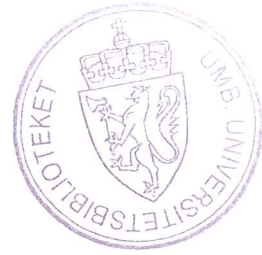# SOCIAL CAPITAL AND HOUSEHOLD INCOME DISTRIBUTION: ANALYZING PARTICIPATION AND HOUSEHOLD INCOME EFFECTS OF WOMEN GROUPS IN MWINGI DISTRICT IN EASTERN KENYA.

ONESMUS MALUKI MUTIO

SOCIAL CAPITAL AND HOUSEHOLD INCOME DISTRIBUTION:
ANALYZING PARTICIPATION AND HOUSEHOLD INCOME EFFECTS OF
WOMEN GROUPS IN MWINGI DISTRICT IN EASTERN KENYA

Onesmus Maluki Mutio

A thesis submitted in partial fulfillment of the requirement for the degree of Masters of Sciences
in Development and Natural Resource Economics

DEPARTMENT OF ECONOMICS AND RESOURCE MANAGEMENT

NORWEGIAN UNIVERSITY OF LIFE SCIENCES (UMB)

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DECLARATION

I, Mutio Onesmus Maluki, hereby declare to the state of the Norwegian University of Life Sciences (UMB) that this thesis is my original research work and all other sources of information used are duly acknowledged. This work has not been submitted to any other University for any academic award or published in any place.

Signature …………………………………..

Date …………………………………..

Onesmus Maluki Mutio

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ACKNOWLEDGEMENT

ABSTRACT

This study investigates the impact of development aid channeled through local women groups in Mwingi district, Eastern Kenya. My main objective is to investigate whether the poorest households participate in these local women groups and to estimate the effect of participation on household income. The study uses household survey data collected from Mwingi district in June and July 2009. I used matching method based on kernel density estimation and the two step estimation on Heckman treatment effects model, *treatreg*. The results show that the poorest households do not participate in the local women groups and that participation in local women groups lead to a higher household income.

I therefore conclude that like other empirical studies have shown, social capital has a positive effect to economic well being of the people. I also conclude that development aid channeled through local women groups do not benefit every household in the district but benefits only those households who have managed to acquire at least physical assets of 10,000 Kenyan Shillings. In my view this development aid is working to increase inequality in the society by widening the gap between the poorest and the poor. I suggest that the donors implement other policies that could also benefit the poorest households so that every household could partake of the blessings of this development aid.

1.0 INTRODUCTION.

Capital is vital for any economic development, earlier studies on economic growth such as Solow (1956), emphasized on physical capital but they later found that physical capital cannot fully explain economic growth. They later focused on other forms of capital, including human capital in the form of skills, training, and education (Becker 1964), and organizational capital. (Prescott and Visscher 1980).

The role of social capital in economic growth has generated a hot debate and given rise to many studies across the world. Literature review shows that social capital has a positive impact on economic well being of people in many parts of the world and that it can contribute positively to economic growth.

Hence Donors, Non-governmental Organizations (NGOs) and government agencies have put in place policies in support of social Capital either directly or by providing an environment that encourages the existence of local associations.

In the recent years a large part of development aid has gone to supporting local women groups in eastern Kenya. My main objective is to investigate whether this type of aid reaches the poorest households and whether there are any economic benefits of participating in these local women groups.

In Mwingi district, much of the development aid from the donor community is channeled to the women groups through the NGOs. There are nine NGOs working with the local women groups. The NGOs support the groups either directly or indirectly by providing a good environment for their existence. They work towards strengthening the women groups and help them through provision of agriculture inputs, provision of water, organizing seminars on community development, H.I.V and AIDS awareness, savings and credit, farming and storage methods among others. They also involve the women groups in their daily operations and activities thus encouraging their existence.

TABLE 1. LIST OF NGOs IN MWINGI DISTRICT

	NAME OF THE NGOs	LOCATION	FUNCTIONS
1	Christian Children's Fund	Migwani	Health and education programs Deals with orphans and the destitute Community mobilization and capacity building
2	World Vision	Mui	HIV&AIDS awareness Water and sanitation Agriculture Capacity building of community based self help groups
3	Mitamisyi Poverty Alleviation Program(MPAP)	Mui	Provision of water(dig shallow wells) Peace building initiatives with neighboring communities
4	Community Assistance Development Organization (CanDo)	Nuu	Primary health care Building schools and other public utilities Community mobilization and capacity building
5	Farm Africa	Central	Provision of agricultural inputs Educating farmers on farming and storage methods Capacity building of self help groups
6	DANIDA	Ngomeni	Construction of roads Water provision/conservation Agriculture
7	Tharaka Integrated Development Agency(TIDA)	Migwani	Deals with feeder schools Agriculture Water Roads Capacity building of self help groups
8	Genesis CDA	Nuu	Helps the destitute & orphans HIV\AIDS awareness Cares for the old, widows and widowers Helps in construction of social amenities Youth mobilization Capacity building of self help groups
9	NGOCAP	Ngomeni	Deals with water, health and education

Some of these NGOs are international while others are local. The international ones are World Vision, Farm Africa, Christian Children's Fund and Danish International Development Agency (DANIDA). The local ones includes Genesis Community Development Association (Genesis CDA), Tharaka Integrated Development Agency (TIDA), Mitamisyi Poverty Alleviation Program (MPAP) and Ngomeni Community Association Projects (NGOCAP). The government supports these groups through the local administration and gives them a free hand to progress in their activities. These NGOs are shown in the table below.

There are 15 local women groups involved in different activities in the district. The most common local women groups are involved in self help activities which are merry go round programs where members contribute a certain amount of money per a set period of time and the total amount contributed is then given to one participant at a specified time. The sequence is then repeated until every participant has received the amount contributed by all other members and a new cycle then begins. In the beginning of the cycle all members pick their dates of getting the money at random. Some of these groups are formal while others are informal. They work with the NGOs towards community development and poverty reduction. There is a general believe that supporting the women groups in this region is a vital tool in poverty reduction.

In the absence of formal banking facilities this helps the women to save their little income which helps in consumption smoothening. This also serves as security in times of uncertainties whereby participating members are able to obtain credits.

TABLE 2; LIST OF LOCAL WOMEN GROUPS IN MWINGI DISTRICT

	Name of the Women Group	Location Of the Group	Number of membership	Main Activity
1	Mukamwendwa	Mui	12	Digging Toilets
2	Wikililye	Mui	12	Self Help
3	Makuka	Mui	13	Agricultural
4	Kwiyika Kwa Aka	Nguni	17	Self Help
5	Kisovo Welfare	Nguni	40	Self Help
6	Singia Self Help	Nguni	50	Construction of social amenities
7	Mukilye	Nuu	20	Microfinance
8	Kwa Mukyama	Nuu	60	Prevention of soil erosion
9	Mui Melody	Nuu	14	Self Help
10	Kasango	Migwani	7	Self Help
11	Mutunga Group	Migwani	25	Terracing
12	Nzuku Sya Kaviu	Migwani	30	Self Help
13	Amutei	Central	12	Self Help
14	Songa Mbele	Central	40	Self Help
15	Kisovo Women	Central	13	Assist the Poor

All these women groups take some amount of money from their members either as membership fee or contribution fee. The poorest households may not have enough money for their basic needs let alone money to spare for such groups. It is therefore most likely that the poorest household may not participate in these groups due to financial barrier. This forms the basis of my first hypothesis; to investigate if the poorest households participate in these women groups I formulate the following null hypothesis:

Hypothesis 1

 "The poorest households participate in the local women groups"

In this study I will take the poorest households to mean the households with little physical wealth. Physical wealth is measured by the value of physical assets owned by the household. To test the above hypothesis I investigated whether households with little physical assets participated in the women groups.

I assume that social capital can improve the economic well being of people in two ways. First it reduces transaction costs between economic agencies. Secondly I assume that social capital is real capital with economic returns and thus it can be used to improve the economic well being of the economic agencies once it is accumulated. I could therefore expect that participating in these women groups could lead to higher household income. To investigate if participation leads to higher household income, I formulate the following null hypothesis:

Hypothesis 2

 "Participation in women groups does not lead to higher household income"

 To test this hypothesis, I investigated whether participation was statistically significant in determining household income.

This study should contribute to the hot debate on social capital and its economic contribution and should guide the donor community on the best way to channel their development aid so as to benefit every household in this society.

2.0 Literature review

One of the greatest challenges on social capital is that there has been no consensus on how to measure it and how to define it.

Different researchers have come up with different ways of measuring social capital. Fukuyama F. (1999) gives two main ways of measuring social capital. The first used by Robert Putnam measures social capital by counting groups in the civil society. It uses a number of n to track sizes of membership in the sports clubs, bowling leagues, literary societies, political clubs, and the like as they vary over time and across different geographical regions. This gives the total stock of social capital as the sum of the membership of all groups.

$$(1) \qquad\qquad SC = \sum nt$$

Where SC = Total social capital stock; n = size of membership and t = number of Organizations.

The second approach is using the survey data on levels of trust and civic engagement. Giving the society's total stock of social capital to be;

$$(2) \qquad\qquad SC = \sum (rpcn)t$$

Where c = measure of cohesion in the society and rp as the trust coefficient. (Funyuka F. (1999))

The World Bank has described Social capital in three aspects in its recent research projects. The first divides social capital into two forms structural and cognitive. Structural social capital refers to social structures like networks, associations and institutions, their rules and procedures. Cognitive social capital refers to generally accepted attitudes and norms of behavior, shared values, reciprocity and trust. The second measurement of social capital is between Macro, Meso and Micro. Micro involves relationships between individuals and households. Macro involves forms of institutions and political environment. Meso involves religion and communities. (Hjerppe R., 2003)

The two dimensional settings of the forms of social capital described by the World Bank projects can be shown as below.

Macro

Institutions of the state
and the rule of the law

Governance

Structural —————————————— Cognitive

Meso

Local institutions, Networks.

Trust, Local norms, Values

Micro
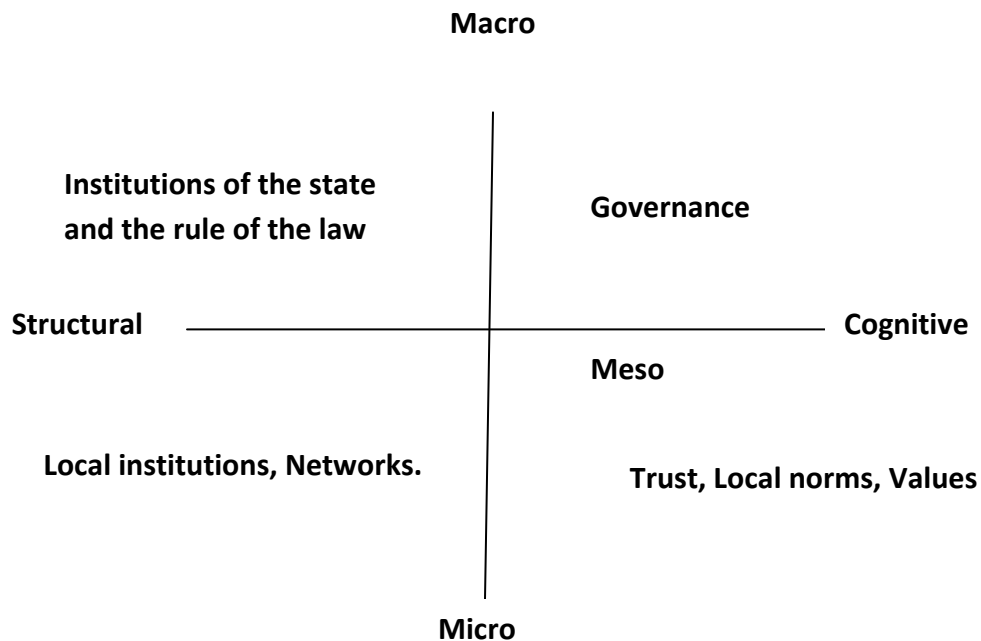
FIGURE 1. SHOWING THE TWO DIMENSIONAL SETTINGS OF FORMS OF SOCIAL CAPITAL BY WORLD BANK;

Source; (Grootaert and van (2000b)); Hjerppe R. (2003)

Social capital has also been defined in other different ways.

Woolcock M. (1998) gives two schools of thought regarding social capital. First social capital is viewed as a community level resource and as a public good with ecological characteristic. It is defined as "features of social organization that includes networks, norms and social trust that facilitate coordination and cooperation for mutual benefit".

Secondly, social capital is viewed as resources that accrue to individuals as a result of their membership in social networks. It is defined as as "the aggregate of the actual or potential resources linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition"

He further argues that social capital includes the Bonding social capital which refers to horizontal ties between individuals or groups sharing similar demographic characteristics and

secondly the Bridging and linking social capital which include ties that cut across different communities/individuals. (Woolcock M. 2008)

Social capital can be defined as "resources embedded in social networks and accessed and used by actors for actions" Lin (2000);. These resources come with benefits that would lead to economic well being of the actors.

It can also be defined as social capital as "an instantiated informal norm that promotes cooperation between two or more individuals". Fukuyama F. 1999.

Empirical studies in different parts of the world show that social capital can have a positive effect on economic well being.

In Indonesia, it was found social capital to have a positive contribution to household welfare. (Grootaet 1999)

In Italy, Luigi G., Sapienza P., and Zingales (2004), found that social capital had a positive impact in financial development across different parts of Italy.

In Nigeria it was established that social capital positively influenced people's welfare and improved the standards of living of members of the local institutions. (Yusuf S.A., 2008)

In Tanzania, Deepan, Narayan, Lant, Pritchett (1997), found that social capital was associated with higher expenditures per person in each household.

In Uganda Svetlana E., and Melinda S. (2006), found that social capital had contributed to efforts of agricultural development in rural areas by improving information diffusion among farmers and transactions in the economy.

Social capital can positively affect economic well being of economic agencies in two ways. First it reduces the transaction cost involved in improving economic well being between the economic actors. Secondly, social capital is indeed real capital truly with a measurable economic return. It is accumulated through interaction with other people and can be used to generate economic benefits to the interacting parties.

3.1 THEORETICAL FRAMEWORK

In order test and investigate the participation in local women groups, I adopt a reduced form of household expenditure model which was the basis for the study by Narayan and Pritchett; (Narayan and Pritchett 1997) and later used by Christian Grootaert; (Christian Grootaert 1999).

$$(3) \quad \lambda \eta E = \alpha + \beta SCI + \gamma HC + \delta OC + \varepsilon X + \hbar Z + \mu$$

Where $\lambda \eta E$ = household expenditure on consumptions of household

SC = household endowment of social capital

HC = household endowment of human capital

OC = household endowment of other assets

X = a vector of household characteristics

Z = a vector of village/region characteristics

μ = error term

The dependent variable in my equation is consumption expenditure. The explanatory variables are assets endowment of the household, demographic control variables, and village dummy variables. I assume that household assets consist of human capital, social capital, land, livestock and physical assets. Demographic control variables include Household head age, household size and household head gender. Village dummies variables for the four villages are also included to control for economic and agro-climate diversity of the district.

I use women group participation as proxy for Social capital and use consumption expenditures as a proxy for incomes for two reasons. One in a society where we have saving and dissaving, current expenditures can be the best way to measure of permanent income than current income. Secondly experience with household surveys shows that it is almost impossible to measure the incomes of self-employed households especially in an agrarian society. (Deepan Narayan Lant Pritchett 1997)

First I used matching methods based on kernel density estimation to compare the household income and physical assets of both the participation and the non participants. This method is a non parametric method and has been used in the cases where there is endogenous

selection bias. It finds the "closest" comparison group from the nonparticipants to the sample of group participants. The "closest" represents the observable characteristics and in this study this will be household income and household physical assets. It divides the households into groups with a similar probability of participation, regardless of whether they actually did participate or not.

Kernel density estimation is an effective way of data representation taking into account the noise for the observed data and a representation of the model or the state.

In the cases of endogenous and selection problem, the matching method based on kernel density is one of the best methods and could give a good estimate of the data for both participants and non participants.

Kernel density estimation is widely used and is one of the most studied nonparametric density estimation methods. It estimates the probability density function of a random variable. The probability density function shows the likelihood of a variable at each point in the observation span. A low density shows a low likelihood of the variable.

The estimated density at any point x is

$$\text{(4)} \qquad .f(x) = \frac{1}{n} \sum_{i=1}^{n} k\left(\frac{x - x(i)}{h}\right)$$

Where K is the kernel function and h is the bandwidth and n is the number of observations.

Secondly I will use Heckman treatment effects model by two step estimation to test and investigate the participation of local women groups and the economic benefits of participation. This model is widely used in the presence of an endogenous and self-selection bias. It was first used by Heckman J.J and is further recommended by Ettner L. S. (2004) as a possible solution in cases of endogenous and selection problems.

Given the equation of interest as;

$$\text{(5)} \quad y_i = x_i\beta + \delta z_1 + \varepsilon_i$$

Where y is the dependent variable X is a vector of exogenous independent variables and z_1 is a binary endogenous independent variable assumed to stem from an unobservable latent variable.

(6) $z_1 = w_1\gamma + \mu_i$

Obtaining the treatment is done according to the rule;

(7) $z_{1=}\begin{cases} 1, if\ z1\ 1\ \text{is} > 0 \\ 0,\ otherwise \end{cases}$

ϵ_i and μ_i are bivariate normal with mean zero. (Newton H. J., 2000)

Given any two choice sets,

(8) $K, l \subset J$

The treatment effect is the difference in potential outcome between two states, which is the effect of an individual being pushed to make the choice of set K verses l.

(9) $\Delta_{K,l} = z_k + z_l$

treareg estimates both equation 5 and 6 simultaneously. The equation 6 is a probit model predicting the probability of participation and equation 5 is a linear regression for the outcome of household income as a function of participation variable.

From equation 7 the probit model to explain whether household participate in the women groups could then be:

(10) $P(z=1/w) = G(\gamma_0 + \gamma_1 w_1 + \ldots + \gamma_K w_K) = G(\gamma_0 + w\gamma)$

Where G is a function taking the values strictly between zero and one; $0 < G(z) < 1$, for all real numbers. This is to make sure that the estimated response is strictly between zero and one.

The partial effect of w_j on $P(w) = P(z=1/w)$ can be obtained through the partial derivative:

(11) $\partial p(w)/\partial\, w_j = g(\gamma_0 + w\gamma)\gamma_j$

Where $g(z) = dG/dz\ (z)$

Since variable z_1 is endogenous it will need to be instrumented. This is possible in the treatreg. The instrument to be used must however satisfy two conditions

(12) $Cov(\alpha, \mu) = 0$

And

(13) $Cov(\alpha, z) \neq 0$

Equation 12 means that the instrument is exogenous. Equation 13 means that the instrument, α, must be related to the endogenous variable z.

4.0 THE STUDY AREA AND SAMPLE

4.1 THE STUDY AREA

Kenya is divided into eight administrative provinces namely Central, Coast, Eastern, Nairobi, North Eastern, Nyanza, Rift Valley and Western. Eastern province is further divided into eleven administrative districts and Mwingi district is among them.

The district borders, Machackos District to the West, Tana River District to the East, Mbeere and Tharaka district to the North and Kitui District to the South. It covers an area of approximately 5215.4 square kilometers with a population of about 239,387 people. It is divided into five Divisions which are Central, Migwani, Nuu, Mui and Nguni.

The district is situated in low potential and semi-arid areas with red sandy soils and clay soils which are in most cases shallow and stony. The rains are inadequate and most parts of the district are dry throughout the year. The soils are of low fertility and given that the rains are inadequate the district is not very productive in terms of farming activities which are a major economic activity in the district. Crops grown in the district are maize, beans, pigeon peas, sunflowers and green grams among others.

Livestock rearing is also a major economic activity in the district and the types of livestock kept include beef cattle, goats, sheep and poultry. Other economic activities include small scale businesses, off farm activities such as sand harvesting, fishing and casual jobs. The main income generating activities are crop production and off farm activities.

PROJECT AREA
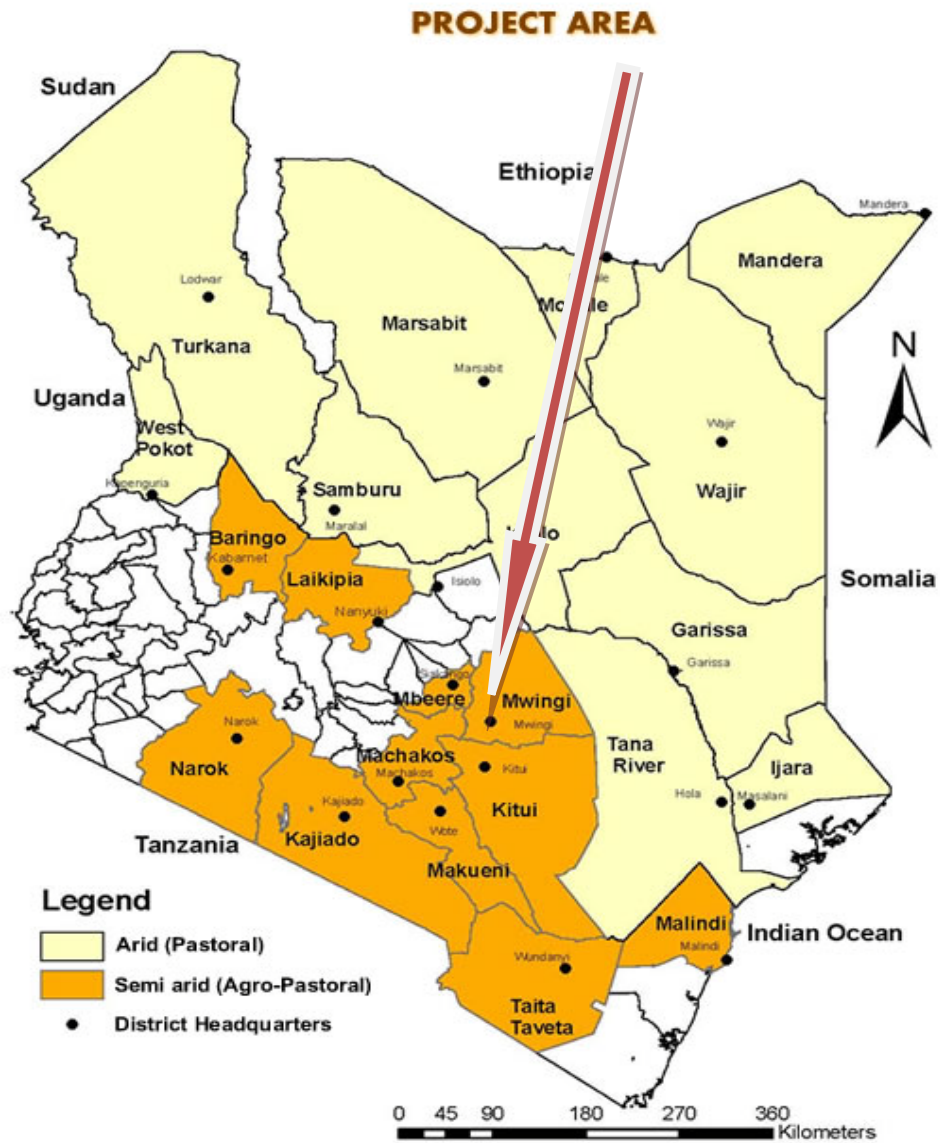
MAP 1. THE LOCATION OF MWINGI DISTRICT IN KENYA.

4.2 THE SAMPLE

From the data the average age of household heads stood at 52. The average household income is 28,587.5 Kenyan shillings per year. This gives an average daily income per person per day as 11.5 Kenya shillings approximately 0.13 US dollar. This is below the World Bank poverty line of 1.25 US dollar an equivalent of 40.85 Kenyan shillings according to exchange rates by poverty rates at international poverty lines 2005 by World Bank. This is evidence that people in this district can be classified as poor. It is further evidenced by a visit to the district.

PICTURE 2. A TYPICAL HOUSEHOLD HOME IN MWINGI DISTRICT.

The average household size is 6.8, which is higher than the average household size in Kenya of 4.8. This could be explained by the fact that the district is in a remote rural area where majority of the people are poor, unemployed and uneducated. The average land size is about 2.5 acres (1 hectare) which is above the average household land size in Kenya of 0.5 hectares. This could be so because the district is in a semi arid area which is not productive and the rains are inadequate as compared to other parts of the Kenya.

5.0 THE DATA

5.1 RAPID RURAL APPRAISAL

A Rapid Rural Appraisal was done in the four villages before the data collection. This included own observation, talking to the village elders as well as women group leaders and ordinary villagers and arranging for the focus group meeting with in the village. In the focus group meeting we used a different type of questionnaire and we collected to collect data about the village.

From the focus group meetings I found that a village had about 80 to 120 households. I got a list with names of all households living in the villages and a list with names of all participants in local women groups. From these meeting I also found that the main commercial activities are farming and livestock keeping. Crops grown in the district are maize, beans, pigeon peas, sunflowers and green grams among others. Livestock rearing is also a major economic activity in the district and the types of livestock kept include beef cattle, goats, sheep and poultry. Other economic activities include small scale businesses, off farm activities sand harvesting, fishing and casual jobs. The main income generating activities are crop production and off farm activities. The price of a one acre land is about 60,000 Kenyan shillings. Most people were born in these villages but some few have migrated due to marriage among others reasons. Most people in the villages were social and welcoming.

5.2 THE SURVEY

The study draws from a survey data collected from 80 rural households in Mwingi district eastern Kenya in June and July 2009. The survey was done through random sampling method. Four divisions from the five divisions in the district were randomly picked. This was done by writing the five names of the divisions on small papers then folded into small papers and someone from outside the survey group was asked to pick four papers at random. Then the names of all the locations in each chosen divisions were written in small pieces of paper and the same process was used to pick one location. And the same process was used to pick one sub location from each chosen location. This was then repeated on villages and finally one village was picked. The names of all the households in each chosen village were written in small folded papers and 20 households were picked at random using the same method above. A household-level questionnaire was then used to collect data from the 20 households in each of the four

chosen villages. We interviewed the household heads and their spouses but in cases where one was not available for any reason we then interviewed the one available.

From the household level, data was collected on household's characteristics, household land size, household consumption expenditure, physical assets, livestock value, grants and, remittance, distance to the nearest market, crop production and women group participation.

Variable Definitions

Land size: The size of total land owned by the household this is given in acres.

Crops Production: The value of the crops harvested by the household in the last two seasons (one year) all valued in Kenya shillings.

Livestock: The value of domestic animals and birds owned by the household given in Kenya shillings.

Off-farm Activities: Money from the income generating activities outside farming, they include wages, returns from small business and returns from locally make items. The value is given in Kenya shillings.

Physical assets: The value of the following assets if they are in working condition; Houses, sewing machine, bicycle, motorcycle, radio, tables, clocks, beds, chairs, lamps, car and other physical family assets, all valued in Kenya shillings.

Grants and remittance: The amount of money received from friends, family members, NGOs and government agencies. Measured in Kenya shillings.

Employed: The employment status of the household head. It is given as a dummy variable; 1 if in formal employment, 0 otherwise.

Female: The gender of the household head. It is given as a dummy variable; 1 if female, 0 if male.

Participant: The household membership to local women associations. Given as a dummy variable: 1 if participant, 0 otherwise.

Household head age. Measures the age of the household head. It is measured in number of years.

Household size; The number of household members who have lived in the homestead for the last one year

Villages: Kisovo, Kiome, Thitha and Kasevi are village dummies for the four villages in the surveyed.

Near market; A dummy variable to show if the household is located about 5 kilometers from the nearest market. This is a proximate of one hours walk. It is equal to 1 if the household lives within 5 kilometers radius and 0 otherwise

Friends visit; A dummy variable to show if the Household head had visited a friend or been visited by a friend in the last one month, equal to 1 if the household has had visitor/visited and 0 otherwise. NB: Women groups meet at least once a month.

Household income; Measures the amount of money that can be termed as household income per year, in this study this is measured as an equivalent of household total consumption expenditure and is given in Kenya shillings.

TABLE 1. SUMMARY OF KEY VARIABLES

Variables	Explanations	Obs	Mean	Std. Dev.	Min	Max
Hhincome	household income	80	28487.5	7814.29	18000	59000
Landsize	Land size	80	2.538542	2.057282	0	10
Livestock	Livestock	80	19865	25282.49	0	144000
Phy_assets	Physical assets	80	138192.5	158914.8	4000	796000
Grants	Grants and remittance	80	51411.25	12331.23	30000	101000
Off_farm	Off farm activities	80	16653.75	12420.74	900	64000
Near_mrkt	Living within a radius of 5 kms from the market.	80	.1375	.3465472	0	1
Hsize	Household size	80	6.8625	1.784205	4	12
Hage	Household head age	80	52.025	10.53382	34	78
Female	Gender	80	.4125	.4953901	0	1
Crop_yield	Crop production	80	2045	3683.212	0	20000
Employed	Employment	80	.1375	.3465472	0	1
Participant	Participation	80	.5	.5031546	0	1
kisovo_villg	Kisovo village	80	.25	.4357447	0	1
kiome_villg	Kiome village	80	.25	.4357447	0	1
Thitha_villg	Thitha village	80	.25	.4357447	0	1
kasevi_villg	Kasevi village	80	.25	.4357447	0	1
Frds_visit	Friends visit	80	.5125	.5029973	0	1

6.0 THE ECONOMETRIC METHODS

I used matching method based on Kernel Density Estimation and the Heckman Treatment effects model using two step estimation to investigate the participation in women groups and the economic benefits of participating in the local women groups.

Treatment effects, *treatreg,* estimates both equation 5 and 6 simultaneously. Equation 5 is a probit model regression predicting the probability of participation:

(14) $P(\textbf{\textit{participant}}_i=1/x)=\varphi(\beta_0+\beta_1\textbf{\textit{Lnphy\_assets}}_i+\beta_2\textbf{\textit{Frds\_time}}_i+\beta_3\textbf{\textit{Demvrbs}}_i+\beta_4\textbf{\textit{Villdms}}_i)$

Whereby *Lnphy_assets*, natural log of physical assets is a selection variable of household i, *Frds_time*, friends time, is the instrument for participation, *Demvrbs*, demographic variables, are household control variables that includes household head age, household size and gender and *Villdms*, Village dummies variables for the four villages are also included to control for economic and agro-climate diversity of the district.

Equation 6 is a linear regression for the outcome of household income as a function of participation variable.

(15) $\textbf{\textit{Lntotalhhinc}}_i=\beta_1\textbf{\textit{Landsize}}_i+\beta_2\textbf{\textit{Lnphy\_assets}}_i+\beta_3\textbf{\textit{Lnlivestock}}_i+\beta_4\textbf{\textit{near\_mkt}}_i+$
$$\beta_5\textbf{\textit{Crop\_yield}}_i+\beta_6\textbf{\textit{lgrant}}_i+/-\beta_7\textbf{\textit{Hchar}}_i+\beta_8\textbf{\textit{Vildms}}_i+\beta_9\textbf{\textit{Participants}}_{i+}\boldsymbol{\mu}_i$$

In stata I used the command;

treatreg Lntotalhhinc Landsize Lnphy_assets Lnlivestv Lngrant Crop_yield near_mrkt Female Hsize Hage Kisovo Kiome Thitha Kasevi, treat(participant = Frds_visit Lnphy_assets Kisovo_villg Kiome_villg Thitha_villg Kasevi_villg Female Hage Hsize)twostep

Where *ltotalhhinc_i* is the natural logarithm of household income of household *i, Landsize* is the size of all the land owned by the household *i*, I expect that households use their land size to increase their household income, I therefore expect this variable to have a positive sign. *Lnphy_assets* is natural logarithm of the value of the physical assets, I expect that households use

their physical wealth to increase their household income and therefore expect this variable to have a positive sign. *Lnlivestock* is the natural logarithm of the value of livestock owned by the household, I expect that household could sell livestock products like milk and eggs thus increasing their household income, I will therefore expect this variable to have a positive sign. *near_mkt* is a dummy variable equal to one if the household lives within 5 kilometers radius of the nearest market, households that live near the market have less transaction cost and could easily access some off farm activities, I therefore expect that this variable will have a positive sign. *Crop_yield* is the crop harvested by the household in the last two seasons which approximately one year, I expect that households could sell part of their crop yields and thus increase their household income, I expect that this will have a positive sign. *lgrant* is the value of grants and remittance received by the household in the last one year, I expect this to have a positive sign, *Hchar* are household characteristics that includes household head age, household head gender, and the household size, I expect that the old household heads may not easily access off farm activities which are available to the young and therefore I expect that age will have a negative sign. In such an agrarian society, I expect that female are limited in terms of resources, I therefore expect that female will have a negative sign. I expect that a big household possess more labor force which can increase the household income; I therefore expect this variable to have a positive sign. *Vildms* are the village dummies for the four villages in the sample, this could have either signs. *Participant* is a dummy variable for participation in the local women association, I will expect that the participants have a stock of capital that can generate household income, I expect this variable to have a positive sign. µ is the disturbance or the error term and represents all those factors that affect Household income but are not taken into account explicitly.

I used matching methods based on kernel density and further used the Heckman treatment model by two step estimation to estimate and investigate the participation of local women groups and the economic benefits of participation. These models are used in the presence of an endogenous and self-selection bias.

Participation variable is potentially a choice variable, the decision to join or not join the women group could be correlated with unobservables relegated to the error term. Since participants self select themselves into joining the women groups it could be that households with high income choose to join the women groups and those with low levels of income choose

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not to join groups. This means that there is potential for self selection bias. Self selection will cause an explanatory variable to be endogenous. (Woodridge, J. M., 2009)

I therefore expect that the variable participant will be endogenous. To deal with this endogenous problem due to self selection problem I choose to instrument for participation and use the Heckman treatment effects model in my study.

The instrumental variable will require one that is correlated with the endogenous variable, uncorrelated with the error term, and does not affect the household income. In this case I choose to use friend's time as an instrument for participation. I believe that if someone has time to visit or to be visited by friends then she may most likely to participate in the women group for two reasons. First the friends are likely to influence someone's decision to join if the friends are members of a women group. Secondly someone who has time for friends visit is likely to be a social person and therefore will most likely participate in the women groups.

Thus the endogenous selection problem and the fact that participant is a binary variable motivates my choice of using the matching methods and the Heckman Treatment effects model using the two step estimation used by Heckman J.J and recommended by Ettner L.S, (2004)

The treatment effects model estimates equation 5 and 6 simultaneously. Equation 6 is a probit model regression predicting the probability of participation and equation 6 is a linear regression for the outcome of household income as a function of participation variable.

7.0 EMPIRICAL RESULTS

I hereby present my final results showing the participation in local women groups and the economic benefits of participation. First I used matching methods based on kernel density estimation graphs and secondly I used the Heckman treatment effects model, two step, to investigate the two hypotheses

7.1 DOES THE POOREST HOUSEHOLD PARTICIPATE IN THE LOCAL WOMEN GROUP?

To investigate this I tested the following hypothesis;

"*The poorest households participate in the local women groups*"

The results from the kernel density matching methods show that there is a systematic difference in physical assets between participants and non participants as shown in graph 1 below.
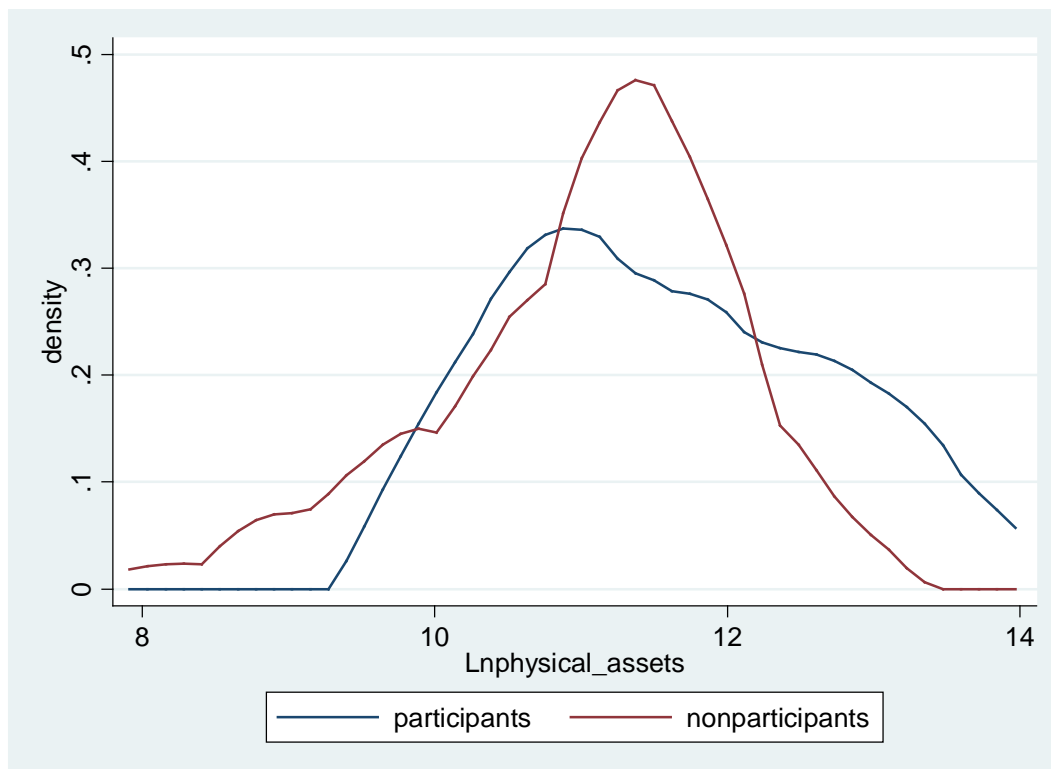
GRAPH 1; KERNEL DENSITY GRAPHS FOR PHYSICAL ASSETS DISTRIBUTION OF PARTICIPANTS AND NON-PARTICIPANTS;

From graph 1 above, Households with physical assets below (log of physical assets of about 9.2) 10,000 Kenyan Shillings have a zero density of participation in the local women groups while households with physical assets of above (log of physical assets of about 13.4) 660,000 Kenyan shillings have a non participation density of zero. This means that households with physical assets below 10,000 Kenyan Shillings do not participate in the local women groups while households with physical assets above 660,000 Kenyan shillings are all participants in the groups.

The regression results presented in table 4 columns 1 and 2 also show that physical assets are statistically significant in determining participation. Using the p-value, I reject the hypothesis that the poorest household participate in the local women group at 10 percent level of significance.

I therefore conclude that the poorest household do not participate in the local women groups.

The variable friend's time used as instrument for participation is highly significance at one percent (1%) in determining participation. This mean that our instrument was relevant since it is highly correlated with participation.

7.2 DOES PARTICIPATION IN THE LOCAL WOMEN GROUP LEAD TO A HIGHER HOUSEHOLD INCOME?

The results from the kernel density matching methods show that there is a systematic difference in household income between participants and non participants as shown in graph 2 below.

From graph 2, most households that participate in local women groups have a household income of between 23,000 and 40,000 Kenyan Shillings. The density of participation is low for households with household income below 23,000 and above 40,000 Kenyan Shillings. However because of self selection problem I cannot at this point establish whether the difference in household income is due to participation or if households with average levels of house income choose to join the women group. I therefore instrumented for participation and used treatment effect estimation to test if this difference household income is due to participation.
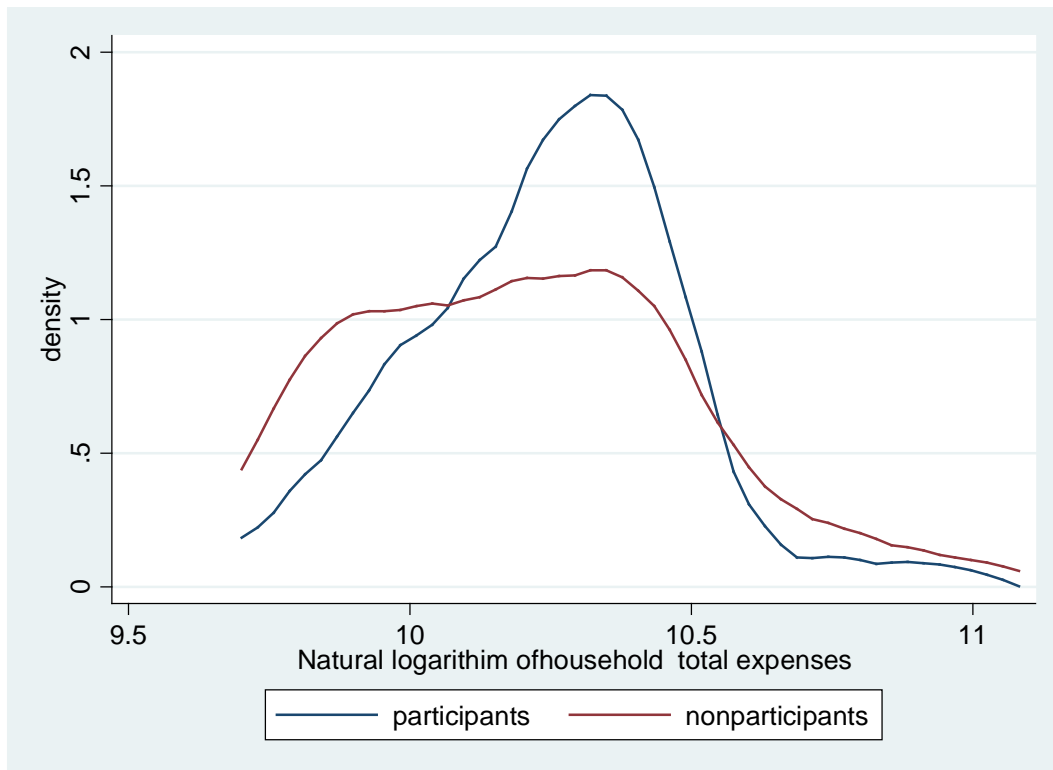
GRAPH 2; KERNEL DENSITY GRAPH FOR TOTAL HOUSEHOLD INCOME DISTRIBUTION OF PARTICIPANTS AND NON-PARTICIPANTS;

From the outcome equation results shown in table 4 columns 1 and 2, participation in the local women group is positive and significant at ten percent (10%) in determining household income. Using the p-value at ten percent level of significance, I therefore reject the hypothesis that participation in women group does not leads to a higher household income and I conclude that participation in local women group leads to a higher household income. All other factors held constant participant gets 10.4% more in household income than non participant.

The results also show that other factors being constant, land size, livestock, grants and remittance, crop yield, near market, household age, gender and village are significant in determining household income. Other factors being constant a one percent increase in livestock could lead to a 4.1 % increase in household income at 5% level of significance, a one percent increase in grants and remittance could lead to a 59.4 % increase in total household income at 0.1% level. Household living near a market have a 18.2 % higher household income compared to household that live far from the markets at 1% level.

A one percent increase in crop yield increases household income by a small coefficient of less than 0.001 % at 0.1% level. Female headed household have a 7.4 % less of household income as compared to male headed households at 10% level. All these variables give the expected signs. However a one more acre of land size could lead to a 4.0% decrease in household income, this was unexpected. I expected that households could use land size to increase their household income. These results could mean that households with small land sizes are more productive than households with big land sizes. One more year of the age of household head could increase the household income by 0.8 %, this was also not expected. I expected that an increase in age could lead to a decrease in household income since the young people could be more productive especially in an agrarian society. The results could be mean the old people are more trusted in such a society and are therefore likely to have more opportunities of off farm activities.

Results from table 4 also show that rho is statistically significant at five percent (5%), this is shown by the significance of lambda. It clearly shows that there was a selection bias problem indeed and justifies the use of a sample selection model in this case Heckman model.

For comparison purposes I also used the ordinary lest square (OLS) regression shown in Column 3 and four of table 4. The treatreg results are different from the Ols results. This is due to endogenous and selection bias problem which have been dealt with in the treatreg regression.

The regression results in table 4, below shows the coefficients, standard errors the levels of significance.

TABLE 4; SHOWING THE REGRESSION RESULTS FROM TREATREG AND OLS WITH Lntotalhhinc AS DEPENDENT VARIABLE;

Variables	treatreg parameters	treatreg Std errors	Ols parameters	Ols robust std errors
Landsize	-0.040**	0.02	-0.039	0.02
Lnphy_assets	-0.022	0.02	-0.028	0.03
Lnlivestv	0.041**	0.02	0.035**	0.02
Lngrant	0.594****	0.10	-0.006	0.02
Crop_yield	0.000****	0.00	0.008	0.01
near_mrkt	0.182***	0.06	0.184***	0.06
Female	-0.074*	0.04	0.000***	0.00
Hsize	-0.008	0.02	0.222***	0.07
Hage	0.008*	0.00	0.055	0.07
Kisovo_villg	0.159***	0.06	0.000	0.00
Kiome_villg	-0.017	0.06	0.057	0.07
Thitha_villg	-0.052	0.06	0.615****	0.10
participant	0.104**	0.05	-0.077*	0.05
Constant	3.292***	1.02	0.139***	0.05
participant				
Frds_visit	-5.651***	2.11		
Lnphy_ast	1.108*	0.65		
Kisovo_villg	0.047	1.23		
Kasevi_villg	-0.303	0.97		
Kiome_villg	0.742	1.17		
Female	0.525	0.87		
Hage	-0.003	0.07		
Hsize	0.362	0.51		
Constant	-12.297	8.11		
hazard				
lambda	0.111**	0.05		
Prob > chi2	0.000			
Numbe..	70.000			

* = 10, ** = 5, *** = 1, **** = 0.1 per cent levels of significant.

8.0 Conclusion

In this study I empirically estimated the effects of development aid on women groups participation in Mwingi district Eastern Kenya.

My main objective was to investigate whether the poorest households participate in the local women groups and to test whether participation leads to a higher household income.

The results show that the poorest households do not participate in the local women groups and that participation leads to a higher household income.

My study results show that social capital has improved the economic well being of the people in this district. I therefore support the donors, NGOs and government agencies policy to invest in social capital in this poor region as this could positively contribute towards poverty reduction.

These findings are also in line with other empirical studies done in different parts of the world that show that social capital can contribute to economic well being and can lead to economic growth. This empirical study should therefore contribute to the hot debate that social capital can improve the economic well being of people and contribute to economic growth.

However my results also show that the poorest households do not participate in these local women groups. Development aid through women groups benefits only the households that have acquired at least a physical wealth valued at 10,000 Kenya Shillings an equivalent of 150 US dollars at the current rate. The poorest household's failure to participate in these groups could be motivated by two main reasons; first the poorest households may not have the financial capability to participate in these local women groups since participation involves contributing some money such as membership fee among other payments. Secondly the poorest households may consider themselves to be less fortunate in the society and shy away from interacting freely with other 'fortunate' households in the society.

I therefore conclude that this kind of development aid is not an effective way to improve the economic well-being of all the households in this poor society. It rather promotes inequality in the society by widening the gap between the poorest and the poor households. In order for this development aid to benefit everyone in the society, I recommend that policies that could help the poorest household acquire a physical wealth of at least 10,000 Kenya shillings need be put in

place. This could include grants, training, creating casual jobs for the poorest, provision of credits among others.

I further recommend that donors, NGOs and government agencies policy to invest in social capital be extended to include the existence of other civil associations that could improve the economic well being of every household in the society. These could be for example supporting the existence of social clubs, churches, welfare associations and others.

Further studies need to be done on the impacts of other social groups in this society. This will help to indentify the best way of channeling development aid on social capital.

9.0 LIMITATIONS OF THE STUDY

Like it is common in any other survey-based study, this study has the potential for bias and incorrect results due to aggregated measures.

It is possible that the non respondents could have given different results that could lead to different outcome of the study.

The other limitation was due to communication problems. The questionnaire was written in English but most respondents did not understand English. The enumerators had to translate the questions the local language, *Kamba*, which could have resulted to respondents misunderstanding the question and thus giving the wrong answers.

The size of the sample used in this study is a bit small. Future studies should be done with a bigger sample size and the questionnaire should be written in both English and the local language, *Kamba.*

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APPENDICES

APPENDIX 1; REGRESSIONS RESULTS

THE REGRESSION RESULTS FROM THE TWOSTEP treatreg MODEL

```
Treatment-effects model -- two-step estimates     Number of obs      =         70

                                                  Wald chi2(19)      =     143.51
                                                  Prob > chi2        =     0.0000
```

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Lntotalhhinc						
Landsize	-.0398628	.0196694	-2.03	0.043	-.0784142	-.0013115
Lnphy_ast	-.0224203	.0244797	-0.92	0.360	-.0703997	.0255591
Lnlivestv	.0407907	.0164143	2.49	0.013	.0086193	.0729621
Lngrant	.5939815	.0958941	6.19	0.000	.4060325	.7819305
Crop_yield	.0000227	6.43e-06	3.53	0.000	.0000101	.0000353
near_mrkt	.1822625	.0579371	3.15	0.002	.0687078	.2958172
Female	-.0737245	.0396089	-1.86	0.063	-.1513564	.0039075
Hsize	-.0083052	.0176611	-0.47	0.638	-.0429204	.0263099
Hage	.0081369	.004235	1.92	0.055	-.0001636	.0164375
Kisovo_villg	.1588185	.0551589	2.88	0.004	.050709	.266928
Kiome_villg	-.0171177	.0605175	-0.28	0.777	-.1357298	.1014944
Thitha_villg	-.0518116	.0586657	-0.88	0.377	-.1667943	.0631712
participant	.10413	.0498543	2.09	0.037	.0064174	.2018425
_cons	3.291532	1.02131	3.22	0.001	1.289801	5.293263
participant						
Frds_visit	-5.651496	2.111035	-2.68	0.007	-9.789049	-1.513942
Lnphy_ast	1.108103	.6452653	1.72	0.086	-.1565934	2.3728
Kisovo_villg	.0468727	1.228829	0.04	0.970	-2.361587	2.455332
Kasevi_villg	-.3028425	.9745611	-0.31	0.756	-2.212947	1.607262
Kiome_villg	.7415398	1.16577	0.64	0.525	-1.543327	3.026407
Female	.524689	.8714512	0.60	0.547	-1.183324	2.232702
Hage	-.0031425	.065128	-0.05	0.962	-.130791	.124506
Hsize	.362038	.5095104	0.71	0.477	-.636584	1.36066
_cons	-12.29674	8.113044	-1.52	0.130	-28.19801	3.604539
hazard						
lambda	.1106199	.0484348	2.28	0.022	.0156894	.2055505
rho	0.72260					
sigma	.15308553					
lambda	.11061993	.0484348				

REGRESSION RESULTS FROM OLS

Linear regression

			Number of obs	=	70
			F(13, 56)	=	14.16
			Prob > F	=	0.0000
			R-squared	=	0.6702
			Root MSE	=	.16999

Lntotalhhinc	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Landsize	-.0391717	.0244936	-1.60	0.115	-.0882383	.0098948
Lnphy_ast	-.0284647	.0302077	-0.94	0.350	-.088978	.0320487
Lnlivestv	.0354213	.016198	2.19	0.033	.0029727	.0678699
Hsize	-.0063623	.0221979	-0.29	0.775	-.0508301	.0381055
Hage	.0082678	.0054731	1.51	0.137	-.0026961	.0192316
Near_mkt	.1842532	.0565666	3.26	0.002	.0709367	.2975696
Crop_yield	.0000219	6.47e-06	3.38	0.001	8.93e-06	.0000349
Kisovo_villg	.2215433	.0662578	3.34	0.001	.088813	.3542737
Kiome_villg	.0547734	.0651138	0.84	0.404	-.0756654	.1852121
Thitha_villg	(dropped)					
Kasevi_villg	.0570149	.0697146	0.82	0.417	-.0826402	.19667
lgrant	.6149072	.1039276	5.92	0.000	.4067152	.8230993
participant	.1390533	.048993	2.84	0.006	.0409086	.237198
Female	-.0767931	.0453222	-1.69	0.096	-.1675844	.0139982
_cons	3.086351	1.067179	2.89	0.005	.9485351	5.224167

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APPENDIX 2; THE COMPLETE HOUSEHOLD SURVEY QUESTIONNAIRE;

QUESTIONNAIRE FOR HOUSEHOLD SURVEY

 MWINGI DISTRICT, EASTERN KENYA, JUNE/JULY 2009

FOCUS GROUP MEETING QUESTIONNAIRE

What is the name of the Village, Location & Division.	
What is the main staple food	
What is the main cash crop	
What is the main commercial activity	
What is the population	
How many households live in the village	
What are the social welfare groups	
What are the women group in the village	

Task	dates	By who?	Status Ok? If not why?
Meeting with officials			
Village/focus group meeting			
Training the enumerators			
Checking questionnaire			
Coding the questionnaire			
Entering data			
Checking & approving data entry			

QUESTIONNAIRE FOR HOUSEHOLD SURVEY

MWINGI DISTRICT, EASTERN KENYA, JUNE/JULY 2009

Name of the House hold head...

Clan of the house hold ....…………………………………………

Household number...………………………

Village name ....…………………………………

Interview: Start time............................. End time...............................………

Date of the interview...…

Time taken...

Enumerator`s Name..

Checked by	Date	Comments

Data entry	When	Who	Comments
Pages			
Pages			
Pages			
Pages			

"Statement of confidentiality: All information provided here is treated as strictly confidential and shall not be revealed to any third party."

1. <u>Household composition and characteristics</u>

Provide the details of each household member

	Name of hh member	Sex	Relationship with hh head	Marital status	age	Highest level of education attained	employment	How many months lived here in the last 12 months
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Relation to the household head: 0= household head, 1=spouse, 2=child, 3=grandchild, 4=brother, 5=sister, 6=hired laborer, 7=daughter in law, 8=son in law, 9= parent, 10=uncle, 11=aunt, 12=others

Sex: 1=female, 0= male

Marital status: 0=Married, 1=Single, 2=widowed, 3=divorced, 4=separated

Education: 0= Below secondary education, 1=From secondary and above.

Employment: 0=Not in formal employment, 1=In formal employment.

2) Household assets

How much of the following do you own?

	ASSETS	quantity	Net value	How did you acquire them
1	Cash in hand/Savings			
2	Land			
3	Bicycle			
4	Radio			
5	Sawing machine			
6	Houses			
7	Plough machine			
8	Generator			
9	Grinding machine			
10	Motor vehicle			
11	Motor cycle			
12	Others specify			

3) Farm Crops Production

How much of the following crops did you harvest in the last two seasons (12 months)

Type of crop	Quantity produced	Price/ kg/bag	Total income
Beans			
Cassava			
Cotton			
Maize			
Millet			
Peas			
Pumpkins			
Sorghum			
Sunflower			
Others specify			

4) Family Livestock

How much of the following livestock do you own?

Type of livestock	No. owned	Price/ livestock	Total income
Cattle			
Chicken			
Ducks			
Donkeys			
Goats			
Sheep			
Others			

5.1) Off-activities Income

How much did you earn from the following in the last 12 months?

Income source	Monthly income	Months earned	Total income
Own business			
Wages			
Land rent/sale			
Sales of own make items			
Others			

5.2) Distance to nearest market. (Tick the appropriate)

Do you live within 5 kilometers from the nearest market?

   Yes………………..………….

   No……………………………….

6) Family Expenditure

How much money did you spend on the following items at home in the last 12 months?

Food	Clothes	General household assets	Health-care	Water, electricity/cooking fuel	Transport to and from work	School Fees	Other

7) Grants and Remittance

How much support did you receive from the following in the last 12 months?

Date	Source	Type of support	Value of the support
	Government		
	Church		
	Friends/relatives		
	N.G.Os		
	Others (specify)		

8) Women group participation

Are you a member of any women group?

8.1) If yes fill the following

Women group	Location of W/G	No. of membership	Main W/G activity	Date of joining W/G	Time spend in W/G/month

8.2) <u>Direct Benefits from participation.</u>

Which of the following did you acquire directly from the welfare/women group activity?

	ASSETS	Quantity	Net value	Date of acquisition
1	Crops			
2	Livestock			
3	Cash			
4	Bicycle			
5	Radio			
6	Farming Land			
7	Sawing machine			
8	Houses			
9	Plough machine			
10	Grinding machine			
11	Motor cycle			
12	Others specify			

What are other benefits did you receive from the welfare/ women group activities.

1) Loan acquisition
2) Farming skills
3) Managerial skills
4) Others
   specify………………………………………………………………………………………
   ………………………………………………………………………………………………

8.3) If no fill the following

What is your best reason for not joining the women group

	Reasons for not being a member	
1	Due to sickness	
2	No time for the activities	
3	Non approval from my spouse	
4	Others specify	

8.4) Friends visit (Tick the appropriate)

Have you visited or been visited by a friend in the last one months?

Yes……………..

No……………….

<u>THE CODE BOOK</u>

HOUSEHOLD COMPOSITION AND CHARACTERISTICS

Relation to the household head:
 0= household head, 1=spouse, 2=child, 3=grand child, 4=brother, 5=sister, 6=hired laborer, 7=daughter in law, 8=son in law, 9= parent, 10=uncle, 11=aunt, 12=others

Sex: 0= male, 1=female,

Marital status: 0=Married, 1=Single, 2=widowed, 3=divorced, 4=separated

Education: 0= Below secondary education,   1=From secondary and above.

Employment: 0=Not in formal employment, 1=In formal employment.

Distance to the market; 1 if within 5 kilometers, 0 if otherwise

Friend's visit; 1 if you had received or visited a friend in the last one month, 0 if
          otherwise