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Determinants of Participation in Value Addition Activities Among Farmer Groups in Ntchisi District, Malawi

Vinjero Jennifer Mkandawire* Hillary K. Bett Edith Gathungu
Egerton University, Njoro Campus, P. O Box 536-20115, Nakuru, Kenya

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Abstract
The study was carried out to better understand the determinants of the decision to participate in value addition among the beneficiary and non-beneficiary groups of Deepening Enterprise Development (DED) in Ntchisi District, Malawi. Data was collected from 100 farmer groups. Results indicated that location, project participation, type of farming enterprise, number of enterprises and gender composition significantly influenced the farmer' decision to engage in value addition. The study, therefore, recommends that development strategies should focus more on implementing initiatives that encourage and support farmers to engage in value addition activities. Stakeholders should also help in creating an enabling environment to improve smallholder farmers' participation in advanced levels of the livestock value chain. Furthermore, stakeholders should encourage farmers to engage in a vertical form of diversification by adding value to their commodities rather than a horizontal form of diversification that requires advanced management capabilities.
Keywords: Value addition, Deepening Enterprise Development, probit model, Malawi.

1. Introduction

The agricultural sector remains to be the most significant sector in the economy of Malawi (GoM, 2016). The smallholder agriculture is a key source of living for most of the population residing in the rural area. It represents more than three-quarters of national exports and generates more than 80 percent of the export earnings. For the case in point, about 84 percent of value-added products from agriculture originate from 1.8 to 2 million smallholder farmers (Chirwa and Matita, 2012).

Rural people in Malawi who are also less resource endowed lack the ability to diversify out of agriculture (Asfaw et al., 2015). Agribusiness is still in its early stage hence most produce is sold in primary form. Smallholder agriculture is associated with insufficient value addition. Consequently, smallholder farmers fail to meet the growing demands for both domestic and international market because they normally produce and sell unprocessed commodities which are perceived to be of low value (GoM, 2009).

In Malawi, agricultural development has been the focus of development strategies (2005 to 2007). These are driven by the belief that if a large proportion of the poor takes part in development activities, growth in the agricultural sector can be achieved (Chirwa *et al*., 2013). It is recognised by the Malawi Growth and Development Strategy (MGDS) that the advancement of local economic development would help to achieve broad-based growth. The development should, however, be done based on the potentials that exist within the local areas. The African Development Bank's mid-term review conducted in February 2008 emphasised the need for a multi-sector intervention that would enable local areas to develop by promoting value addition and building capabilities for entrepreneurship development as essential in maintaining pro-poor economic growth in the country (AfDB, 2008). It is to this effect that the Government of Malawi with financial funding from the African Development Bank (AfDB) implemented the Deepening Enterprise Development (DED) initiative under the Local Economic Development (LED) project in 2010.

The DED project aimed at enhancing the competitiveness of the rural agribusiness actors on the market and ultimately raising their incomes through their involvement in value addition activities. The DED initiative focused on expanding already established businesses through a series of trainings on marketing, value addition, financial management and savings mobilisation. The project also supported the construction of basic economic development infrastructures such as processing and storage facilities and provided the beneficiaries with processing and other value addition equipment. The targeted beneficiaries were the economically active poor such as local business associations and cooperatives as well as small-scale entrepreneurs (AfDB, 2008).

Farmers' ability to add value and produce outputs in quantity and quality, which is marketable and commercially viable, is inadequate due to limitations that they face. These include lack of sufficient storage, processing facilities, inadequate skills, limited access to credit as well as information asymmetry (Ellis and Ntengua, 2003; Aliou and Zeller, 2001). Participation of the farmers in the agricultural value chain is affected by these constraints deterring them from satisfying both domestic and export markets (GoM, 2016). Reducing the challenges faced by the small-scale farmers would enhance their competitiveness and help to set up growth in the agricultural sector. This study, therefore, sought to understand the determinants of value addition among the

beneficiaries and non-beneficiaries of DED groups in Ntchisi District of Malawi.

2. Methodology

2.1 Study area

Data for this study was collected in Ntchisi District in central Malawi. Ntchisi is situated 90 km North East of Lilongwe City and located at the approximate latitude of 13°22′S and 34°0′E. Total land area of the district is 1,655 square kilometres with a population of 212,000 giving a density of 128 persons per square kilometre. Ntchisi lies at an altitude of between 1,300 to 1,700 meters above the sea level. The mean annual temperature varies between 22°C in low altitude areas and 18°C in high altitude areas. Annual rainfall ranges from 900mm to 1500 mm (Andreski *et al*., 2005). The district has 4 major Extension Planning Areas (EPAs) namely Malomo, Chipuka, Chikwatula and Kalira. The major part of the population in Ntchisi live on subsistence agriculture. Agriculture forms around 80% of the district economy where 15% of cultivable land are estates producing mostly tobacco with the remaining smallholder farms producing a range of crops such as maize, soybeans, beans, groundnuts, potatoes and cassava. Livestock, forestry and irrigation are also important activities in the district. There is little private industry in the District and Government is by far the largest employer (GoM, 2015)

2.2 Sampling procedure and sample size

The study used a multistage sampling technique to obtain the required sample size. The first stage was to purposively select Ntchisi District because of its level of development in terms of production of agricultural commodities as compared to the other 3 districts where DED was implemented. The second stage involved purposive selection of Malomo Extension Planning Area (EPA) among the 4 EPAs since it is the area where the project was implemented. The EPA has 133 groups out of which 83 are the beneficiaries of DED. The sample size of 100 groups was generated. This was then divided proportionately between the beneficiary and non-beneficiary groups. Lastly, the respondents from the two categories were randomly selected from a list of smallholder farmer groups provided by the District Agriculture Office using a simple random sampling procedure. The sample size determination followed a sampling methodology as specified by Yamane (1973).

$$n = \frac{N}{1+N(e)^2} \quad (1)$$

Where:

n = sample size; N = number of groups; e = the level of significance at 0.05.

Therefore;

$$n = \frac{133}{1+133(0.05)^2} = 100$$

The sample size was therefore 100. The proportions of the beneficiaries and non-beneficiaries were thus calculated as below:

$$n = \frac{83+100}{133} = 62.40 \approx 62 \text{ Beneficiary groups}$$

$$n = \frac{50+100}{133} 37.57 \approx 38 \text{ Non-beneficiary groups}$$

2.3 Analytical framework

A probit model was used to determine the factors influencing the decision to engage in value addition among the beneficiaries and non-beneficiaries of DED. A satisfying number of past literature used the probit model (Martey *et al*., 2014; Ntale *et al*., 2014; Issa *et al*., 2015). Other studies have employed the logit and linear probability models (LPM) to analyse the objective. However, probit is usually preferred due to its ability to constrain the utility value of the decision to engage in value addition to lie within 0 and 1 and more importantly resolves the heteroskedasticity problem (Asante *et al*., 2011; Wiboonpongse *et al*., 2012). Furthermore, logit analyses data that have a logistic cumulative distribution function. Shortcomings of LPM are that it can generate probabilities that lie below or above zero but also leads to questionable values of the measure of goodness of fit (Gujarati and Porter, 2009). The probit model was chosen because adding value is mutually exclusive, discrete and dichotomous (binary) response, that is to say, a group opts either to add value or not. The aim was to explain the effects of the x_i (factors in this case) on the response probability P(y = 1\x) on farmers groups' decision to add value.

The dependent variable was value addition, represented by the letter Y. The dependent variable assumed only two variables (1 if the group engages in value addition and 0 otherwise). The supposed utility Y^*_{i1} from engagement in value addition activities which is unobservable was dependent on a vector of explanatory variables x_i. Having the underlying variable $y^*_{i1} > 0$ results into the binary outcome $y_{i1} = 1$. The regression equation representing the dependent variable, which is value addition and the independent variables influencing the decision to engage in value addition, is thus written as:

$$Y = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + ... + \beta_k X_{ki} + \mu \quad (2)$$

Where Y= Value addition

X= Factors determining the decision to engage in value addition
β= Coefficient
μ= Error term

The probit model is represented as below according to Greene (2012):

$$P(Y = 1) = F(XB) = P(Y = 1|X) = F(X\beta) = \frac{1}{\sqrt{2\Pi}}\int_{-\infty}^{X\beta} e^{\frac{-(X\beta)^2}{2}} dx \quad (3)$$

Where: $X = (1, x_{1i}, x_{2i}, \ldots . x_{ki})$

$\beta' = (\beta_0, \beta_1, \ldots . \beta_k)$

The marginal effects of the variables are calculated using the formula given:

$$\text{Marginal effects} = \beta_i \Phi(Z) \quad (4)$$

Where: β_i are the coefficients of the variables, $\Phi(Z)$ refers to the cumulative distribution value with the mean dependent variable from the probit estimation. A set of explanatory variables used in the probit model and their priori signs are presented in Table 1Table 5: Specification of variables used in a probit model.

Table 1: Description of variables used in a probit model

Variable	Description	Measurement	Expected sign
Dependent variable			
ValueAdd	Value addition (1= adds value, 0= does not add value)	Dummy	
Independent variables			
CredACC	Access to credit (1=yes, 0=no)	Dummy	+
ExtACC	Access to extension services (Number of contacts)	Continuous	+
MarACC	Access to the market (Distance to the market in km)	Continuous	+/-
TrainACC	Access to training (1=yes, 0=no)	Dummy	+
TrainProd	Training on production	Dummy	+
TrainVA	Training on value addition	Dummy	+
Memb	Number of members	Continuous	+/-
GendComp	Gender composition (Percentage of males and females)	Dummy	+/-
Regstatus	Registration status (1=registered, 0= not registered)	Dummy	+/-
Affil	Affiliation to an organisation (1=yes, 0=no)	Dummy	+/-
NumberEnter	Number of enterprises	Continuous	+/-
TypeEnter	Type of farm enterprise (1=crop, 0=animal)	Dummy	+/-

3. Results and discussions

3.1 Group characteristics

Table 2 presents the results of a comparative analysis on the number of members, gender composition, affiliation to organisation and registration status of the farmer groups in percentages. The mean number of members was 31.21 and 51.6 for the beneficiaries and non-beneficiaries respectively. The sense in the results is that having a large number of group members increased the probability of benefiting from the program. A study by Poteete and Ostrom (2004) showed that there is no straightforward relationship between group size and prospects of collective action. However, the DED project did not consider the number of members in recruiting its beneficiaries. The economic activeness of the groups regardless of their group size in terms of membership was of paramount importance. A large number of both the beneficiaries and non-beneficiaries (74% and 79% respectively) were located within Malomo. This was the project site. The number of members was statistically different ($p<0.05$), with benefiting from the program bearing a positive relationship.

The variable gender composition was statistically related to benefiting from the program at 10% significance level. Gender was made up of three categories, that is males only, females only and a combination. For the male-only category, 19% benefited from the program and 13% did not. More of the female-based groups (31%) also benefited from the program as compared to 13% who were non-beneficiaries. The majority of the groups were found under the mixed-gender category, with the beneficiaries having 50% and the non-beneficiaries, 74%. The results indicate that the preferred option to the majority of the farmers was to belong to a mixed-gender group as opposed to male only or female only gender groups. This is in agreement with the findings by Tallam *et al.* (2016) whose results indicated that farmers would choose to form mixed-gender groups as opposed to single gender groups. Gender is currently a focal point in most development projects including agricultural and rural

development. Women are being incorporated into development projects because they make a vital contribution to agriculture both in developing and developed countries (Lambrecht *et al*., 2014).

Table 2: Number of members, gender, affiliation and registration

Variables	Beneficiary	Non-beneficiary	t-value	p-value
Number of members (mean)	31.21	51.63	2.339	0.021**
			χ^2 value	
Location (%)			0.292	0.589
Malomo	74	79		
Outside Malomo	26	21		
Gender composition (%)			5.774	0.056*
Males only	19	13		
Females only	31	13		
Mixed-gender	50	74		
Affiliation to organisation (%)			3.330	0.068*
Yes	100	95		
No	0	5		
Formal registration (%)			0.422	0.516
Yes	11	16		
No	89	84		

Note: *, ** indicate significant at 10% and 5%.

All the beneficiary groups were affiliated to at least one organisation representing 100% affiliation while 5% of the non-beneficiaries indicated no affiliation. Affiliation with an organisation was found to be significantly related to participating in the program at 10%. Being beneficiaries of the project, the farmer group were automatically connected to this organisation. According to Tallam *et al*. (2016) farmer groups with affiliation have access to more services and enhanced social network as compared to those with no affiliation. This is because these partners play different roles such as capacity building in the form of training, in-kind support such as a provision of inputs and financial support provided as credit or grants.

The non-beneficiaries had a greater percentage (16%) of the groups that were formally registered by the government as compared to the beneficiary groups (11%). Registration status was found not to have any relationship with joining the program. The expectation is that benefiting from the group should enhance registration of the groups. However, in Ntchisi district, the DED project did not facilitate the registration of groups into either cooperatives or associations. The project focused on strengthening the groups that already existed. The registration of the existing groups was done mainly with the help of government extension officers. In the rural areas, informal farmer organisations, also termed as traditional organisations have a function of self-reliance to build social capital and facilitate collective action. This is done with the aim of dealing with uncertainties that go with agricultural production as well as building relationships within the groups (Thompson *et al*., 2009). Formal farmer organisations on the other hand bridges relationship gap between farmers and other stakeholders.

3.2 Institutional attributes

Table 3 illustrates results on the institutional traits being market distance, number of contact with extension officer, credit and training access. The mean market distance in kilometres for the beneficiary groups was less (3.12) than that of the non-beneficiaries (4.64). According to the results, positive relationship indicated that farmers who travelled long distances to the market were more likely to benefit from the program with intention to benefit from enhanced market access thus reduced market distances. This implies that participating in the program improved the group's ability to have access to the market. One of the LED project components was Growth Centers Development. Under this component, market structures were constructed within the rural growth centers. Mujeri (2002) concurs with this finding and states that this type of infrastructure reduces the costs of marketing of products from the rural areas due to ease of access and increases farm gate prices. In essence, infrastructure development is an important way of raising rural incomes.

Table 3: Market distance, number of contacts, access to credit and access to training

	Program beneficiary			
Variables	**Beneficiary (62)**	**Non-beneficiary (38)**	**t-value**	**P-value**
Market distance (mean)	3.12	4.64	1.894	0.061*
Number of contact with extension (mean)	6.56	3.00	-6.974	0.000***
			χ^2 value	
Access to credit (%)			0.874	0.350
Yes	84.00	76.00		
No	16.00	24.00		
Access to training (%)			28.793	0.000***
Yes	100.00	61.00		
No	0.00	39.00		

Note: *, *** indicate significant at 10% and 1%.

The mean number of contact with extension officers for groups that benefited from the program was 6.56 while that of the non-beneficiaries was 3.00. The results were statistically significant at 10% indicating a negative relationship. The direction of the sign here bears meaningless interpretation. However, the logic is that participating in a program should increase with the frequency of farmers' contact with extension agents who are usually the carriers of the information let alone the project. Agricultural extension creates links between available technology and farmer's practices through the provision of technical advice, information and training. In the absence of this, farmers would be limited in their ability to adopt new technologies (Oladele and Mabe, 2010).

About 84% of the beneficiary groups had access to credit in comparison to the 76% of the non-beneficiaries. Both the groups indicated rotating savings and loans as their source of credit. The project facilitated training on savings mobilisation for the beneficiary groups hence most of them resolved to access credit through rotating savings and loans. This informal source of credit entails the revolution of social capital into economic capital. A framework is created enabling the farmer groups to mobilise savings from within themselves. The saved income is then invested in agricultural production or other business ventures. Farmers in the rural areas opt for informal financial mechanism due to the absence of formal financial institutions within their localities. Most importantly, informal institutions do not require collateral which usually poses as a threat and alternatively uses group membership as the requirement for access. As indicated by Ksoll (2016), the role of collective action as an institution has over time played an integral role in accelerating access to some institutions. Savings groups act as a substitute for existing informal financial networks, which provide more flexibility, transparency, and security.

Training enhances the adoption of new technologies. According to the study results, all the beneficiary groups had access to training as compared to only 61% non-beneficiary groups. The results indicated a positive relationship between access to training and program participation at 1% significance level. According to Nhundu *et al.* (2015) farmers who received regular training had a higher probability of participating in a program. Mostly, farmer groups rely on services from government extension agents which are usually not sufficient due to limited resources. Agricultural extension is the most important means of reaching out to farmers in rural areas most of which are hard to reach. The role of Non-governmental Organisations (NGOs) in complementing governments' efforts in the delivery of agricultural extension services cannot be overemphasised. So is the case with the program under study, which was funded by NGOs but implemented by the government. Sustainable agricultural growth is dependent on effective agricultural extension services(Masangano *et al*., 2016).

3.3 Regression results

Table 4 presents maximum likelihood estimates of probit model regression results used to determine factors influencing the decision to engage in value addition among beneficiary and non-beneficiary groups of DED. The log likelihood for the fitted model of -34.341 and p-value of 0.000 indicated that at least one of the regression coefficients was not equal to zero. Variables; location, animal farming, program participation, number of enterprises and gender categories were statistically significant in influencing the decision to engage in value addition.

Location was statistically significant at 10% significance level. Being located in Malomo rural growth center increased the likelihood of the group to engage in value addition by 35%. This could be because Malomo was a project site, which provided the groups located within it a chance to benefit from the value addition activities promoted by the project. Furthermore, the rural growth center provided the groups located in Malomo access to a reliable market. Being located outside Malomo might have hampered the non-beneficiaries from participating in value addition activities. Transaction costs would be relatively higher as compared to their counterparts due to increased transportation costs hence lowering their product competitiveness. Selling within their localities led to low profits owing to insufficient markets. Kaguongo *et al.* (2012) found out that location had an effect on adoption and intensity of adoption of an intervention.

Table 4: Factors influencing the decision to engage in value addition

Variable	dy/dx	Std. Error	P-value
Access to credit	-0.033	0.155	0.831
Extension contact	-0.002	0.026	0.953
Distance to the market	0.004	0.013	0.751
Location	0.346	0.183	0.059*
Crop farming dummy	0.252	0.279	0.367
Animal farming dummy	-0.77	0.095	0.000***
Program participation	0.605	0.15	0.000***
Number of enterprises	-0.146	0.046	0.002***
Training in value addition	0.193	0.126	0.126
Training in production	0.118	0.108	0.274
Male only dummy	-0.466	0.155	0.003***
Female only dummy	-0.428	0.172	0.013**
Number of observations = 100	Wald $chi^2_{(12)} = 48.15$	Pseudo $R^2 = 0.464$	
Log likelihood = -34.340801	Prob > $chi^2 = 0.000$		

Note: *, **, *** indicate significant at 10%, 5% and 1% level.

Practicing animal farming reduced the probability of engaging in value addition activities by 77%. This was significant at 1% significance level. In the livestock value chain, local farmers transact at farm level with minimal volumes. Terminal markets have been left to big traders and butchers who process the live animals into meat products as demanded by the consumers. Livestock farmers face a number of market-related constraints that prevent them from participating in terminal markets. These include poor infrastructure, high transaction costs and lack of information (Musemwa *et al*., 2008). Changes in the supply chain of agricultural products pose challenges to smallholder farmers since high-value agricultural products attract increased cost of production coupled with greater production and marketing risk (Gulati *et al*., 2005). With the quest to enhance market participation level of the smallholder livestock farmers, infrastructure, as well as institutional arrangements need to be improved in order to guarantee wide-ranging, competitive and functional markets. This would be achieved by improving the farmers' capacity in terms of cooperation (Zuwarimwe and Mbaai, 2015).

Participating in DED program increased the probability of a group to engage in value addition activities by 61%. The influence of being a beneficiary on the choice of adding value was statistically significant at 1% significance level. Being a project beneficiary entails getting assistance inform of capacity enhancement required to address the problems faced by the rural community. Mbavai *et al*. (2015) argued that participating in agricultural activities organized by organisations aimed at promoting agricultural activities is fundamental to the adoption of new technologies. Findings by Kaguongo *et al*. (2012) indicated that program beneficiaries were three times likely to adopt an intervention as opposed to the non-beneficiaries.

Increased number of enterprises reduced the group's probability of doing value addition by 15% at 1% significance level. An enterprise in this case is defined as a component of business that a group is undertaking. These results imply that as the number of enterprises increases, the group's likelihood to engage in value addition lessens. In agriculture, diversification strategy calls for complex management capability and increases the cost of management per unit of output limiting local farmers from getting its benefits. Although enterprise diversification is seen as a risk management strategy, an increased number of enterprises have implications on specialisation. Specialization strategy is an accepted economic theory having widely held origins, particularly in agriculture (Edwin *et al*., 2013). Although it can be argued that specialisation leads to instability of cash flow, this can be cushioned through full exploitation of technologies and savings generation to be used during occurrences of uncertainties. Findings by Chaplin *et al*. (2003) indicated that adding value to raw agricultural commodities was poorly developed among the diversified activities. In most cases, farmers prefer to diversify into other farm activities rather than engage in value addition activities like processing which is regarded as a high value commodity mix.

For gender composition categories, the results showed that male-only and female-only groups reduced the probability of doing value addition by approximately 47% and 43% respectively. This was in reference to mixed-gender categories and was significant at 1% significance level for male only groups and 5% significance level for female only groups. The outcome can be explained with the reasoning that organisations with a greater gender equality in membership and participation contribute positively to organisation performance due to improved member's collaboration as well as increased collective benefits and knowledge within the group (Kaaria *et al*., 2016). Gender is a social concept in reference to relations between and among sexes based on their relative roles. For decades, men have been perceived as the real farmers as compared to women hence being qualified to receive a better share of both technical assistance and extension services. However, a critical view reveals that women are greatly involved in the production and handling of crops (Manfre *et al*., 2013). Women tend to be sidelined as agricultural value chains become more formalised. Eliminating either of the two gender categories from the picture

endangers proper functionality of the agricultural value chain since both make significant contributions to its success.

4. Conclusion and recommendations

The study established that a number of farmer group characteristics significantly influenced their decision to add value to agricultural commodities. These included location, project participation, type of farming enterprise, number of enterprises and gender composition. According to the study, participating in the project positively influenced the farmer groups to engage in value addition activities. To the contrary, involvement in animal enterprise was found to affect the farmer groups' decision to add value negatively. This can be attributed to challenges surrounding the livestock enterprise that hinders participation by smallholder farmers. The study also revealed that having an increased number of enterprises negatively influenced the decision to participate in value addition. By nature, enterprise mix requires a multifaceted managerial capacity which the smallholder farmers lack. On gender composition, belonging to a group with a more balanced gender was found to positively influence the decision to add value. Having both gender categories provides a conducive environment for collaboration and sharing of ideas from both parties.

Based on the findings, the study therefore recommends that initiatives from stakeholders should be designed to enable farmers to participate in interventions aimed at boosting the farmers' capacity to add value to their commodities. This would enhance their competitiveness which in turn can enable them to fetch better prices for their products. Participating in animal enterprise was found to negatively affect the decision to add value. This can be attributed to market-related challenges surrounding the livestock industry. Therefore, government should develop strategies that would improve smallholder farmers' participation level in the industry. One way of achieving this would be to facilitate development of cooperatives to enhance farmers' capacity. The study also found out that an increased number of enterprise affects negatively the decision to add value. The concept of diversification should therefore focus more on farmers' involvement in various value addition activities rather than venturing into different type enterprises as this limits the farmers from reaping off its benefits due to their lack of management capacity.

References

AfDB. (2008). Support to Local Economic Development (Appraisal Report). Available on https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and Operations/Malawi_-_Support_to_Local_Economic_Development_-_Appraisal_Report.PDF (retrieved on 7th May 2016).

Aliou, D., and Zeller, M. (2001). Access to Credit and Its Impact on Welfare in Malawi. Washington, D.C. Avalable on http://www.ifpri.org/publication/access-credit-and-its-impact-welfare-malawi (retrieved on 15th November 2017).

Andreski, A., Kaira, C., and Chagunda, J. (2005). Rural Accessibility and Mobility in Ntchisi District, Malawi. In Sustainable Access and Local Resource Solutions Available on http://mercurypoisoningproject.org/malawi/pdf/RAMPA_1.pdf (retrieved on 29th November 2016).

Asfaw, S., Mccarthy, N., Paolantonio, A., Cavatassi, R., Amare, M., and Lipper, L. (2015). Diversification, Climate Risk and Vulnerability to Poverty: Evidence from Rural Malawi. In Agriculture in an Interconnected World. Available on http://ageconsearch.umn.edu/bitstream/230216/2/Asfaw-Diversification-831_Dec1_2015.pdf (retrieved on 3rd September 2017).

Chaplin, H., Davidova, S., Gorton, M., Wlikin, J., Milczarek, D., Lukaszewicz, A., and Csillag, P. (2003). Agricultural Adjustment and the Diversification of Farm Households in Central Europe Agricultural Adjustment and the Diversification of Farm Households in Central. In a Contributed paper selected for presentation at the 25th International Conference of Agricultural Economists, August 16-22, 2003, Durban, South Africa.

Chirwa, E. W., Kumwenda, I., Jumbe, C., Chilonda, P., and Minde, I. (2008). Agricultural Growth and Poverty Reduction in Malawi : Past Performance and Recent Trends (No. 8). Available on https://www.researchgate.net/publication/228682735%0D (retrieved on 9th June 2016).

Chirwa, E. W., and Matita, M. (2012). From Subsistence to Smallholder Commercial Farming in Malawi: A Case of NASFAM Commercialisation Initiatives (No. 37). Available on www.future-agricultures.org (retrieved on 12th August 2017).

Edwin, P., Shahriar, K., and Yu, Z. (2013). The dilemma of biodiversity and specialization in agricultural development. *Journal of Development and Agricultural Economics*, *5*(5), 168–173.

Ellis, F., and Ntengua, M. (2003). Livelihoods and Rural Poverty Reduction in Tanzania - ScienceDirect. *World Development*, *31*(1), 1367–1384.

GoM. (2009). Agribusiness report. Malawi.

GoM. (2015). Ntchisi District Agricultural Office Annual Report. Ministry of Agriculture.

GoM. (2016). National Agriculture Policy, Government of Malawi. Malawi. Available on

http://foodsecuritypolicy.msu.edu/uploads/files/Malawi/Malawi_National_Agriculture_Policy_25.11.16.pdf (retrieved on 8th September 2016).

Gulati, A., Minot, N., Delgado, C., and Bora, S. (2005). Growth in high-value agriculture in Asia and the emergence of vertical links with farmers. In Paper presented at the workshop "Linking Small-Scale Producers to Markets: Old and New Challenges" The World Bank. Available on http://siteresources.worldbank.org/INTRANETTRADE/Resources/Topics/Standards/paper_minot.pdf (retrieved on 27th August 2017).

Issa, N., Ngabitsinze, and, and Chrysostome, J. (2015). Determinants of Farmer Participation in the Vertical Integration of the Rwandan Coffee Value Chain: Results from Huye District. *Journal of Agricultural Science*, *7*(9), 197–211.

Kaaria, S., Osorio, M., Wagner, S., and Gallina, A. (2016). Rural women's participation in producer organizations: An analysis of the barriers that women face and strategies to foster equitable and effective participation. *Journal of Gender, Agriculture and Food Security*, *1*(2), 148–167.

Kaguongo, W., Ortmann, G., Wale, E., Darroch, M., and Low, J. (2012). Factors influencing adoption and intensity of adoption of orange flesh sweet potato varieties: Evidence from an extension intervention in Nyanza and Western provinces, Kenya. *African Journal of Agricultural Research*, *7*(3), 493–503.

Ksoll, C., Lilleør, H. B., Lønborg, J. H., and Dahl Rasmussen, O. (2016). Impact of Village Savings and Loan Associations: Evidence from a cluster randomized trial. *Journal of Development Economics*, *120*(May, 2016), 70–85.

Lambrecht, I., Vanlauwe, B., and Maertens, M. (2014). What is the sense of gender targeting in agricultural extension programs? Evidence from eastern DR Congo (No. 4). Belgium. Available on http://ees.kuleuven.be/bioecon/ (retrieved on 19th August 2017).

Manfre, C., Rubin, D., Allen, A., and Summerfield, G. (2013). Reducing the Gender Gap in Agricultural Extension and Advisory Services: How to Find the Best Fit for Men and Women Farmers (No. 2). Available on http://networking.afaas-africa.org/sites/default/files/MEAS (retrieved on 19th August 2017).

Martey, E., Etwire, P. M., Wiredu, A. N., and Dogbe, W. (2014). Factors influencing willingness to participate in multi-stakeholder platform by smallholder farmers in Northern Ghana: implication for research and development. *Agricultural and Food Economics*, *2*(1), 11.

Masangano, C. M., Chiwasa, H., Kambewa, D. K., Kakwera, M., Chimombo, M., Matita, M., and Gausi, W. (2016). Making the demand-driven extensions services systems work through decentralised structures: Prospects for the future extension service delivery in Malawi. *Journal of Agricultural Extension and Rural Development*, *8*(12), 240–249.

Mbavai J, J., Shitu M, B., T, A., Kamara A, Y., and Kamara S, M. (2015). Pattern of adoption and constraints to adoption of improved cowpea varieties in the Sudan Savanna zone of Northern Nigeria. *Journal of Agricultural Extension and Rural Development*, *7*(12), 322–329.

Mujeri, M. K. (2002). Issues in Employment and Poverty Bangladesh: Bringing Poverty Focus in Rural Infrastructure Development (No. 2). Geneva. Available on http://ilo.org/wcmsp5/groups/public/@ed_emp/documents/publication/wcms_120739.pdf (retrieved on (retrieved on 20th June 2016).

Musemwa, L., Mushunje, A., Chimonyo, M., Fraser, G., Mapiye, C., and Muchenje, V. (2008). Nguni cattle marketing constraints and opportunities in the communal areas of South Africa: Review. *African Journal of Agricultural Research*, *3*(4), 239–245.

Nhundu, K., Mushunje, A., Zhou, L., and Aghdasi, F. (2015). Institutional determinants of farmer participation in irrigation development post and quot; fast-track and quot; land reform program in Zimbabwe. *Journal of Agricultural Biotechnology and Sustainable Development*, *7*(2), 9–18.

Oladele, O. I., and Mabe, L. K. (2010). Job burnout and coping strategies among extension officers in Northwest province, South Africa. *African Journal of Agricultural Research*, *5*(17), 2321–2325.

Poteete, A. R., and Ostrom, E. (2004). Heterogeneity, Group Size and Collective Action: The Role of Institutions in Forest Management. *Development and Change*, *35*(3), 435–461.

Tallam, S. J., Tanui, J. K., Muller, A. J., Mutsotso, B. M., and Mowo, J. G. (2016). The influence of organizational arrangements on effectiveness of collective action: Findings from a study of farmer groups in the East African Highlands Sheilla. *Journal of Agricultural Extension and Rural Development*, *8*(8), 151–165.

Thompson J, Teshome A, Hughes D, Chirwa E, O. J. (2009). Challenges and Opportunities for Strengthening Farmers Organisations in Africa: Lessons from Ethiopia, Kenya and Malawi. Brighton. Available on https://assets.publishing.service.gov.uk/media/57a08b50ed915d3cfd000c60/FAC_Policy_Brief_No31.pdf (retrieved on 28th June 2016).

Wiboonpongse, A., Sriboonchitta, S., Rahman, S., Calkins, P., and Sriwichailumphun, T. (2012). Joint determination of the choice of planting season and technical efficiency of potato in northern Thailand: A comparison of Greene's versus Heckman's sample selection approach. *African Journal of Business*

Management, *6*(12), 4504–4513.
Yamane, T. (1973). Statistics and introductory Analysis. London: HLeonard Hill.
Zuwarimwe, J., and Mbaai, S. M. (2015). Factors influencing smallholder farmers' decisions to participate in livestock markets in Namibia. *Journal of Development and Agricultural Economics*, *7*(7), 253–260.