Journal of Agriculture

The Participation Levels of Smallholder Maize Farmers in Group Microcredit in Murang'a County, Kenya

Mbugua, Elijah Wamunyu, Dr. Eric K. Bett (PhD) & Dr. Ibrahim Macharia (PhD)

Stratford Peer Reviewed Journals and Book Publishing
Journal of Agriculture
Volume 1||Issue 2||Page 17- 28||December||2017|
Email: stratfordjournals.org

The Participation Levels of Smallholder Maize Farmers in Group Microcredit in Murang'a County, Kenya

[1*]Mbugua, Elijah Wamunyu, [2]Dr. Eric K. Bett (PhD) and [3] Dr. Ibrahim Macharia (PhD)

[1]Post graduate student, Department of Agribusiness Management and Trade
Kenyatta University
[2]Lecturer, Department of Agribusiness Management and Trade
Kenyatta University

[3]Lecturer, Department of Agribusiness Management and Trade
Kenyatta University
***Corresponding email: ewmbuguss@gmail.com**

How to cite this article: **Wamunyu, M. E., Bett, E. K. & Macharia I. (2017). The Participation Levels of Smallholder Maize Farmers in Group Microcredit in Murang'a County, Kenya.** ***Journal of Agriculture, 1*****(1), 17 - 28.**

Abstract

Availability, accessibility and affordability of rural credit is one of the key elements for transforming rural economies through enhancing agricultural productivity, food security and poverty reduction. A good number of farmers in Murang'a County have engaged micro credit to boost maize production but the difference in productivity between beneficiaries and non beneficiaries have not been evaluated. This study sought to examine the contribution of Microfinance services to food security of smallholder farmers in Murang'a County. Descriptive and econometric analysis, were used to analyze the data. Primary data was collected from 200 respondents randomly selected from credit beneficially and non-beneficially groups in Kiharu constituency using a structured questionnaire. The study uses the "counterfactual" approach using propensity score matching to assess whether households who had participated in microfinance services had increased their maize yield compared to non-participants. Multivariate logistic regression showed that the proportion of land allocated to maize production had a positive and significant association with credit borrowing. The results also indicated a positive and significant relationship between group membership and credit borrowing. With regards to interest on loan and credit, a positive and significant relationship existed. In addition, the results revealed that the frequency of group meetings had a positive and significant effect on the credit borrowed. The study recommends that small-scale farmers can work together as a recognized legalized entity in order to improve

their bargaining ability and to take advantage of economies of scale. In addition, commercial banks are yet to exploit their full potential with regards to credit provision to high-potential small-scale resource constrained farmers.

Keywords: *Smallholder Maize Farmers, Group Microcredit, Murang'a County, Kenya*

1.1 Introduction

Agriculture is a vital economic sector that constitutes the foundation of most African economies. Farming gives 60 percent of all work; represents around 60 percent of the mainland's foreign exchange earnings. In contributor 23.9% of National Gross Domestic Product (GDP); and the prevailing supplier of crude industrial materials (New Partnership for Africa's Development-NEPAD, 2013). Agriculture is an inevitable corresponding to the economies of growing nations, with critical multiplier impacts as it assumes a key part in giving sustenance to the populace and providing different sectors industrial raw materials (Food and Agriculture Organization-FAO, 2009). In Kenya farming is a noteworthy sector of the economy and effects food security, poverty reduction and industrial promotion through the supply of inputs.

Maize is a stable food crop in Kenya. It is approximated to contribute more than 25% of job creation and 20% of total agricultural output (Government of Kenya, 2012 It is food crop for 96 percent of Kenya's population with 125 kg per capita consumption and provides 40 percent of the calorie requirements (Byerlee Eicher, 1997). and Raw material for industries, Create employment and Reduce income inequalities Contributes to food security and poverty reduction, hence contribute toward achievement of MDG1, currently SDG1,2 and 3 Sustainability in maize creation was accomplished amid the 1970s when generation was high and surplus was traded. The Current patterns demonstrate that the Kenya maize part is attempting to attain sustainability in maize creation. Growth in maize creation has been low averaging around 2 percent. This is lower than the populace development rate which remains at around 3 percent. On the off chance that the nation is to act naturally adequate residential generation needs to develop at a rate of 4 percent. Absence of food sufficiency is ascribed by causes including absence of profitability improving advancements, environmental change, high frequency of pests invasion, difficulties in getting to credit (Nyoro et al., 2007; FAO, 2012).

Subsequently, cultivate yields are low averaging 1.5–2.6 tons for each hectare. Over the most recent one decade, the nation has encountered years of elevated sustenance weakness and reliance on imports and crisis compassionate help. In 2009, Kenya imported 16.8 million packs of maize (GoK, 2010). Maize request in the nation has been on the expansion exceeding supply. For example, in 2012 maize creation remained at 2.8 million metric tons (33 million sacks) against a national necessity of 4.1 million tons (40 million packs). With the nation's populace anticipated to be 43.1 million by the year 2020, the interest for maize is probably going to be 5 million metric tons. In view of the overarching development rate, 1.2 million metric tons by 2020 (Nyoro et al., 2007). Expanded dependence on imports infers that the outside trade stores and assets reserved for advancement is occupied to obtainment of nourishment.

Increasing maize production in the existing arable land is the surest way to bridge the demand gap as there is limited opportunity for expanding cultivated land without negative environmental consequences. Higher production from a farmers own farm increases access to food and enhances household food security consequently improving the nutritional needs of

community (ROK 2013). For those who purchase food, higher production generally means lower food prices and consequently access to a greater quality of food in the markets for a given income level. Traditional farming practices are no longer capable to meet demand and hence, application of scientific and improved farming methods is essential.

Increasing maize production in Kenya can be approached both on farm and at national levels. At the farm level, a number of important measures are necessary. Such measures include early and better land preparation, timely planting, planting of the most appropriate maize varieties, proper fertilization, efficient weeding and improved control of pests and diseases. However, majority of farmers in Kenya are not able to access adequate inputs in order to increase their current yields and to sustain increased yields. According to FAO (2012), better agricultural and post-harvest technologies will improve the quantity and quality of available farmland and to some extent increase access to agricultural inputs which will increase food availability to address food insecurity.

Murang'a county has a potential which has not fully been utilize for maize production .The production has been on decline in recent years .The county has been relying on maize from loitoitock, Karatina and other places of the nation. Some parts of the county also get reliefs foods. The county face a critical food situation. In the year 2016 the county recorded a drop of food security by 15% which stood at 53% from 68% in 2015 (GOK, 2012). The ministry of Agriculture report blamed lack of credit access and technical support from extension officers for the dwindling production.

Farmers in Murang'a, more than than any other part in Kenya , still encounters lots of problems including environmental change, globalization and the current worldwide subsidence, expanded weight on the normal asset base, ominous outside economic situations. The absence of access to imaginative advances, low efficiency of smallholders farmerss, diminished speculation by governments and authority improvement help and the restricted engagement by the private part work log jam the way toward commercializing the horticulture United Nation Development Program (UNDP, 2012). Absence of access to credit and back to empower reception, postharvest (capacity/handling), dry season, restricted accessibility half and half seeds, and most as of late MLN (Maize Lethal Necrosis) are among the significant limitations to maize production in Kenya.

Table 1: Maize production and Consumption in Murang'a

Year	Area in Ha	Yield bag per ha	Achieved Production bags	Food demand
2012	61075	12	732900	953960
2013	91416	14	877357	982579
2014	62108	9	540656	1012056
2015	65365	18	1191702	1042418
2016	66336	8	540316	1073690

Source: Murang'a County Government CIDP

Stratford Peer Reviewed Journals and Book Publishing
Journal of Agriculture
Volume 1||Issue 2||Page 17- 28||December||2017|
Email: stratfordjournals.org

Table 2: Projected Maize Production and Food Demand

Year	Area (Ha)	Yield (Bags/Ha)	Production 90 kg bags	Food Demands
2017	67000	12	804000	1105901
2018	67670	12	812040	1139078
2019	68346	12	820152	1173250
2020	69030	12	828360	1208448

Source: AFFA

According to the 2011 Economic Review of Agriculture (Ministry of Agriculture) data, the national average yield of maize was nearly 16 bags/ha. Murang'a County yielded <10 bags /ha. against a potential of 30bags /Ha .It is this potential that this project want to exploit.

Despite the key role maize plays in food security and income generation in Murang'a County and the whole country at large, its productivity has not been adequate especially in the past four decades during which stagnation/decline in maize yield led to frequent food security problems The declining production for small scale farmers has to a large extent been caused due to several factors including lack of proper or non-utilization of farm inputs and poor preservation and storage. Declining maize output and loss of post-reap yields has consequences on welfare as far as food provision amount of lost income is concerned thus contributing to poverty.

The country's ability to fully utilize its agricultural production potential depends on the innovativeness of actors in the agricultural sector, particularly farmers. The capacity of farmers and actors along the agricultural value chain to innovate in their production activities is contingent on the availability of technology. Access to credit through group is a local innovative initiative deemed very important in order for rural households to access farm inputs, improved technology and financial capital (Owour , Shem 2012).

With regards to credit access, farmer organizations are efficient since they can reduce collateral use as they rely on social capital. In addition, they enable farmers access inputs, acquire important market data, secure access to new advancements and take advantage of high-esteem output enabling them to contend with bigger established agribusiness (GOK, 2013). Access to credit enables farmers to afford pesticides and other chemical inputs for pests and diseases management, thereby reducing destruction of crops and losses to the farmers. In the long run, access to credit enhances agricultural productivity, food security, creation of new business and poverty reduction (FAO, 2012).

The challenges farmers face is accessing loans from formal credit institutions. This has made them rely on the unregulated informal credit sources such as the Grameen type institutions that peg lending to memberships in social networks such as groups and cooperatives. Traditionally, non-governmental organizations (NGOs) and microfinance institutions were the only sources for microfinance, but nowadays commercial banks, savings and credit co-operative societies (SACCOs) have taken up provision of microfinance to Kenyans.

In Murang'a County, lack of affordable credit constitutes a big challenge to accessing better inputs and modern technologies in farming (Bekele, 2007). Constraint in accessing credit to acquire agricultural inputs like fertilizers and agrochemicals can in turn reduce the productivity of farming enterprises. This will in turn affect production as even hybrid variety crops may not attain their potential production (Mbugua, 2009). The low participation of farmers in the credit market is an indication of poor output, savings and investment in

production assets. These are likely to cause vicious cycle of lower rates of adoption of improved inputs which in turn will reduce productivity and commercialization. One way to address decreasing maize production due to diminishing arable land is to unlock access to credit (Njoroge et al., 2015; Kosura & Karugia, 2005; Mbugua, 2009).

Murang'a County has more than 500 farmer-groups and cooperatives registered with social and gender office (GOK, 2014). The expensive and unaffordable credit and subsequent reluctance of farmers to take up loans from formal credit has contributed to a rise in alternative financial institutions which cater for Small and Medium Enterprises (SMEs) and farmers. Examples of microfinance institutions in the county include farmers' cooperative unions such as Mugama Farmers Sacco, Murata Sacco and Unaitas, among others.

Investing in agricultural enterprises through provision of microcredit services has the potential to increase the income and food sufficiency rural homes in Kenya (Olwande, 2012). Several approaches on increasing farmers' access to credit have been proposed; one form is through farmers organizations, such as farmer groups, cooperatives, common interest groups and merry go rounds (Olwande, 2012). Small-holder farmers at times rely on group credit offered by Micro-Finance Institutions (MFIs). The groups offer social collateral on behalf of individual members who in the long run get to credit, which they would not have gotten to on the off chance that they worked independently (Owuor and Shem, 2012). The MFI programme can increase maize productivity and effectively make the country self-reliant in maize production with the surplus produce exported. Therefore, the study hopes to investigate the impact of group microfinance on small holder maize farmers' productivity in Kahuro Sub-County in Murang'a County, Kenya. The research brings out unfulfilled potential for integrating microcredit organizations into the rural financial frameworks.

1.2 Statement of the Problem

Maize is an important staple food in Kenya and provide food security availability of raw materials in many households .There is a chromic deficit in the supply of maize in Kenya which can be filled through increasing farm productivity (ROK 2014) .Muranga is among the producer of maize whose potential has not been exploited. The low productivity is causing household food insecurity, raw materials and poverty. According to the 2011 Economic Review of Agriculture (Ministry of Agriculture) data, the national average yield of maize was nearly 16 bags/ha. Murang'a County yielded <10 bags /ha. against a potential of 30bags /Ha .It is this potential that this project want to exploit.

Microfinance services has the potential to reduce vulnerability, improve the income and food security of rural households in Kenya (Olwande2012, IFAD 2009). Despite the Kenya government promoting MFI there is limited participation of maize farmers in the commercial credit market (FAO. 2013). Maize farmers have challenges of accessing loans from formal credit institutions. To fill this gap small and resource poor farmers have developed local innovative initiative credit access strategies that peg lending to memberships in social networks such as groups Owuor and Shem (2012), The group credit lending model is popular among the farmers and has been operating for the last ten years

A good number of farmers have engaged micro credit to boost maize production but the difference in productivity between beneficiaries and non-beneficiaries have not been evaluated. With this in mind, this study seeks to assess access to credit and the impact of emerging and innovative rural finance model on smallholder maize productivity in Murang'a

County so as to appraise its contribution to improving the production and productivity of small-scale farmers.

1.3 Objective of the Study

To estimate the participation levels of smallholder maize farmers in group microcredit in in Murang'a County, Kenya.

2.0 Literature Review

2.1. Theoretical Review

Impact evaluation is an approach to approve the theories that helped with planning the program and to affirm regardless of whether the impression of recipients and the truth are adjusted. Assessment ascertains affect through basically taking the distinction between the circumstance of the recipients prior and then afterward the program and the channels through which it rises. Knowing this data is significant for enhancing the program's outline, for its possible adjustment to various groups, and for the distinguishing proof of best practices being developed (Copestake et al., 2001).

The real effect of a program relies on upon its potential, obviously, however it is likewise inseparably connected to its usage conditions. A program may not achieve its maximum capacity affect because of blemishes in the usage procedure. Along these lines, knowing the potential effect of a program is not a purpose behind not assessing it. An effect assessment is as yet important to comprehend the genuine effect on recipients and helpful to illuminate policymakers about the need to enhance the procedure of execution. Needy individuals' lives can be enhanced if the advancement group gained all the more efficiently from its endeavors – specifically, if more thorough effect assessments of what works being developed were done, if their outcomes were made generally accessible and comprehended and if policymakers and program chiefs utilized that proof to enhance policy and practice.

2.2 Empirical Review

2.2.1 The Determinants of Participation in Microfinance by Smallholder Farmers

Previous empirical studies have demonstrated that household's decision to access formal or informal credit sources is influenced by different factors. For instance, Vincent (2012) examined credit demand by maize producers and analyzed factors influencing the use of informal and formal credits in Ghana such as gender, other economic activities. They also noted that formal and informal credits are not really culminate substitutes but rather they supplement each other to give credit needs of agriculturists in maize generation. The study presented a geographical gap since it focused on Ghana.

Emerole *et al*. (2014) analyzed the determinants of women farmers' participation in self-help micro financing groups in Nigeria. The results showed that participation of the women in the self-help groups was influenced by ease of membership to group, age of woman, household size, use of cultural/formal insurance over the risk period and the owed debts.

Bekele (2007) analyzed the participation of farmers in the credit market in Ethiopia. The results showed that the participation was significantly increased by family size, land size, labor, off farm employments, and unforeseen expenses. On the other hand, participation was reduced by the village dummy and borrowing from other sources.

`The Demand for microfinance institutions and services depends on socio economic characteristics of farm households, farming objectives, government policy and MFIs policy

frameworks (Mosley & Hulme, 1998; Zaman 1998b; Coleman, 1999). The amount of funds procured by borrowers determine the type of investments (farm, non-farm or consumption) undertaken and the nature of capital asset procured and ultimately the extent of impact (Mosley & Hulme, 1998; Coleman, 1999; Copestake *et al*., 2001).

Credit can be viewed as an input in the classical production function and the household as the basic decision making units. It shows how the independent variables influence the dependent variable of the study. The framework below is an illustration of possible underlying determinant of credit demands and how influencing maize production among small scale farmers. The independent variables are grouped together on the left side but not in any order of importance. The dependent variable is placed on the right hand connected with an arrow as a sign of direct relationship. The household characteristic consequently impacts on decision making process in joining a microfinance institution. The group characteristic determines the access of credit. The marginal contribution on of credit is to bring input levels closer to the optimal levels thereby increasing output and yield increases, the dependable variables (yields of maize) which was measured in kilogrammes per hectres. The independent variables are the farm and group characteristics and credit access, the group credit model can is based on that group collateral can substitute physical collateral.

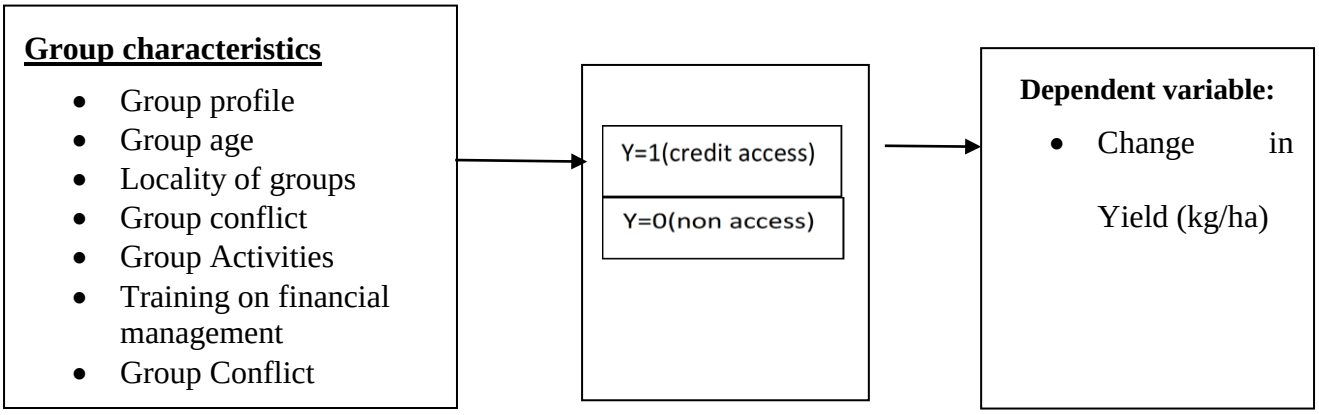

Figure 1 Conceptual framework

3.0 Research Methodology

The area under study was Murang'a County. Survey research design was used in this study. The target population for this study was 17,880 small scale maize farmers. A sample size of 202 small scale maize farmers was calculated using Cochran formula (1963). The study employed both primary and secondary data. Questionnaires were sorted to check for completeness and consistency of data, then the data was keyed in an excel spreadsheet. Thereafter, responses were coded for analysis using STATA 12. Descriptive statistics employed were means, standard deviations and frequencies/percentages. The t-test was used to test the correlation between variables, while Analysis of Variance (ANOVA) was used to test the goodness of fit. Regression analysis established the relationships between study variables. Influence of micro-credit on maize production, economic status and living standard of the borrowers was described using graphs and frequency tables. Chi square test was used to bring out the association among the variables.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Agriculture
Volume 1||Issue 2||Page 17- 28||December||2017|
Email: stratfordjournals.org

4.0 Results and Discussion

4.1 Participation Levels of Smallholder Maize Farmers in Group Microcredit

A logistic regression was employed to model the relationship between socio-economic characteristics and participation in group microcredit revealed that the amount of land devoted to maize was positively and significantly associated with credit borrowed (*Exp(B)*= 0.61, *P*=0.01). Thus, the odds of those who had a higher proportion of the their land used to grow maize had a better chance (0.61 times more) to receive credit. The overall model was significant since the *p*-value was 0.0001. Table 3 brings out farm characteristics that contributed to participation of small-scale maize farmers in group microcredit.

Table 3: Farm Characteristics Contributing to Participation in Group Microcredit

Credit borrowed (Yes, No)	**Coefficient**	**Std.**	***z***	***P*>|*z*|**
Religion	0.06	0.24	0.24	0.82
Age	-0.07	0.23	-0.27	0.79
Education	-0.42	0.25	-1.74	0.08
Position household	-0.2	0.16	-1.25	0.21
Land size	0.18	0.11	1.62	0.11
Land access	-0.09	0.19	-0.46	0.65
Land ownership	0.05	0.23	0.21	0.83
Labor intensive	0.02	0.45	0.04	0.97
Rely on extra labor	-0.11	0.18	-0.58	0.56
Land maize	0.61	0.21	2.95	0.01*
Extension visit	-0.26	0.32	-0.81	0.42
Constant	2.16	1.49	1.45	0.15
No. of observations	200			
LR chi(11)	36.84			
Prob>chi2	0.01			
Pseudo R2	0.16			
log likelihood	-101.10			

4.3 Group Characteristics and Their Effects on Lending Participation

The results showed that there was a positive and significant relationship between group membership and credit borrowed *(Exp(B)*= 0.1933, *P*=0.019). Thus, there existed a probability of 0.1933 that those members who had been in groups for a longer time tended to receive more credit than those who had been in the groups for a shorter period. Similarly, the results indicated that interest on loan and credit borrowed had a positive and significant relationship *(Exp(B)*= 0.6604, *P*=0.000). Thus the probability of those who had paid more interest on loan to receive more credit was 0.6604. In addition, the results revealed that more frequent group meetings had a positive and significant effect on the credit borrowed. Members' frequency of attendance in group meetings increased the odds of credit access, at 1.443. The overall regression model was significant (*p*=0.0000). Table 4 brings out the group characteristics that influenced participation in group microcredit.

Table 4: Group Characteristics that Influenced Participation in Group Microcredit

Credit borrowed (Yes, no)	Coef.	Std err	z	P>|z|
Credit lend group	-0.04	0.85	-0.05	0.96
Membership years	0.19	0.08	2.34	0.02
Credit access group	0.92	0.61	1.50	0.13
Interest on loan	0.66	0.17	3.85	0.00
Membership MFI	-0.37	0.56	-0.66	0.51
Group meeting frequency	1.44	0.61	2.35	0.02
Constant	-3.35	1.73	-1.93	0.05
No. of observations	200			
LR chi(6)	142.45			
Prob>chi2	0.00			
Pseudo R2	0.60			
log likelihood	-48.30			

5.0 Conclusions

Multivariate logistic regression showed that the proportion of land allocated to maize production had a positive and significant association with credit borrowing The results also indicated a positive and significant relationship between group membership and credit borrowing. With regards to interest on loan and credit, a positive and significant relationship existed. In addition, the results revealed that the frequency of group meetings had a positive and significant effect on the credit borrowed.

The study concluded also that the number of years a farmer is a member of a group had a positive relationship with maize yield while distance to market input had a negative effect on maize yield. Despite their mixed performance, credit lending groups had the potential to `provide credit to small-scale farmers. Despite the size of financial intermediaries, they still functioned as viable institutions. With this, microcredit played an important role with regards to agricultural development. From the study on MFIs, for effective poverty reduction, credit access to promote the productive use of farm inputs is necessary. Group microcredit had positive impact on the agricultural development but gaps for improvement existed in this program. The research brings out unfulfilled potential for integrating microcredit institutions into the mainstream rural financial systems. In addition, commercial banks are yet to exploit their full potential with regards to credit provision to high-potential small-scale resource constrained farmers.

6.0 Recommendations

Small-scale farmers find themselves at a disadvantage due to high transaction costs and low bargaining ability. For this reason, small-scale farmers can work together as a recognized legalized entity in order to improve their bargaining ability and to take advantage of economies of scale.

Successful group credit models are available from Murang'a County and different organizations that have used them. Examples of credit models in the county include Ndikwe Self-Help Group, Kiyagi Cereal Self-Help Group, Ngwethe Self-Help groups and Mugaciku Self-Help groups (NAAIAP and NALEP programme). While looking for and testing new

models, the existing ones should be scaled up and best practices from them publicized and scaled-up.

Government should promote infrastructure to enable the private sector such as banks to penetrate the rural areas. Rural finance in most cases have addressed the issue of credit but lack innovative measures. Provision of credit in form of input or vouchers can reduce diversion and increase repayment ability. Rural finance policy should be comprehensive and involve the whole value chain actors. The findings show that households using microcredit in combination with micro-insurance derive significant gains in terms of welfare improvement. Microcredit may be good but its benefit to the poor is enhanced and sustained if the poverty trapping risks are covered with micro-insurance. To this extent, combining microcredit with micro-insurance will empower the poor to make a sustainable exit from poverty.

To promote group credit lending, the government should launch a campaign to educate members as well as managers. The active involvement of members is required to build institutions at the local level and to promote members' economic self-sufficiency. Farmers need to be trained on marketing management.

6.0 References

Bekele M, S. (2007). Determinants of Agricultural Credit Market Participation and Loan Repayment Performance in Finoteselam Town, Northwestern Ethiopia. *Unpublished thesis submitted to the Department of Economics and resource management, The Norwegian University of Life Science (UMB).*

Byerlee, D., & Eicher, C. K. (1997). *Africa's emerging maize revolution*. Lynne Rienner Publishers.

Coleman, E. B. (1999). The Impact of group lending in Northeast Thailand. *Journal of Development Economics* 60: 105-141.

Copestake, J.,Sonia, B. and Johnson, S. (2001). Assessing the impact of micro-credit: A Zambian case study. *Journal of Development Studies*, 37: 81-100.

Economic Review of Agriculture. (June 2012) .*World Development* 14 (10/11): 1253–1267.Economy(Chapter7).Webpage:http://www.dbsa.org/ocument/%5cpDevelopment Report.

Emerole G, O., Osondu C,K., & Anyiro C,O (2014). Risks, vulnerability and determinants of women farmers' participation in self-help-group (SHG)-led micro financing in Isuikwuato, Abia state, Nigeria. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development* Vol. 14, Issue 3.

FAO (2009). Agricultural Sectors Development Strategy 2012-2020.

FAO (2012). Agricultural Sectors Development Strategy 2012-2020.

GOK. (2013). Food Security Assessment Report March 2013. Nairobi: Government Printer.

GOK.(2010). Agricultural Sectors Development Strategy 2012-2020. Nairobi: Government Printer.

Kosura, W. & J. Karugia, (2005). "Why the early promise for rapid increases in maize productivity in Kenya was not sustained: Lessons for sustained investment in Agriculture". In: Djurfeldt, G. Holmen, H. Jirstrom, M and Larsson, R. (eds). *The African Food Crisis. Lessons from the Asian Green Revolution*. CABI, UK and USA.

Mbugua, F. (2009). "An analysis of factors influencing adoption of the recommended maize technology's package in Makuyu Division, Muranga South District, Kenya". http://ir-library.ku.ac.ke/handle/123456789/1558.

Mosley, P. & Hulme, D. (1998). Micro-enterprise Finance: Is there a conflict between growth and poverty alleviation? *World Development* 26(5): 783-790.

Njoroge, K., Muiru, W. M., Miano, D. W., Kimenju, J. W., & Charles, A. K. (2015). Evaluation of resistance reaction of maize germplasm to common foliar diseases in Kenya.

Olwande J, (2012). "Smallholder Maize Production Efficiency in Kenya. Tegemeo Institute of Agricultural Policy and Development". Regional Workshop on an Integrated Policy Approach to Commercializing Smallholder Maize Production 6th -7th June, 2012- The Norfolk Hotel, Nairobi, Kenya.

Owuor, G. & Shem A. O. (2012). "Informal Credit and Factor Productivity in Africa: Does Informal Credit Matter?" Selected Poster Prepared for Presentation at the *International Association of Agricultural Economists (IAAE) Triennial Conference*, Foz do Iguaco.\, Brazil, 18-24 August, 2012.

Zaman, H. (1998b). Who benefits and to what extent? An evaluation of BRAC's micro-credit program' University of Sussex, D.Phil. Thesis, Sussex. 291pp.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Agriculture
Volume 1||Issue 2||Page 17- 28||December||2017|
Email: stratfordjournals.org

Map of Kenya showing the study area