

Determinants of Rural Multi-dimensional Poverty: The Case from Kuyu District, Central Ethiopia.

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Abstract

Understanding, determinants of multi-dimensional rural poverty is a pre-condition for effective public action to alleviate poverty in rural area of Ethiopia. The major concern of this article was to look into determinants of multi-dimensional rural poverty in Kuyu District, Central Ethiopia. In order to attain this objective, relevant data were collected through key informant interview, focus group discussion and structured interview. The generated data were analyzed through econometric model. In our econometric analysis, we performed logistic regression model to analysis determinants of probability of being multi-dimensionally poor. The result indicated that market distance was the variable that was positively and significantly correlated with probability of the being multi-dimensionally poor rural household. On the other hand, education of household head, time spent on income generating activities, use of improved seeds, agro-ecology was the variable that was negatively and significantly correlated with probability of the being multi-dimensionally poor rural household. Hence, our conclusion is that effort should be made by policy makers and other related stakeholders to improve these identified determinants to alleviate rural poverty of Kuyu district.

Key words: Logistic regression analysis, Multi-dimensionally poor, Multi-dimensional poverty

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I. INTRODUCTION

a) Background of study and Problem Justification

Poverty is deprivations in basic capabilities of the individual or households in a given region. The deprivation of basic capabilities is multidimensional and includes the absence or lack of economic, social, political and environmental assets and resources (UN, 1998; Sen, 1999; Wilson *et al.*, 2001; World Bank, 2006). Both definitions of poverty reveal as a state of human well-being deprivation defined by poverty cutoff (Uni-dimensional and Multi-dimensional poverty index) in which our study focused on. Accordingly, Bradshaw (2005); Bhatta *et al.* (2006); Ferreira (2016); World Bank, (2016) defined poverty as not only an insufficient income to buy a minimum basket of goods and services but also as the lack of basic capabilities to live in dignity in a given region in the light of the International Bill.

In having different extents, Poverty has existed for a very long time and it remains worldwide social immoral in this 21st century (FAO, 2015). Though poverty is worldwide social problem, it is the most challenging and pressing public concern in many developing countries. In the world, the highest inhabitants living in poverty are found in Africa. Hence, the regional share of residents living in poverty is high in African continent. According to the evidence, 47.9 percent of population is living in poverty in this continent (Ncube, *et al.*, 2015). Regardless of being second largest continents in the world and having 54 countries, the combine gross domestic product (GDP) of Africa is about 15 times less than the GDP of the USA and about 7 times less than the current GDP of china (Teshome and Quiacoe, 2014). They add that the inappropriate development strategies and institutional weakness are claimed to be one of the main factor for poverty in many African countries.

Sub-Saharan Africa is the only region in the world where poverty is relatively worse off than their counterparts in other parts of the world. Thus, 389 million people are inhabited in extreme poverty over sub-Saharan Africa which is 43.4 percent of the global poor. Nigeria, Democratic Republic of Congo, Tanzania, and Ethiopia were top four countries contributing the 53 of percent poverty to sub-Saharan African (Ncube *et al.*, 2015; Beegle *et al.*, 2016). Among the extremely poor, poverty is clustered in the rural areas. Rural inhabitants

of most Sub-Saharan Africa rely on low-productivity, and low-paying jobs in the informal sector for their livelihood (Chuhan-Pole 2014).

Ethiopia is one among sub-Saharan African countries facing extreme poverty. Poverty is pervasive in Ethiopia as a great portion of its population lives below poverty line (OPHI, 2016). Despite of fast economic growth in the past decade, poverty happens ubiquitous in Ethiopia that makes the country among the poorest in the world. Recently, Ethiopia is among the low-income countries in the world with GDP per capita of \$1608 in PPP terms in 2017 and ranked 164 out of 187 countries (World Bank, 2017). Poverty is a long-lasting problem affecting a main portion of its rural and urban population.

The Multidimensional poverty index is estimated to be 0.564 while it is 0.637 for rural areas and 0.230 for urban areas in Ethiopia (OPHI, 2016). Hence, the elimination of poverty is currently a key concern of all those interested in Ethiopia. The incidence of poverty in rural areas is greater and poverty is more severe than in urban areas. And also there is an uneven distribution of poverty throughout the country's rural areas. This means, rural poor are not a homogeneous group (IFAD, 2011). This is because, poverty is truly a multi-dimensional phenomenon that requires multi-dimensional policy and program interventions as of local situation to improve the well-being of households and, hence, make them free from poverty (World Bank, 2015). Therefore, identifying determinants of multi-dimensional poverty was required based on condition of the rural households to have relevant policy for poverty alleviation.

b) Objective of the study

The objective of the study was to identify determinants of rural multi-dimensional poverty in Kuyu district.

II. RESEARCH METHODOLOGY

a) Location of Kuyu district

Kuyudistrict is one of the 180 districts in the Oromia regional state of Ethiopia and also one among 13 districts in North shoa/selale/. It was established as independent district in 1933 E.C. This district is about 42 km from Fiche and 155km away from Addis Ababa on the way. The administrative city of Kuyudistrict is GarbaGuracha. Astronomically, it is located between 9°35' and 9°59' N latitude, and between 38°03' and 38°31' E longitude. In relative terms district is located North of Ada'abarga and Meta robi, East of Gindeberet, South of Warajarso, south west of HidabuAbote and West of Dagam. See the following figure.

b) Population of Kuyu district

Based on the figure published by the central statistical agency estimation in 2015, Kuyudistrict has total population of 152,366 of whom 75,523 are men and 76,843 are women. 123,130 or 80.81% of its population are rural dwellers. According to the same source, with an estimated area of 950.75km², Kuyu district has an estimated population density of 160.3 people per square kilometer which is proportionate to zone average of 172.2 people per square kilometer. The inhabitants of this district is mostly believe in orthodox (92.6%), followed by protestant (5.9%), traditional believers (1.06%), Muslim (0.35%), Catholic (0.03%), and finally other believers (0.06%).

c) Land use land coverage of rural parts of kuyudistrict

Of the total area covered by Kuyu district (95074.579 hectare), 94061.998 hectare is occupied by rural areas. From this rural land area, round 48084.84 ha is used for rain fed agriculture, 6609.6 hectare is used for irrigation, 13467.71hectare is used for grazing, 7260.68 hectare is used for various construction, 2833.649hectar is covered by forest, 3838hectar is covered by shrubs, 3168.11 hectare is covered by stone and 8799.409 hectare is used for other purpose (ABKW, 2016/17).

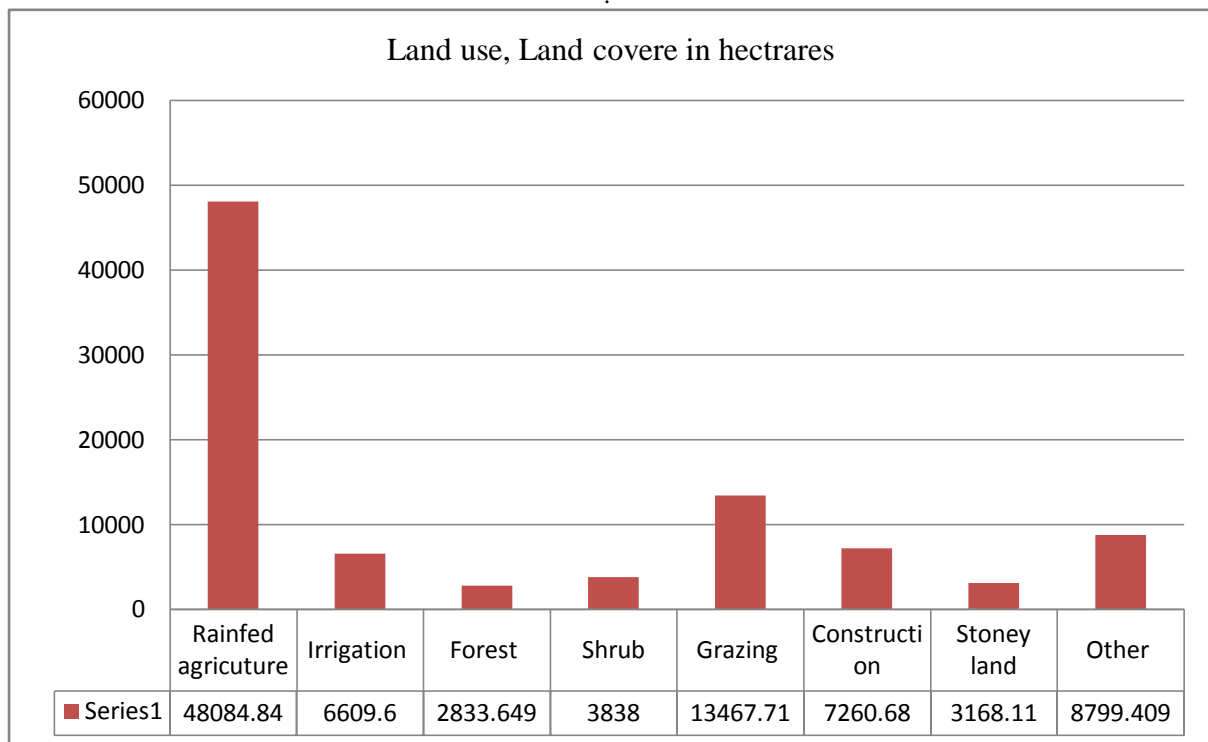


Figure1 Land use land coverage of rural parts of Kuyu Woreda/district

d) Research design

Mixed research methods is the kind of research where the researcher combines quantitative and qualitative techniques, methods and concepts in a single study or series of related studies during single or multiple phases within a pragmatic philosophical worldview (paradigm) and theoretical lenses that direct the plan for conducting the study (Onwuegbuzie and Leech, 2007; Greene, 2007; Niglas, 2009). whereas Johnson and Onwuegbuzie and Leech (2007) and Johnson (2007) have argued that the fundamental principle of mixed methods research is that multiple kinds of data should be collected with different strategies and methods in ways that reflect complementary strengths and non-overlapping weaknesses, allowing a mixed methods study to provide insights not possible when only qualitative or quantitative data are collected.

In keeping to the pragmatist perspective and with regard to study that deals with poverty, the mixed methods approach was deemed the most appropriate (World Bank, 2005). Likely, the researcher found a mixed research, combining both quantitative and qualitative approaches, more appropriate for the current research. This practice, according to Kim (2003), ensures intellectual coherence and quality control. Hence, mixed method research combined qualitative (inductive theory) and quantitative (deductive theory) approaches to provide methodological triangulation to study social setting (Tashakkori and Teddlie 2008).

e) Technique and methods of data collection

Every research design has to choose methods of data collection that relate to the research problem. Marshall and Roesman (2016) stipulate commonly used methods of data collection for mixed research to be; participant observation and scheduled interview methods since they generate detailed aspects of the problem focused. The methods for this research were chosen in line with its research strategy and they included focus group discussions, key informant interviews, and questionnaire or scheduled interview that generated quantitative and qualitative data.

f) Methods of Data Analysis: Logistic regression model analysis

Logit model was employed to estimate the determinants of poverty in rural household. Logit model is a statistical method for analyzing a data set in which there is one or more independent variable that determine outcome. The outcome is measured by dichotomous variable in which there are only two possible outcomes (Gujarati, 2003). Hence, for our study, the logistic regression model was employed to determine value of variance in the dichotomy of multi-dimensional poverty status (poor and non-poor by 0.333 poverty cutoff) by the predictor variables; to rank the relative importance of predictor variables; to assess interaction effects; and to understand the impact of covariate control variables.

Prior to parameter estimation of logit model, different assumption were considered. But, the assumptions required for statistical tests in logistic regression are far less restrictive than multivariate linear regression model. However, the following assumptions still apply to logistic regression model. These include: meaningful coding, inclusion of all relevant and exclusion of all irrelevant variables in the regression model, low error in the explanatory variables, linearity in logits, independent sampling, no outliers, no multi-collinearity and sampling adequacy. As per of these assumption, all of the 23 explanatory variables were retained within logistic regression model for analysis. To estimate this type of relationship, it requires the use of models.

The model is specified as follows.

$$P_i = \frac{e^{z_i}}{1 + e^{z_i}} \dots\dots\dots 1$$

Where: pi is 1 if the household is Multi-dimensionally poor (below 0.333 Poverty cutoffs); 0 otherwise.

The probability that the household belongs to Multi-dimensionally non-poor (above 0.333 poverty cutoff) will be (1-Pi). That is,

$$1 - P_i = \frac{1}{1 + e^{z_i}} \dots\dots\dots 2$$

The odds ratio can be written as:

$$\frac{P_i}{1 - P_i} = e^{z_i} \dots\dots\dots 3$$

In linear form by taking the natural log of odds ratio:

$$\ln \left(\frac{P_i}{1 - P_i} \right) = \ln (e^{z_i}) = z_i \dots\dots\dots 4$$

Zi=β0+β1(HSIZE) +β2(AGEH) +β3(FM)+ β4(EDUC) +β5(DEPR) +β6 (AFJO) +β7(HTSIGA)+ β8(TEX)+ β9 (RTR)+ β10 (FRECO) +β11(VOTR) +β12(AHCE) +β13 (AVSE) +β14 (AHCS) +β15 (_SAVE) +β16 (AGECO) +β17 (LHOL) +β18(DIMAR) +β19 (DIROD) +β20 (USFERT) +β21 (USISED) +β22OXOWNE)+ β23 (LIOWNE) +εi

Where:

- e = the base of natural logarithms
- β0= intercept term
- β1...2= the coefficient of explanatory
- εi= disturbance term

Table1 List of Variables for the Determinants of Multi-dimensional rural Poverty for logistic regression model

Variables		Variables definition and measurements
a. Dependent variable		
Multi-dimensional Poverty status		Households poverty status, 1=non-poor,0=poor
b. Explanatory variables		
LIOWNE	Livestock ownership	Livestock ownership in TLU per AE
LHOL	Farm land holding	Land holding of the household in hectares
USFERT	Use of fertilizers	1 if the households used adequate fertilizers, 0 other ways
USISED	Use Improved seed	1 if the households used improved seed,0 if not
OXOWNE	Oxen ownership	Oxen ownership in number per AE
HSIZE	Family size	Family size of household in AE

AGEH	Age	Age of the household head in years
FM	Female-male ratio	Female-male ratio
EDUC	Education	Educational achievement of Household head as Ethiopian curriculum
DEPR	Dependence ratio	Dependency ratio
AGECO	Agro-ecology	Categorical variables are included for each agro-ecological zone to capture any difference that may happen
DIMAR	Distance to Market	Distance from the market center in kilometers
DIROD	Distance to Road	1 if above average Distance from the road in kilometer , 0 otherwise
FRECO	Frequency of extension contact	Frequency of households visiting extension agents by number of days per month
AVSE	Access to Veterinary service	1 if the households access to veterinary and medicine center for livestock, 0 other ways
AHCE	Access to health service	1 if households access to health center,0 if not
AHCS	Access to Credit service	1 if household with access to credit,0 otherwise
HTSIGA	Time spent on income generating activities	1 if the household spent 8hr and above on work, 0 otherwise
AFJO	Apathy to find a job	1 if the households are lazy to find job,0 other ways
TREX	Tradition of reciprocal exchange	1 if the low households reciprocity in community, 0 other ways
RTR	Relationship of Trust	1 if the low households Relationship of Trust in community , 0 other ways
VOTR	Vocational Training	1 if the household has able to get Vocational Training , 0 otherwise
SAVE	Available saving	1 if the household has able to save , 0 otherwise

III. RESULT AND DISCUSSION

a) Determinants of Multi-dimensional Poverty by Using Logistic Regression Model

The result in the Table 2 shows, the logistic estimate of determinants of multi-dimensional poverty in Kuyu district. The regression classification table revealed that logistic regression model fitted to the data as explained in Table 2 below.

Table2 logistic estimate of the determinants of rural Multi-dimensional poverty in Kuyu district

MPI_poverty_status	Coef.	Std. Err.	z	P>z
FM	-0.1669337	0.208344	-0.80	0.423
EDUC	-0.2392818*	0.1226622	-1.95	0.051
DEPR	0.0030124	0.2868308	0.01	0.992
AFJO	0.737548	0.4505493	1.64	0.102
HTSIGA	-0.6922136**	0.3356109	-2.06	0.039
RTR	-0.068669	0.5150408	-0.13	0.894
FRECO	-0.0068123	0.0128828	-0.53	0.597
AVSE	0.2059585	0.3149369	0.65	0.513
AHCS	0.0863265	0.317287	0.27	0.786
SAVE	-0.2324879	0.3286692	-0.71	0.479

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LHOL	0.1065612	0.0657365	1.62	0.105
DIMAR	0.053058**	0.023663	2.24	0.025
DIROD	-0.3820349	0.3353129	-1.14	0.255
USFERT	-0.1402103	0.3237079	-0.43	0.665
USISED	-0.6020355*	0.343586	-1.75	0.080
OXOWNE	0.4801781	0.6437855	0.75	0.456
LIOWNE	-0.3230903	0.2752805	-1.17	0.241
AGECO	-0.1757979*	0.0979555	-1.79	0.073
Cons	-2.833998	0.8129971	-3.49	0.000
LR chi2(23)	29.05			
Prob>chi2	0.0478			
Correctly classified	74.39			
Number of obs.	367			

Notes: i. * indicates that the coefficient are significant at 0.1 significant level
 ** indicates that the coefficient are significant at 0.05 significant level
 *** indicates that the coefficient are significant at 0.001 significant level
 Source: Survey result, 2017

The result reported on Table 2 shows, the logistic estimate of determinants of the rural poverty in the study area. The multi-dimensional poverty taken for poverty cutoff (0.333) was taken as the poverty line to group household as poor and non-poor as directed and used by Alkire *et al.* (2016); Conconi *et al.* (2014); Alkire and Santos (2013 and 2010). The logistic model with significant LR chi2 at 29.05 and chi-square 5 percent shows that the model is good fit for the data. Table revealed that education of household head, time spent on income generating activity, market distance, improved seed and agro-ecology were statistically significant in determining multi-dimensional poverty. Hence, the detailed explanations of these statistically significant explanatory variables were presented below.

Education of household head (EDUC): Education is decisive dimension of poverty itself when poverty is broadly defined to include shortage of capability and knowledge deprivation. The justification is that the literacy promotes the utilization of modern agricultural technology and facility entry into productive and profitable production which escape the rural household from the poverty. The coefficient for education of the household head was found to be negative at 10 percent significance level. Holding other thing constant, the average marginal effect result reported in Table 3 show promoting the household head by one level of education will increase the probability of the household to exit from the risk of the multi-dimensional poverty by 0.044 percent. The rationale is that education better equips household to deal with and to escape from risks of multi-dimensional poverty.

Similar to aforementioned, focus group discussants and key informants said, “Educated household head use modern agricultural input efficiently and involved in any other profitable activities than uneducated household head. Hence, household led by educated heads are better off in the community”. The result is consistent with the finding of Bigsten and Shimeles (2004), Amao *et al.* (2017) and, Cho and Kim (2017) emphasizing that promoting the education level enables rural household to reduce the risk of the being under poverty.

Time spent on income generating activities (HISIGA): Time spent on income generating activities made by rural household per day was negatively and significantly related with rural poverty at 5 percent probability level. This is due to the fact that rural household who spent much of their time on income generating activities is having the probability of above multi-dimensional poverty threshold. The negative coefficient on time spent on income generating activities is due to the manner in which a value of 1 is associated with rural household who spent 8 and above hour on income generating activities per day, and a value of 0 is associated with rural household who spent below 8 hour on income generating activities per day. Therefore, an increase from 1 to 0 in the coding of time spent on income generating activities per day variable will result in increasing topoverty prevalence. This is logical, as people closer to poverty is not as likely as others to be able to work 8 and above hour on income generating activities per day.

Holding other thing on their mean, the negative marginal effect of 0.1273 indicates that the probability of the poverty status decrease for rural household who spent 8 and above hour on income generating activities per day by 0.1273 percent. Naturally, every household and individuals have enough time to tasks very necessary activities for attaining minimum standard of their living. But, this reality is not equally happening in the society.

Because, most non-poor rural household may not have sufficient time and forced to hire care provider for activities to cover time deficit. Some others have enough time to swim in poverty. This all aforementioned information (econometric result) confirms that rural household who spent much of their time on income generating activities are non-poor and otherwise. The result is conformity with the study of Zacharias (2011) and Masterson *et al.* (2014) disclosing that Time poverty is markedly difference across household. Time poverty among poor household is much higher than among non-poor household.

Focus group discussant and key informants also said that “there is enough time to adequately attend to the need of the household members but poor household or individual was their time on taking rumors here and there in the community and causing conflict in different section of the community. These poor household or individual are wasting most of their time in taking alcohol and talking much on their unconcern than on income generating activities”. Additionally, focus group discussant and Key informants revealed, “Most of poor household members waste their time on giving unpaid comedy, unpaid singing and unpaid saying poem in funeral ceremony in the community. Main focus of these poor household is becoming icebreaker in different social event in the community than making the bread for their household”

Distance to market (DIMAR): Market distance is prominent determinant of multi-dimensional poverty. Market distance is crucial variable significantly and positively affecting multi-dimensional poverty. Hence, proximity of household to market can provide rural household with better access to market and there by contributing in lowering households’ chance of falling into poverty. The result of the survey revealed that the variable under consideration is positively related and statistically significant at 5 percent probability level with poverty (multi-dimensional poverty).

Holding the other thing on their mean value, the average marginal effect shows that for each additional market distance from the household, the probability of the household fell to poverty increases by 0.00976 percent. Higher market distance from the household, the greater chance of the falling in poverty. The possible explanation is that access to market gives the household an opportunity to be involved in different income generating activities that keep the household above poverty (multi-dimensional poverty) threshold.

Use of improved seeds (USISED): Use of the improved seed is critical to boost crop production. The expectation is that use of the improved seed can wider the opportunity of being better off. It is the important source of increased productivity that makes a difference in the poverty status of farm households. Therefore, the use of improved seeds has negatively influenced poverty (multi-dimensional poverty) status of rural households at 10 percent significance level. That means, rural household that used improved seed have better likely to meet the requirements to be out of poverty (multi-dimensional poverty). Holding other thing constant, the average effect indicates that as rural household used one more unit of improved seed, the probability of being multi-dimensionally poor decrease on average by 0.1108 percent.

In the same reflection, focus group discussant and key informants said that “those household who used improved can harvest better production than otherwise. But delay in supply of improved seed is problem we face every year. Office acknowledged the strong complaining from the farmer in that improves seed should be supplied quite before time of broadcasting, but disable to manage the problem due to factors external to the district”. Conformity to our finding, Mathengeet *al.* (2012) CGIAR (2014); Adenugaet *al.* (2016) and Smale (2016) Revealed that Multi-dimensional poverty is high among the household who do not use improved seed.

Agro-ecology (AGECO): Agro-ecology is statistically significant determinants of multi-dimensional poverty at 10 percent significant level, which is consistent with the finding of Kwak and Smith (2011) and Twerefou (2014). More specifically, being in the kola agro-ecological zone statistically increases the probability of rural household being under poverty threshold. From marginal effect result computed in Table3, it could be seen that if rural household moves from kola agro-ecological zone to Dega and Weynadega agro-ecological zone, it significantly reduces the probability of being poor by 0.0323 percent.

Table 3 the probability of being Multi-dimensionally poor, marginal effect at mean values (percent)

Explanatory variables	Marginal effect	Explanatory variables	Marginal effect
FM	-0.0307234	SAVE	-0.0427883
EDUC	-0.0440387	LHOL	0.0196121
DEPR	0.0005544	DIMAR	0.0097651
AFJO	0.1357423	DIROD	-0.0703118
HTSIGA	-0.1273987	USFERT	-0.0258051

RTR	-0.0126382	USISED	-0.1108019
FRECO	-0.0012538	OXOWNE	0.0883746
AVSE	0.0379057	LIOWNE	-0.0594633
AHCS	0.015888	AGECO	-0.0323548

Source: Survey result, 2017

IV. CONCLUSION AND RECOMMENDATION

- Market distance is crucial variable significantly and positively affecting multi-dimensional poverty. Proximity of household to market can provide rural household with better access to market and there by contributing in lowering households' chance of falling into poverty. But, households far from the main market have a lower level of welfare status and they have a higher level of poverty intensity. This calls the policy measures to address inadequate market access through investments in marketing infrastructures, such as market stalls, rural access roads, transportation facilities and agricultural price information systems. Moreover, all stake holder including Government and non-governmental organization should be encouraged to invest in agricultural input and output market infrastructural facilities.
- The coefficient for education of the household head was found to be negative sign with Multi-dimensional poverty and statistically significant. This means that people closer to poverty or in poverty is not as likely as others to be able to get education. All stake holder including government and non-governmental organization have to increased provision of education (formal and informal education) which lead to increase in productivity and therefore, earnings. The justification is that education can promotes the utilization of modern agricultural technology and facility entry into productive and profitable production which escape the rural household from the poverty.
- Agro-ecology is statistically significant determinants of multi-dimensional poverty having negative sign. Accordingly, the rural households dwelling in kola agro-ecological zone are having the probability of the being in poverty than otherwise. This is because, the kola agro-ecological zone are mostly deprived of social service and amenities which are crucial to reducing poverty. Therefore, all stake holder including government and non-governmental organization have to improve social service and amenities in Kola agro-ecological zone of the Kuyu district.
- Use of the improved seed is critical to boost crop production. It is the important source of increased productivity that makes a difference in the poverty status of farm households. Therefore, the use of improved seeds has negatively influenced poverty (multi-dimensional poverty) status of rural households at significance level. That means, rural household that used improved seed have better likely to meet the requirements to be out of poverty (multi-dimensional poverty). Therefore, all stake holder including government and non-governmental organization have to invest on market infrastructural facilities to enable rural household to get improved seed and other agricultural input in Kuyu district.
- The time spent on income generating activities made by rural household per day was negatively and significantly related with rural multi-dimensional poverty. This is due to the fact that rural household who spent much of their time on income generating activities is having the probability of above poverty threshold. Therefore, all stake holder including government and non-governmental organization have to increased provision of vocational training and education (formal and informal education) which enables rural household wise use of their time that lead to increase in productivity in the study area.

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