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Factors influencing smallholder farmers' participation in village banks in Ngaka Modiri Molema district municipality (NMMDM)

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ABSTRACT

The study investigates the factors influencing smallholder farmers' participation in village banks. Data from 200 households' members and non-members of village bank were collected from three villages where village banks were established using structured questionnaire and analysed with logistic regression model. Results revealed that variables such as gender ($p<0.1$), level of education ($p<0.1$), farming experience ($p<0.05$), size of the land ($p<0.1$), income per capita ($p<0.01$) and distance from office of village bank ($p<0.01$) significantly affect smallholder farmers' decision to participate in village bank. Furthermore, female respondents constituted the highest proportion of the participants with 61%, while most of the non-participants (59%) were males. Results show that the village bank initiative was not within the proximity of farmers, however farmers were willing to go far to save if they will be able to access credit, hence distance was not a constraint. Despite the low number of village banks established, village banks still bring significant improvement in smallholder farmers expenditure and therefore the study recommends to create more community based village bank initiative in order to ensure that farmers are able to access credit easily to promote their farming initiative, therefore improve farmers income and food security in South Africa.

Key words: Smallholder farmers, Village bank, logistic regression, North West Province

INTRODUCTION

Historically, smallholder farmers have been undermined in many countries in sub-Saharan Africa, while commercial farmers are given preferential treatment and also supported by legislations and subsidies. As a result, a highly dualistic agricultural sector has been created with smallholder farmers operating on small lands, with insufficient investment or lacking institutional support thereof (Reardon, Barret, Berdegue & Swinnen, 2009).Smallholder farmers are the drivers of many economies in Africa, even though their potential is often not brought forward. In general terms, smallholder farmer only refers to their limited resource endowment relative to other farmers in the sector.

Over the years, the South African government has studied the foundations for improving access to financial services for rural people. A lot more needs to be done rather than basically expressing the approaches. Itis contended that approaches do not separate target assembles sufficiently (Chisasa & Makina, 2014). This can come about inefficient implementation. The idea of a wide scope of institutional possibilities to improve access to financial services, none of which particularly gives a convincing model, is considered to be realistic. The thought is to meet this scope of conceivable structures into a co-ordinated effort to expand access to money related administrations for rustic individuals in every rural area. Among the available sources of capital in farming such as savings, credits facilities, inheritance, grants and gifts, pooling of capital; leasing and contract farming, many still remain inaccessible to smallholder farmers. Thus, the Strauss Commission(1996) proposed a process for transforming the rural financial services sector at national level that will start immediately and be built on the strength of existing local level institutions in the private, public and voluntary sectors (DAFF,2009). At the retail level the Commission did not provide the detail of how to accomplish expanded access to rural financial services. Therefore, there is a need to broaden participation of rural financial markets by proposing assorted financing systems to guarantee access to monetary administrations with accentuation on the mobilisation of savings through self help group or cooperative. Thus, the government initiated village bank in South Africa at the beginning of 1994 in the North West province by the entry of the International Fund for Agricultural Development (IFAD) in South Africa after the Agricultural Bank in Bophuthatswana (now North West province) connected for participation of the African Rural and Agricultural Credit Association (AFRACA). The main problem for village bank is how to guarantee payment and reliable management to help members to achieve better productivity,

and therefore village banks members need to be united and keep to their rules in terms of payments and specially the purpose of the loan (Chisasa, 2014).

Several empirical researchers examined the determinants of savings (Hori, Kondo, Nogata & Ben, 2013; Horioka & Terada-Hagiwara; 2012). Study reported that income level, inflation, transaction costs, levies/taxation policy, returns from savings, interest rates, security, farm sizes, household sizes and dependency ratios, levels of farmers' education, proximity and availability of banking facilities, membership of farmer organizations are the determinants of savings in rural farming areas even though they are ineffective without savings culture(Botha, Simleit & Keeton, 2011). Cultural components are routinely specified in writing as requirements on utilization of financial services. Some serve as boundaries to get to and others dishearten potential clients from looking access. This though was confirmed by Meniago, Mukuddem-Petersen, Petersen and Mongale(2013) in a study to measure to decrease household debt in South Africa. The study found that household savings was found to positively contribute to a rise in household debt but this relationship was found to be statistically insignificant. However, household behavior are insufficient in term of expenditure and there is a lack of saving culture to encourage positive savings and suggested that savings culture, financial literacy, and consumerism are also determinants of savings in South Africa (Odhiambo, 2009).

Despite the restructuration after year of village bank to improve their services, there still a negative feedback on smallholder farmers participation as their number remained low compared to other small business in rural area and village banks are not well integrated in the financial infrastructure. Therefore, the aim of this study is to investigate factors that influence smallholder farmers to participate in village banks in the Ngaka Modiri Molema District Municipality (NMMDM).

METHODOLOGY

DESCRIPTION OF THE STUDY AREA

The District covers a range of 31039 square km and shares outskirt with the Republic of Botswana. The region is officially separated into five nearby districts to be specific: Mafikeng, Ratlou, RamotshereMoiloa, Distsobotla and Tswaing. The aggregate populace of the locale is roughly 842

699, with 93.9% African, 1.6% hued, 0.6% Indian/Asian and 3.7% white. The normal age of the populace in the area is under 25 years (Local Government, 2015).

Regarding income situation in the district, roughly 75% of all family units in the Ngaka Modiri Molema District (NMMDM) procure under R1 500 every month. The spatial example of wage circulation amongst family units in the locale demonstrates a low level of pay and reasonableness in the provincial ranges, particularly in the northern and south-western parts of the area. This pattern is upheld when contrasting wage figure among different Local Municipalities in the area.

In term of employment, the present unemployment rate in the area has enhanced by 2.2% which is comparable to 23% of the aggregate number of unemployed individuals in the North West. In any case, this rate is not steady with subsistence cultivating where we encounter the drop of job with movement of youth to huge urban areas for better life (Local Government, 2015)

As to water and atmosphere in the locale, the State of the Environment Report for North West Province gives itemized information and data on water and spatial dissemination of climatic components. The aggregate number of water shopper units living in zones named country farmland is 17 438. The larger part of these units is situated in the Ditsobotla Local Municipality and Ramotshere Moiloa Local Municipality. Around 70% of family units on farmland have entry to some type of water reticulation framework (house association, yard association or collective standpipe). Most by far of these buyers units use boreholes as their principle wellspring of water supply. Precipitation in the District shifts from 400 to 600mm for every annum. A little part of the territory adjoining the eastern limit has precipitation marginally higher than the locale midpoints (800 to 1 000mm every year). The normal precipitation per annum is being ascertained at 600mm. Storms and hails do happen however are lower contrasted with figures got for the Highveld locale. The NMMDM region is recognized from the Highveld locale based on differences in climatic statistics (Local Government, 2015).

SAMPLING AND SAMPLE SIZE DETERMINATION

To achieve the objective stated above, the study adopt a cross- sectional research design in which data are to be collected once from sampled respondents in Ngaka Modiri Molema District Municipality. In this study, data was analysed using both qualitative and quantitative method.

Hypothesis testing was used to test factors influencing smallholder farmers to participate in village banks.

The target population of this study was all participants and non- participant's village's banks in Ngaka Modiri Molema district municipality who are smallholder farmers. From the five village banks identified in the district, three village banks was selected using a vertical and horizontal analysis to ensure that all the banks had the same level. To avoid choosing success banks over the unsuccessful one, the study chose the most successful, the less successful and the average one to avoid bias. From the selected 3 village banks, proportional due to the number of smallholder farmer's members, simple sampling technique was used to select members from each of the selected village banks using registers of village banks make available by management of each village bank, which gave a total of 100 members. Because the participation target also non-members, 100 non-members were selected randomly to have a broad view on factors that influence participation in village banks. The total sample size was 200 household smallholder farmers.

EMPIRICAL MODEL SPECIFICATION

In line with the stated objective and to answer some of the specific objectives of the present study with are beyond the scope of descriptive analysis, appropriate empirical model such as logistic regression was formulated to examine the determinant of factors influencing smallholder participation in village banks. This model is specified as follow.

Logistic model is based on cumulative logistic probability function. It advantage is that it can predict the probability of smallholder farmer's participation in village banks. It is based on the assumption that the value of a random variable falls within a specific range (Bendat & Piersol, 2011). In the Logit model the log odds of the outcome is modelled as a linear combination of the predictor variables. Models which include a "yes" or "no" types of dependent variable are called dichotomous (binary). Such models approximate the mathematical relationship between explanatory variables and the dependent variable that is always assigned qualitative response.

The cumulative probabilities of a random variable is less than or equal to a specific value as

$$P = \frac{e^{l_i}}{1+e^{l_i}} \qquad (1)$$

Conceptually, the behavioral model used to examine factors participating being given by:

$$Y_i = g(l_i) \qquad (2)$$

$$l_i = b_0 + b_j X_{ji} \quad (3)$$ where

Y_i= observed response for the i^{th} observation (i.e binary variable Y_i= 1 for participation in village bank, Y_i = 0 for non- participation in village bank).

l_i underlying stimulus index for the i^{th} observation

g = functional relationship between the field observation (Y_i) and the stimulus index(l_i) which determine the probability of participating in village bank.

i = 1,2,.....,n are observed on variables for the participation model; m is the sample size ; X_j is the j^{th} explanatory variable for the i^{th} observation and j= 1,2,3,...,n . b_j is an unknown parameter , j= 0,1,2,.....,n , where n is the total number of explanatory variables.

The Logit model assumes that the underlying stimulus (l_i) is a random variable which predicts the probability of participation in village bank.

$$P = \frac{e^{l_i}}{1+e^{l_i}} \quad (4)$$

Therefore, for the i^{th}observed (an individual farmer);

$$l_i = \ln \frac{p_i}{1-p_i} = b_0 + \sum b_j X_{ji} \quad (5)$$

The relative effect of each explanatory variable (X_{ji}) on the probability of village bank participation is measured by differentiating with respect to X_{ji}ie

$\frac{\delta p_i}{\delta X_{ji}}$, using the quotient rule

$$\frac{dp_i}{dX_{ji}} = (\frac{e^{l_i}}{1+e^{l_i}})(\frac{I_i}{X_{ji}}) \quad (6)$$

Thus logistic regression can be specified as follow.

$$\ln \frac{p_i}{1-p_i} = z_i = \beta_0 + \beta_1 gen + \beta_2 age + \beta_3 edu + \beta_4 dratio + \beta_5 lsiz + \beta_6 \log inc + \beta_7 div + \beta_8 dist + \beta_9 hlab + \beta_{10} ms + \beta_{11} pocc + \beta_{12} techap + \beta_{13} far \exp + \mu_i \quad (7)$$

Where gen, age, edu, dratio, lsiz, loginc, div, dist, hlab, ms, pocc, techap and farexp refer to dummy for gender, age of household head, dummy education , dependency ratio, land size, logarithm

income, diversification of product, distance from household head to village bank office, hired labor, marital status, primary occupation, technology applied and farming experience.

DATA SOURCES AND COLLECTION

A household survey was conducted using a structured questionnaire on individual. A total of two hundred (**200)** questionnaires were administered to household and was subdivided into four sections as follows: characteristics of smallholder farmers; Agricultural characteristics; savings mobilization indicators; credit indicator. Primary data was collected through interviews using face to face interviews with managers and staffs of village bank on membership. Secondary data and other relevant information was collected from bulletins, books, journals, publications from the North West University library, the Agricultural center library, and records from village banks.

RESULTS AND DISCUSSION

The data obtained from primary and secondary sources were analysed using descriptive and logistic regression method.

DESCRIPTIVE DATA ANALYSIS

Table 4.1 presents the distribution of the household heads across their gender. It shows that female respondents constituted the highest proportion of the participants with 61%, while most of the non-participants (59%) were males. This finding is in line with Babigumira, Angelsen, Buis, Bauch, Sunderland and Wunder (2014) who found that majority of members of community saving and investment promotion program were females. This may be due to the fact that females generally make greater responsibilities for agricultural production and enhanced economic contributions to family needs as the males abandon farming and migrate to seek for white collar jobs in the cities (Osondu, 2015)

Considering the educational level, results show that most village bank participants (74%) were educated as well as non-village banks participants (75%). In the context where most government

encourages education in rural area, it is common to see members of groups having at least a primary education. Literacy would enable the farmers to utilize effectively and efficiently whatever resources are available to them. As expected, higher education would enhance adoption of improved technology. This findings is in line with the study conducted by Ahmed, Ying, Bashir, Abid, Elahi and Iqbal (2012) who found that increased education of the farmers provide them with an advantage to access and use modern technology and subsequent increase in farming income.

Major sources of smallholder farmers' income came from farm income which represents 75% of total income of village banks members and only 57% of total income for non-village banks members. However, off farm income represented 22% of total income of non-village banks members and 17% of total income of village banks members. Spouses' contributions represented 21% of total income for non-village banks members and only 8% of total income for village banks members.

Table 1. Descriptive on sample characteristics of households

		Participants		**Non-participants**	
Qualitative dummy	**Categories**	**Number**	**Percentage**	**Number**	**Percentage**
Gender	Male	39	39	59	59
	Female	61	61	41	41
Education level	Educated	74	74	75	75
	No educated	26	26	25	25
Income	Spouse contribution	580800	8	1002000	21
	Off farm income	1251600	17	1050000	22
	Farm income	5711742	75	2669400	57

Source: Field survey data, 2016

The descriptive statistics results in table 2 show that, the average of farming experience was 8 years for non-village banks members, as compared to 6 years for members of village banks. This may be because village banks are targeting less experience farmers to accompanying them through their development strategy (Karlan, Ratan & Zinman, 2014)

Village bank participants and non-participants had on average almost the same size of land (3.64 ha) and (3.7 ha) respectively. This result is in agreement with the observation of Wiggins,

Kirsten and Llambi (2010) that most farmers in the rural area generally have small holdings and called smallholder farmers.

This household survey witnessed that the average distance covered by non-village bank member was 0.76 km compared to the average distance covered by village bank member which was 2.99 km. meanwhile; these findings contradict Babigumira *et al* (2014) that suggest distance from household house to association offices must be closer for members than non-members.

The average household size of non-participants was greater than those of participants. This can be due to the success of village bank to educate their members regarding family planning which is important in terms of financial management.

According to age distribution, results show that males and females who did not participate in village banks had an average age of 50 and 46 years older respectively than participants male and female(43 and 40 years respectively). This implies that most men and women who participate in village banks were economically active and could increase their chance to access financial services.

Table 2. Distribution of mean and standard deviation of continuous variables

		Participants		**Non-participants**	
Variables	**Variable description**	**100**		**100**	
		Mean	**Standard deviation**	**Mean**	**Standard deviation**
Farm exp	Farming experience	6.01	0.26	8.94	0.33
Size land	Size of the land	3.64	0.21	3.7	0.16
Dist off	Distance from office	2.99	0.13	0.76	0.09
H H size	Household size	3.63	0.16	4.64	0.14
Age	Male	43.12	1.38	50.25	1.30
	Female	40.45	1.11	46.68	1.49

Source: Field survey data, 2016

ANALYSIS OF FACTORS INFLUENCING SMALLHOLDER FARMERS TO PARTICIPATE IN VILLAGE BANKS USING THE LOGISTIC MODEL.

As evidenced from table 3, education level, size of the land and log income per capita positively and statistically affect the probability of households' participation in village banks in the study area. That means that, better years of schooling, higher size of the land, higher household per capita income and being in NMMDM increase the probability of smallholder farmers participation in village banks.

The marginal effects results are provided below in Table 3. The pseudo R-squared is found about 0.6487, meaning all the explanatory (independent) important variables included in the model do exactly explain 64% of the probability of households to participate in village banks. The overall model is proven as it's statistically significant at a p-value of 0.000. As reported in table 4, variables gender, education level, farming experience, land size, income per capita and distance from village bank office are significant at 1%, 5% and 10% probability level, despite their positive and negative signs of coefficient.

The marginal effect estimates of table 3 shows that holding other factors constant, being educated significantly increases the probability of participating in village bank by 9.84%. This is the same trend with participation which will increases by 7.33% if the size of the land increase by one hectare. The marginal effect of Log annual income per capita was 0.4633, meaning that there will be an increase of 46.33% in participation if income increases by one rand, other things remain constant.

The marginal effect of gender shows that being a male farmer reduces the probability of participating to village banks by 0.265.This finding is in line with that of Horioka and Terada-Hagiwara (2012) who found gender differentials as major predictors of farmers' participation in village bank. The marginal effect of farming experience is -0.070, meaning that there will be a decrease of 7.0% in participation if farmer experience increases by one year. This sign identity of farming experience do not make sense in general whereby farmers with more experience normally become more dedicated to the group as compare to young farmers. The more farmer grow in experience , the more they gain knowledge in the business, which limits risks and therefore becomes more productive as supported by Hori *et al*(2013) and also by Grande, Madsen and Borch (2011) who observe that experience from farming and farm premises often enabling firms to create, reconsider and apply their resources in more efficient ways.

The marginal effect of distance from household house to village bank office shows that there will be an increase of 44.44% in participation if distance increase by one kilometer. This is contrary to a priori expectation and theory which assume that the more household is close to the village banks office, the more farmers are willing to participate in village bank. In the study area, this contrary is not a problem as farmers were willing to go far to save as long they can be able to access credit.

Table 3: Logit regression coefficient of factors affecting participation in village banks by smallholders farmers

Variables	Estimated coefficient(B)	Odds ratio=exp^B	Standard error	P >|z|	Marginal effect
Gender	-1.0993*	0.3331	0.5815	0.059	-0.2659*
Marital status	-0.4759	0.6213	0.5834	0.415	-0.1174
Education	0.3977*	1.4883	0.2370	0.093	0.0984*
Dependency ratio	0.3408	1.4060	0.5607	0.543	0.0843
Main occupation	-0.8489	0.4278	0.6525	0.193	-0.2087
Farming Exp	-0.2853**	0.7517	0.1184	0.016	-0.0706**
Land size	0.2963*	1.3448	0.1700	0.081	0.0733*
diversification	-0.3399	0.7118	0.5405	0.529	-0.0839
Hired labour	0.1202	1.1277	0.5702	0.833	0.0296
Tech applied	0.6762	1.9663	0.5600	0.227	0.1635
Log AC	1.7553***	5.7851	0.5702	0.001	0.4633***
Office distance	1.7625***	5.8269	0.3245	0.000	0.4444***
Constant	-20.5978	0.000	6.2344	0.001	
Log likelihood	-48.698876				
Number of Obs	200				
LR chi2(12)	179.86				
Prob> chi2	0.0000				
Pseudo R2	0.6487				

Source: computed from field survey data 2016.Variables significant at 1%(***); Variables significant at 5%(**); variables significant at 10%(*)

CONCLUSIONS AND POLICY IMPLICATIONS

The results from the study revealed that variables gender, education level, farming experience, size of the land, log income per capita and distance from office of village bank affected significantly

smallholder farmer decision to join the village bank. But from these variables, only variables such as education level, land size , income per capita and distance from household house to village bank office were affecting positively farmers decision to participate in village bank, even though variable distance was contrary to the literature. Consequently, the null hypothesis that socio-economics, demographic do not influence a smallholder farmer decision to join a village bank was partially rejected.

POLICY IMPLICATIONS

Results from this study revealed that farmer experience was negative, yet significant. Therefore there is a need to provide expertise training to farmers so that they can get more experience in order to have a positive effect in participation. This training could be helpful to gain more expertise in their business by investing efficiently.

Promoting more women participation in village bank can have an indirect positive impact on effective production in the study area. Given the inverse gender participation relationship that result of the present study found, it is necessary to promote more women to village bank if the village bank initiative is to be productive and effective in the North West Province.

The results from this study found that the village bank initiative was within the proximity of farmers in which distance was not an issue. that despite the non-proportion of number of village banks established in the NMMDM , village banks still bring significant improvement in smallholder farmers expenditure and therefore the study recommends to create more community based village bank initiative in order to ensure that farmers are able to access easily and promote their farming initiative.

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