \dots, q$) is characterized by the following log odds

$$\log\left(\frac{p[y_i = k|x_i]}{p[y_i = 1|x_i]}\right) = \alpha_k + \phi_k \beta' x_i, i = 1, \dots, n, k = 2, \dots, q \quad (1)$$

Where the inclusion of the following monotone non - decreasing constraint

$$0 = \phi_1 \leq \phi_2 \leq \dots \leq \phi_q = 1 \quad (2)$$

Ensures that the response Y_i is ordinal [9]. The vector x_i is a set of predictor variables (covariates) for observation i which can be categorical or continuous, and the $p \times 1$ vector of parameters β represents the effects of x_i on the log odds for the category k , relative to the baseline category of Y_i . This formulation of the model treats the first category as the baseline category, the parameters $\{\alpha_2, \dots, \alpha_q\}$ are the intercepts, and $\{\Phi_1, \Phi_2, \dots, \Phi_q\}$ are the parameters which can be interpreted as the "scores" for the categories of the response variable Y_i . We restrict $\alpha_1 = \Phi_1 = 0$ and $\Phi_q = 1$ to ensure identifiability. With this construction, the response probabilities are as follows.

$$\theta_{ik} = p[y_i = k | x_i] = \frac{\exp(\alpha_k + \phi_k \beta' x_i)}{\sum_{i=1}^q \exp(\alpha_i + \phi_i \beta' x_i)} \text{ for } k = 1, \dots, q \quad (3)$$

An advantage of the stereotype model is that it is more parsimonious than the baseline category logit model that has the form $\partial_k + \beta_k^i x_i$ on the right - hand side of model. Additionally, the ordered stereotype model is more flexible than adjacent categories logits models with proportional odds structure [10] as a result of the $\{\Phi_k\}$ parameters. Agresti (2010) showed that the stereotype model is equivalent to the proportional odds version of the adjacent - categories logit model, when the scores $\{\Phi_k\}$ are equally spaced. Although the model has advantages, it is not as popular as the proportional odds model, because the parameters are more difficult to estimate due to the intrinsic nonlinearity, which arises from the product of parameters in the predictor. However, the parameter estimates may be calculated by the standard maximum likelihood (ML) method [10] by imposing the monotone non-decreasing constraint through the parametrization described in [11]. Therefore, the marginal effect was used for the results interpretations.

Multinomial endogenous switching regression (MESR)

In the second stage of multinomial endogenous switching regression, the relationship between the social capital and food security outcome variables and a set of explanatory variables (z) is estimated for each social capital participation e.g. $j=1$ (Low participant as a reference category); medium level of participation in local organization, $j=2$, high level of participation, $j=3$ and both very high level of participation in local organization, $j=4$. The social capital and food security outcome equation for each possible regime (j) is given as:

$$\int_{Regime\ 1: Y_{jit} = \beta_1 z_{1it} + \delta_1 z_{1it} + \mu_{1it} \text{ if } U=1}^{Regime\ J: Y_{jit} = \beta_j z_{jit} + \delta_j z_{jit} + \mu_{jit} \text{ if } U=j} \quad (4)$$

where Y_{jit} are the social capital and food security outcome variables of the i th farmer in regime j at time t and the error terms (ε_{jit}) are distributed with $E(Y_{jit} | X, z) = 0$ and variance ($\delta_{jit} | x, z$) = δ_j^2 . Y_{jit} are observed if only one of possible social capital participation combinations is used.

This approach can minimize the problem of unobserved heterogeneity [12, 13]. The error term (U_{jit}) is comprised of unobserved individual effects (ε_{jit}) and a random error term (U_{jit}). Therefore, OLS estimates in Eq. (4) ε_{jit} and U_{jit} will be biased if β_j and δ_j are not independent. A consistent estimation of and requires the inclusion of the selection correction terms of the alternative choices in Eq. (4). In the multinomial choice setting, there are $j-1$ selection correction terms, one for each alternative participation combinations. The second stage of MESR with consistent estimates is specified as follows [12-13]:

$$\int_{Regime\ 1: Y_{jit} = \beta_1 z_{1it} + \alpha_1 \lambda_{1it} + \delta_1 z_{1it} + \mu_{1it} \text{ if } U=1}^{Regime\ J: Y_{jit} = \beta_j z_{jit} + \alpha_j \lambda_{jit} + \delta_j z_{jit} + \mu_{jit} \text{ if } U=j} \quad j = 2, 3, 4 \quad (5)$$

where μ_{jit} is the error term with an expected value of zero, δ_j is covariance between ε_{jit} , U_{jit} , λ_{jit} is the inverse Mills ratio computed from estimated probabilities in Eq. (5) as follows:

$$\lambda_{jit} = \sum_{m \neq j} \rho_j \left(\frac{\rho_{mi} \ln(\rho_{mi})}{1 - \rho_{mi}} \right) + \ln(\rho_{jit}).$$

At this point ρ is the correlation between ε_{jit} and U_{jit} . Standard errors in Eq. (5) are bootstrapped to account for the heteroscedasticity arising from the generated regressors due to the two stage estimation procedure.

This MESM model was also to analyses the effect of levels of participation on food security of the sample households.

Estimation of average participation effects on the participant

The multinomial endogenous switching regression framework mentioned above is used to estimate average treatment effects on the treated (ATT). To estimate average treatment on the treated we compared expected values of the outcomes of participant of different social capitals in actual and counterfactual scenarios as given below;

Participant with different levels (actual)

$$E(Y_{jit} | U = J, Z_{jit}, z_{ji}, \lambda_{jit}) = \beta_j Z_{jit} + \delta_j z_{ji} + \sigma_j \lambda_{jit} \quad (6)$$

Participants had low to participate (counterfactual)

$$E(Y_{jit} | U = J, Z_{jit}, z_{ji}, \lambda_{jit}) = \beta_1 Z_{1it} + \delta_1 z_{ji} + \sigma_1 \lambda_{jit} \quad (7)$$

The above equation defines the value of the outcome variable for participants which would have been obtained if the coefficients on their characteristics (Z_{jit}, z_{ji} and λ_{jit}) had been the same as the coefficient on the non-participant characteristics [14]. The expected values of the social capital and food security outcomes for the households that participated in social capital j can be calculated by taking differences between actual and counterfactual outcomes following [14] as:

$$ATT = E(Y_{jit} | U = J, Z_{jit}, z_{ji}, \lambda_{jit}) - E(Y_{jit} | U = j, Z_{jit}, z_{ji}, \lambda_{jit}) \quad (8)$$

$$Z_{jit}(\beta_j - \beta_1) + z_{ji}(\delta_j - \delta_1) + \lambda_{jit}(\sigma_j - \sigma_1) \quad (9)$$

The expected change in the mean outcome variable if participants had the same characteristics and resources as non-participants is captured by the first term (Z_{jit}) on the right-hand side of eq (8). The third term (λ_{jit}) on the right-hand side of the Eq. (9) along with the Mundlak approach (z_{ji}) corrects selection bias and endogeneity originating from unobserved variable.

2.5. Definition of Variables

Dependent variable for measurement of social capital

The dependent variables represent the extents of social trust in the community. Based on the levels of trust the variable ranked from low levels to high extents of trust was ranked. The ranked dimension of social capital measured as categorical variables and takes the value of 0 to 2 as defined below:

$Y_1=0$ if the household has low social trust in the society

$Y_1=1$ if the household has medium social in the society

$Y_1=2$ if the household has high social trust in the existing society

3. Result and Discussions

3.1. Descriptive Results

3.1.1. Descriptive Results for Continues Variables

Descriptive result of Level of trust in farm households

Age: The average age of the overall sample household was discovered to be 43 years. According to the comparative results, the mean age of the households with low, medium, and high levels of social trust was 44, 42, and 44 years, respectively. The F-value indicated that there is a statistically significant mean difference in household age between the three groups at 10% probability levels (Table 1).

Family size: The average family size of the overall sample household was discovered to be 5 people. According to the comparative results, the average family size of the households with low, medium, and high levels of social trust was 5.2, 4.8, and 5.5 people, respectively. At a 5% probability level, the F-value indicated that there is a statistically significant mean difference between the three groups in terms of home family size.

Farming experience: The average experience of the complete sample household was discovered to be 22 years.

The comparative result shows that the mean experience of households with low, medium, and high levels of social trust was 22.9, 23.4, and 22.4 years, respectively (Table 1). The F-value indicated that there is a statistically significant mean difference between the three groups in terms of home farming experience at 5% probability levels.

Farm size: The average farm size of the entire sample household was discovered to be 2.8 hectares. The comparative result shows that the average farm size of households with low, medium, high, and very high levels of social capital participation was 2.6, 2.6, and 3.2 hectares, respectively. At 1% probability levels, the F-value indicated that there is a statistically significant mean difference between the three groups in terms of farm size of the household (Table 1).

Livestock holding: In tropical livestock units, the mean livestock holding of the whole sample household was found to be 4.6. The comparative result showed that the mean livestock of households with low, medium, and high levels of social trust were 4.9, 7.0, 5.3, and 5.6 TLU, respectively. At 1% probability levels, the F-value indicated that there is a statistically significant mean difference between the three groups in terms of livestock holding of the household.

Extension contact: The average interaction with an extension agent was determined to be 2.8 times in the overall sample home. The comparative result shows that the mean contact of households with low, medium, and high levels of social trust was 5.1, 2.5 and 4.2 times, respectively. The F-value indicated that there is a statistically significant mean difference between the three groups in terms of household extension contact at 1% probability levels (Table).

Road distance: The average weather-road distance of the entire sample home was discovered to be 2.9 kilometers. The comparative result shows that the mean road distance of households with low, medium, and high levels of social trust was 3.2, 1.9, and 3.3 kilometers, respectively (Table 1). At 1% probability levels, the F-value indicated that there is a statistically significant mean difference between the three groups in terms of weather road distance of the household.

Table 2. Descriptive results of continuous variables of sample households.

Variables	Low	Medium	High	Average	F-value
Age	44	42	44	44	1.36*
Family size	5.2	4.8	5.5	5.2	3.21***
Experience	22.9	23.4	22.6	22.6	0.07**
Education	3.9	5.3	5.6	4.6	4.1*
Farm size	2.6	2.6	3.2	3.9	5.93***
Economic ac	2.5	2.8	2.4	2.2	12.8***
Livestock	7.0	5.3	8.3	7.0	16.31***
Extension	5.1	2.5	4.2	3.9	18.66***
Mkt dist	5.0	7.5	9.9	7.8	21.87***
Road dist	3.2	1.9	3.3	2.9	13.93***

Source: own survey result, 2023. *, ** and *** means significant at 10%, 5% and 1% respectively

According to the survey result 28 percent of the farm households have low level of trust in the community where as about 30 percent and 42 percent of the sample households believe they have medium and high level of trust in the

community (Table 2).

The survey result shows that majority of households in North Shawa Zone have high level of trust indicating that most of the sample households experience high level of social capital. This implies that during the bad times like climatic and non-climatic shocks which is prevalent in the study area households in the North Shawa zone tends to social capital to overcome the problem through borrowing from his neighbors or friends as a means of coping strategy.

Table 3. Descriptive results for extents of household trust across level of trust.

Extents of trust	Freq.	Percent	Cum.
Low	110	27.50	27.50
Medium	121	30.25	57.75
High	169	42.25	100.00
Total	400	100.00	

Source: own survey, 2023.

Descriptive result of income and food security across level of social trust

Income status: According to the study findings on average a households with low level of trust earn 113,596.60 Birr per annum. Households with medium and high level of trust earn an annual income of 97,228.10 birr and 135,748.30birr respectively. The chi-square test revealed a statistically significant proportion difference in income status among the three level of trust at a 10% probability level (Table 3).. The result shows that households with high level of trust in the community earn more average yearly income as compared to households with low and medium level of trust.

Food security status: The results of the study findings reveal that across the different groups of social capital, the average nutrition status were 2762.8, 3542.4, 3687.6 and 3888.8 kilocalories were respectively for households with low, medium and high level of trust in the community. The chi-square test revealed a statistically significant proportion difference in food security among the three levels of trust at a 1% probability level (Table 4). Households with high level of social capital in terms of trust in the community, have high food security status than households with low and medium level of trust in the community.

Table 4. Descriptive results for income and food security across level of trust.

Variables	Low	Medium	High	Total	F-value
Income	113596.6	97228.1	135748.3	118004.23	2.18*
Kilocalorie	3206.6	2360.6	4366.3	3440.7	44.24***

Source: Own survey result, 2022.

3.1.2. Descriptive Results for Dummy Variables

Sex of household head: The survey result shows that about 92.8% of the sample household was male headed whereas only 7.2% was female headed. The comparison result across the different groups of the social capital shows that 27, 29, and 44% of household who had low, medium, and high levels of social trust were male headed. The chi square test result indicates statistically significant mean difference between the three groups in terms of sex of the household head at a 10%

probability levels (Table 4)..

Training: According to the survey results, around 46.5% of the sample household received livelihood training, while only 53.5% did not. The comparison result across the three social capital groups showed that 27, 29, and 44% of households with low, medium, and high levels of social trust in livelihood training. At 1% probability levels, the chi square test results show a statistically significant mean difference between the three groups in terms of livelihood training.

Farmer training: According to the survey results, around 46.5% of the sample household received farmer training, while only 53.5% did not. The comparison result across the five social capital groups shows that 34, 47, and 45% of households with low, medium, and high levels of social trust participated in farmer training (Table 4).. At 1% probability levels, the chi square test results show a statistically significant mean difference between the three groups in terms of farmer training.

Irrigation practice: According to the survey results, around 29% of the sample household utilizes irrigation farming, whereas 71% do not. The comparison result across the three social capital groups shows that irrigation farming was practiced by 34, 37 and 29% of households with low, medium, and high levels of social trust. At 1% probability levels, the chi square test results show a statistically significant mean difference between the groups in terms of irrigation farming.

Cooperative membership: According to the survey results, around 45.5% of the sample household engaged in local cooperatives, while only 55.5% did not. The comparison result across the three social capital groups showed that 37, 57, and 48% of households with low, medium, and high levels of social trust (Table 4). At 1% probability levels, the chi square test results show a statistically significant mean difference between the three groups in terms of cooperative engagement.

Table 4. Descriptive results for the sample households dummy variables.

Variables		Low		Medium		High		Total		X ² -value
		Num	%	Num	%	Num	%	N	%	
Gender	Fh	11	38	13	45	5	17	29	7.2	4.08*
	Mh	99	27	108	29	164	44	371	92.8	
	Total	110	26.8	121	27.8	169	25.2	400	100	
Media	No	78	46	28	17	65	38	169	42.3	6.3*
	Yes	34	15	93	40	104	45	231	57.8	
	Total	110	26.8	121	27.8	169	25.2	400	100	
Farmers training	No	78	36	74	35	86	40	214	53.5	4,12***
	Yes	34	18	47	25	83	45	186	46.5	
	Total	110	26.8	121	27.8	169	25.2	400	100	
Livelihood training	No	11	32	14	41	9	26	34	53.5	15.5***
	Yes	99	27	107	29	160	44	366	46.5	
	Total	110	26.8	121	27.8	169	25.2	400	100	
Irrigation practice	No	71	25	78	27	135	48	284	71	12,2***
	Yes	39	34	43	37	34	29	116	29	
	Total	110	26.8	121	27.8	169	25.2	400	100	
Cooperative membership	No	73	33	64	29	81	37	218	54.5	102**
	Yes	37	20	57	31	88	48	182	45.5	
	Total	110	26.8	121	27.8	169	25.2	400	100	

Source: Own survey result, 2023. ***, ** means significant at 1% 5% and 10% probability level respectively

3.2. Econometric Model Results

This section presents the results of the econometric models results. In this study household level of social trust is the dependent variable. Therefore, the results of ordered logistic regression were employed to identify determinants of level of social trust.

3.2.1. Determinants of the Level of Participation in Social Trust

Social trust is one of the major dimensions of social capital, and helps to measure the extent level of household social capital in the community. Determinants of the sample households' levels of trust were presented on Table 5. Looking into the estimated coefficients of ordered regression model result, the probability of having social trust in the community significantly influenced by eight explanatory variables. These variables were; media, agro-ecology,

education, extension contact, credit, livestock holding, farm income, and weather road distance. Each of these variables was discussed one by one as follows;

Agro-ecology: This variable has a positive relationship to the probability of having low and medium levels of social trust in the community at a 5% significance level, respectively. The marginal effects of 0.084 and 0.035 for agro-ecology stated that, keeping other factors constant, the probability of having low and medium levels of social trust increases by 8.4 and 3.5% as agro-ecology of the farm household head being highland. However, the marginal effects value of 0.053 for the variable indicated that, the probability of the farm household having high level of trust decreases by 5.3% as the agro-ecology of the farm household being highland at a 5% statistical significance levels (Table 5). The result was substantiated by qualitative survey that in high land people tend to stick to individual life rather than group commitments and this lose their social ties as compared to low land where the people social tie is relatively better.

Education level of household head: At a 10% significance level, this variable has a negative and significant relationship with the probability of having low and medium levels of social trust in the community. The marginal effects of 0.009 and 0.003 for agroecology stated that as the education level of the household head increases by one grade, the probability of having low and medium levels of social trust decreases by 0.9 and 0.3%, respectively. However, the marginal effects value of 0.013 for the variable indicated that, when all other variables were held constant, the probability of a farm household having a high level of trust increased by 1.3% as the education level of the household head increased by one grade at a 10% statistical significance level (Table 5). Literate household heads could better understand training and meetings than their counterparts; making them more aware of the opportunities associated with cooperatives, including access to machinery, farm inputs, and improved varieties of cattle distributes primarily through coops. Previous studies also supported this finding [15-22]. When household's skill and resource ownership increases the household have a chance to be trusted by his neighbors and community to borrow money and participate in other social commitments.

Livestock holding: livestock holding has a negative and significant relationship with the probability of having low levels of social trust in the community at a 1% probability level. The marginal effects of -0.020 for livestock holding stated that, when all other factors are held constant, the probability of having low levels of social trust decreases by 2.0% as the household head's livestock holding increases by one tropical livestock unit. However, the marginal effects value of 0.027 for the variable indicated that, the probability of the farm household having a high level of trust increased by 2.7% as the household's livestock holding increased by one tropical livestock unit at 1% probability levels (Table 5). This conclusion is supported by the empirical research findings of [23, 24] where livestock holding in TLU is positively associated with level of social trust of households, Livestock production were also discovered to be determinants of social capital accumulation and positive relationship [25, 26]. In the study area livestock is considered as source wealth, indication of social status and a major input for crop production. Thus, households with more livestock have more to be trusted and respected in the community than households with fewer livestock's.

Access to media: At a 10% probability level, this variable has a negative and significant relationship with the probability of having low levels of social trust in the community. The marginal effects of 0.025 for media access stated that, the probability of having low levels of social trust decreases by 2.5% as the farm household accesses media. However, the variable's marginal effects value of 0.310 indicated that, the probability of the farm household having a high level of trust increased by 31% as the farm household accessed media (Table 5).

Because of the presence of the estimate for membership years and having a mobile phone, the estimate for being a female member of a farmer group lost statistical significance in

explaining changes in crop yield after joining a farmer group because mobile phone status facilitates access to services such as information that are mostly accessed through farmer groups. This implies that household heads that have access to market information are more likely to be members of agricultural cooperatives than households who do not have access to market information. This allows farmers with less information to interact with one another and build mutual trust. This empirical finding is supported by other studies [26].

Moreover, access to media through radio, television and mobile phones improves the skill and knowledge of farm household to make informative decision and close to the accuracy than those with less access to media, which in turn helps the household build mutual trust and more acceptable in the community.

Access to credit: access to credit has a negative and significant relationship with the probability of being in the low and medium levels of participation in the social organization. The marginal effects of 0.185 for credit access stated that as the farm household accessed credit, the probability of being in the low extents of participation decreased by 18.5 % at the 1% probability level. However, the marginal effects value of 0.236 for the variable indicated that, the probability of the farm household being having high levels of social trust increases by 23.3% as the farm household accessed credit at a 1% statistical significance levels (Table 5). If the house hold have more access to credit service, it can easily meet the household requirements and may have good productive resource than other. This help the household to be more trusted by the community, This result is consistent with the findings of [21].

Farm income: This variable has a negative significant relationship to the probability of being in the low extents of participation in the social organization at 1 % probability level, The marginal effects of 0.049 for farm income stated that, the probability of being having low levels of social trust in the community decreases by 4.9 % as total farm income increases by one Birr. However, the marginal effects value of 0.668 for the variable indicated that, the probability of the farm household being having the high levels of social trust increases by 66.8% as the farm income increases by one Birr at a 1% statistical significance levels (Table 5). When the household's farm income level increases the neighbors and friends tend to provide him loan expecting he has ability to repay back and more trusted by the community than low farm income households. This result is consistent with the findings [26].

All weather road distance: This variable has a positive significant relationship to the probability of being having low levels of social trust in the community at 10 %probability level. The marginal effects of 0.006 for all weather road distance stated that, the probability of being having low levels of social trust increases by 0.6% as all-weather road distance increases by one km. However, the marginal effects value of 0.008 for the variable indicated that, when other variables remain constant, the probability of the farm households being having high levels of social trust in the community decreases by 0.8% as the all-weather road

distance increases by one km at a 5% statistical significance levels (Table 5). This could be due to the fact that as the distance from the all-weather road increase communities more attached to customary laws and this increases their trust level. When the household is close to all weather road the local community suspects he will be contacting with different person coming from the towns in which the community traditionally biased of cheating and perceived untrustworthy. This result is consistent with the findings of [21].

Extension contact: This variable has a positive and significant relationship to the probability of being having low and medium levels of social trust in the community at 5% probability level. The marginal effects of 0.016 and 0.005 for extension contact stated that, keeping other factors constant, the probability of being having low and medium level of

social trust extents increases by 1.6 and 0.5% as the farm household extension contact increases by on advise contact. However, the marginal effects value of 0.02 for the variable indicated that, when other variables remain constant, the probability of the farm household being having the high levels of social trust decreases by 2% as the farm household extension contact increases by one unit at 5% statistical significance levels (Table 5). Thus, household heads with better extension contact has a less trusted by the community as opposed to result of empirical findings of [27]. This could be due to the fact that as extension contact increases to the household the household tend to government programs rather than attaching to the community rules which could make loose their trustworthiness from the community.

Table 5. Determinants of the sample households' levels of community trust.

Variables	Low		Medium		High	
	M.E	S.E	M.E	S.E	M.E	S.E
Ecology	.0715069**	.0284328	.0257713**	.0119974	-.0972782**	.0384263
Age	-.0016291	.0026823	-.0005871	.0009811	.0022163	.0036517
Sex	-.0652545	.1565687	-.0145421	.016454	.0797966	.1720847
Gender	.0451029	.1219386	.0213824	.0729788	-.0664853	.1947751
Education	-.009459*	.0050056	-.003409*	.0019623	.012868*	.0067608
Experience	-.0015049	.0024946	-.0005424	.0009081	.0020472	.0033919
Family Size	-.0094446	.0079176	-.0034039	.0030246	.0128485	.0108125
Farm Size	-.0144598	.0110712	-.0052114	.0041748	.0196712	.0150241
Economic Active	.0059776	.0155916	.0021544	.0056201	-.008132	.0211842
Livestock	-.0201187***	.0048747	.0072508**	.0025657	.0273695***	.0066328
Media	-.2516575***	.0488242	.059092**	.0200353	.3107495***	.0534545
Training	-.0205697	.0352694	-.0074885	.0131684	.0280583	.048298
Extension	.0156362**	.0065461	.0056353**	.0026636	-.0212715**	.0087813
Credit	-.1855254***	.0433782	.0507861***	.0174514	.2363116***	.0516324
All-weather roads	.0061316*	.0033921	.0022098	.0013931	-.0083414*	.0046642
Income	-.0491185***	.0151585	-.0177025**	.0071977	.066821***	.0207265
Ordered logistic regression Number of obs = 400						
LR chi2(16) = 101.88 Prob > chi2 = 0.0000						
Log likelihood = -381.34872 Pseudo R2 = 0.1178						

Sources: Own survey result, 2023. ***, ** and * means significant at 1% 5% and 10% probability levels, respectively.

3.2.2. Impacts of the Level of Trust on Farm Income, Food Security Status and Livelihoods

Impacts of the level of trust on farm income and food security status

Table 6 shows the effects of having different levels of social trust on farm households' farm income generation of the sample households. The estimated result indicated that having medium level of social trust in the community had not strong correlation with the farm households' farm income generation status. However, having high level of social trust in the community significantly increases households' total farm income by 66 over low trusted farm households, and this difference is statistically significant at a 1% probability level (Table 6). This could be attributed to households with high level of trust in the community have good opportunity to be supported by other member of the community and have good access to loan service from individuals in the community which help them access

factors of production timely without any challenges. On the contrary less trusted households have difficulties in getting loan from their friends which impedes them not timely accessing agricultural inputs if they don't have sufficient money at time of production.

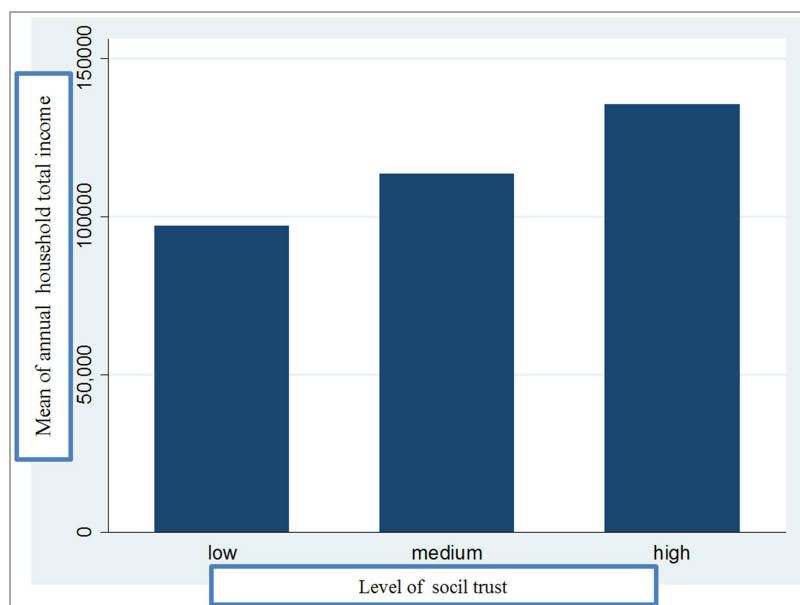
Table 6. Impacts of the level of community trust on farm income status.

Level of Trust	Ln income	S.E	Ln income effects	S.E
Medium	10.576927	1.4542157	.0445235	.2366138
High	11.249069	1.1257912	.660266***	.2297907

Sources: Own survey result, 2023. *** means significant at 1 % probability levels

The following figure 2 indicates the mean levels of farm households' farm income status measured in Ethiopian birr by different extents of trust of the farm households in the community. The figure shows households with high level of social trust helped to have high level of income as compared

to the low level of trust.



Sources: computed based on own survey data, 2023

Figure 2. Total farm income across the levels of community trust.

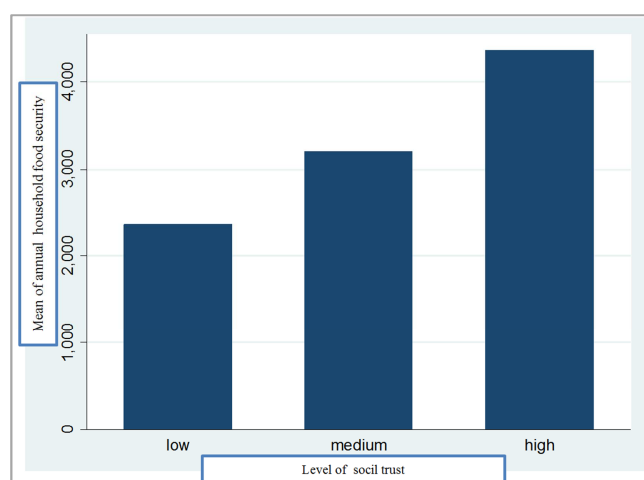
Table 7 shows the effects of having different levels of social trust on farm households' food security status of the sample households. The estimated result indicated that having medium and high level of social trust in the community had strong correlation with the farm households' food security status. Accordingly, having medium and high level of social trust in the community significantly increases households' food security status by 23 and 46%

over low trusted farm households, and this difference is statistically significant at a 1% probability level (Table 7). During food shortage or climatic and non climatic shocks highly trusted households tends to easily access credit from their friends or neighbors which help them mitigate the food availability of the household and easily cope up from the crises.

Table 7. Impacts of the level of community trust on food security status.

Level of Trust	K calorie	S.E	M/d	Food security effects	S.E
Medium	3206.6538***	1833.145	1046.695	0.232441***	.0941027
High	4366.2979***	1925.7419	1764.3	.4577408***	.0859935

Source: Own survey result, 2023. *** means significant at 1 % probability levels



Source: computed based on own survey data, 2023

Figure 3. Food security across the levels of trust.

The following figure indicates the mean levels of farm households' food security status measured in food consumption score by different extents of trust in the community of the farm households in the study area. As indicated on Figure 3 high level social trust is associated with high level of food security status, This indicates that more trusted households in the community have high tendency to be more food secure than low trusted households. This indicates that as the household more trusted they tend to have access to credit facilities and high tendency of support in times of crises or shocks than low trusted households.

Effects of participation in social trust on livelihood choice strategies

The estimated results shows that medium and high level participation of the farm households in the local social organization did not show a significant effect on the farm households' livelihood choice strategies but very higher level participation in the social organization had significant

relationships with the farm households' livelihood choice strategies. Accordingly, very high level participation in the local social organization increases the farm households livelihood diversification strategies by 40% over that of low participant households and significant at a 5% statistical levels (Table 8).

Table 8. Effects of social capital of the households on livelihood choice strategies.

Levels of social trust	Participation effects	S.E	t-value
Medium	.0223011	.2541687	0.09
High	.5894636**	.2436213	2.42

Sources: Own survey result, 2023. ** means significant at a 5% percent statistical levels

The possible explanation could be when a household participate in many different organization the chance of accessing finance, skill information and different livelihood practice experiences which help to diversify their farm to off and non-farm activities.

Likewise, having medium trust in the community did not show significant relationships with the farm households' livelihood diversification strategies. But having high levels of social trust in the community increases the farm households livelihood diversification strategies by 59% over that of low trusted household and significant at a 5% statistical levels (Table 8). This could be due to the fact that highly trusted households tends to access resources like skill and finance which helps to invest in other livelihood activities other than farming.

4. Conclusions and Recommendations

According to the estimated results, at a 1% probability level, households with high and very high levels of engagement in the social local organization of the sample households had total farm income that is 46 and 65% more than those with low levels of participation. Similarly, farm families have higher food security status than non-farm households when they participate at high and very high levels in the social local organization of the sample homes. This difference is statistically significant at a 1% probability level. Yet, at a 1% probability level, high levels of social trust in the community greatly enhance households' overall farm income by 66 over low levels of trust in farm households. Similar to the previous example, at a 1% probability level, having medium and high levels of social trust in the community considerably improves families' food security status by 23 and 46% over low trusted farm households.

Last but not least, the impact evaluation results of the mean comparison result demonstrate that very high level participation in the local social organization increases the farm households' strategies for diversifying their sources of income by 40% over those of low participant households, and is significant at a 5% statistical level. Also, there was no evidence of a connection between medium levels of community trust and the farm households' efforts to diversify their sources of income. Yet,

compared to poorly trusted households, farm households' livelihood diversification techniques improve by 59% when there is high levels of social trust in the community, which is significant at a 5% statistical level.

5. Recommendation

This study has uncovered proof that a high degree of social capital, shown in involvement in a variety of local organizations and community trust, as well as the diversification of livelihood options, will improve the food and nutrition security of farm households. The study also found that social capital levels have a favorable impact on the diversity of livelihood methods, which in turn enhances the food and nutrition security of farm households. This sends a positive message to those responsible for designing and implementing programs as well as funding sources, encouraging them to take the necessary steps to improve rural families' access to food and nutrition. After the study's findings, the following policy recommendations were made. The most significant factor affecting food and nutrition security at the family level was social capital (trust) status. As a result, enhancing household social capital (household social trust) and using it as a possible input for development programs has the potential to reduce food insecurity and enhance nutrition among smallholder farmers.

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