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## INFLUENCE OF FARMER CAPACITY BUILDING IN FINANCIAL MOBILISATION ON PERFORMANCE OF SMALLHOLDER IRRIGATION PROJECTS IN MIGORI COUNTY, KENYA.

<sup>1</sup>Leopold Othieno Asawo, <sup>2</sup>Ann Assey and <sup>3</sup>John Rugendo Chandi

<sup>1</sup>PhD Candidate, Department of Management Science and Project Planning, Faculty of Business and Management Sciences, University of Nairobi, Nairobi – Kenya - [asawoleo@gmail.com](mailto:asawoleo@gmail.com)

<sup>2</sup>Senior Lecturer, ODeL Campus, University of Nairobi, Nairobi - Kenya

<sup>3</sup>Lecturer, ODeL Campus, University of Nairobi, Nairobi - Kenya

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### Abstract

*Irrigation is increasingly being accepted as a precursor to food security, employment creation and economic development. Irrigation accounts for up to 40% of world food production (Asian Development Bank [ADB], 2015). The development of 7,800 hectares under irrigation in Lower Kuja Irrigation Project is an attempt by the National Irrigation Authority to address food insecurity, unemployment and socioeconomic conditions in Nyatike Sub-County, Migori County (GIBB Africa, 2011). While the decision to develop 7,800 hectares of land under irrigation is a noble idea that has potential to positively change the standard of living for citizens of Migori County, it's important to understand that besides construction of physical infrastructure, other critical factors can affect achievement of these objectives. Thus, the study sought to assess the influence of farmer capacity building in financial resource mobilisation on performance of smallholder irrigation projects in Migori County. The study framed the alternate hypothesis as H<sub>1</sub>: There is a significant relationship between farmer capacity building in financial resource mobilisation and performance of smallholder irrigation projects in Migori County. The study was based on Resource Based View Theory (1959) by Edith Penrose. The study views Resource Based View Theory as explaining the importance of resource mobilisation to an organisation's performance. The study adopted pragmatism as a philosophy, and used cross sectional and correlational research design. Using Krejcie and Morgan (1970) Tables, the study selected 341 respondents from a sampling frame listing 2,815 members in 15 smallholder irrigation projects of Lower Kuja Irrigation Project. The study used systematic random sampling to select the sample. Data collection was done using the questionnaire and classified using a 5-Point Likert Scale. Data was subsequently analysed using descriptive statistics (means and standard deviation) and inferential statistics (Pearson's regression analysis at p-value of 5% significance level). The study findings show that personal savings and assets (3.427) is the most preferred source of credit, while commercial banks (2.988) is the least preferred source. Further, the results show that  $r = .801$ ,  $r^2$*

*= .641, F [5, 331] = 118.405, F critical = [2.2413],  $p < 0.000 < 0.05$ . Hence, the study accepted the alternate hypothesis ( $H_1$ ), and concluded that personal savings and assets, agricultural cooperative societies, commercial banks, non-governmental organisations, and governmental organisations have significant influence on performance of smallholder irrigation projects in Migori County. Consequently, the study recommends that Migori County Government educate farmers in smallholder irrigation projects on loan facilities by different financial institutions. Further, the study recommends that the county develop a framework to assist smallholder irrigation projects to qualify for loans facilities operated by financial institutions. The study also recommends research on influence of financial resource mobilisation on performance of smallholder irrigation projects using longitudinal and experimental research design.*

**Keywords:** *Critical Factors, Financial Resource Mobilisation, Migori County, Resource Based View Theory, Smallholder Irrigation Projects.*

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## Introduction

It has been argued that irrigation holds the key to food security, employment creation and economic development. Irrigation produces forty and seventeen percent of food in the world, and in developing nations, respectively (Asian Development Bank [ADB], 2015). Siebert et al. (2005) state that the largest irrigated areas are found along Rivers Indus and Ganges in Northern India and Pakistan, respectively; Yangtaz, Huang He and Hai He Basins in China; Mississippi-Missouri River Basin in California USA; and River Nile in Sudan and Egypt. According to Lawal and Idris (2018), as the population of a nation grows, the population increasingly relies on agricultural land to meet food and financial needs. Therefore, Lawal and Idris state that enhanced efforts, including research into new technology, exploitation of irrigation and ground water exploration, and improvements on crop varieties and seeds, should be made to increase food output from existing and new agricultural land.

Besides construction of irrigation physical infrastructure, socioeconomic conditions of a project community can constrain a community from acquiring benefits of a

project initiative. Omoregbee et al., (2013) state that the inability by smallholder farmers to utilise project opportunities can be traced to socioeconomic factors Ofofu et al., (2014). Omoregbee et al. state that Africa has only developed 13% of its 42 million hectares irrigation potential due to systematic challenges. While Laube et al., (2012) relate poor performance of smallholder irrigation projects in Ghana to amongst other challenges, crop pests and disease, Mutambara and Munodawafa (2014) state that smallholder agriculture in Zimbabwe suffers lack of access to bank loans, and that only about 40 - 67% of smallholder farmers have access to fertilizers and pesticides, while only 17% have access to farm input loans. Likewise, Aditto et al., (2012) attribute the poor performance in smallholder irrigation in Sub-Saharan Africa (SSA) to its inability to address business and financial requirements in agriculture.

The ability to mobilise financial resource is a critical factor in successful farming. Dlamini et al., (2014) state that inability to access credit prevents smallholder farmers from commercialisation in agriculture. In addition, Agwu and Edun (2007) describe availability of credit to smallholder farmers as a precursor

to commercialisation in agriculture. Thus, Montaña et al., (2009) state that ignorance of socioeconomic dynamics contributes to failure in project performance. However, Food and Agricultural Organisation [FAO] (2008) advises that there are other forms of credit apart from financial credit. Thus, FAO (2008) recommends refocusing on other forms of credit, including personal savings, crop insurance, equipment leasing, and direct financial transfer programmes. In the study, farmer capacity building in financial resource mobilisation is an independent variable, and refers to personal savings and assets, agricultural cooperative societies, commercial banks, non-governmental and governmental organisations.

#### *Problem of Research*

Access to financial resource by farmers is considered important to utilisation of opportunities in smallholder irrigation. Salami et al. (2010) attribute poor performance in smallholder irrigation in SSA to amongst other factors, lack of finances. Similarly, Dlamini et al. (2014), and Mutambara and Munodawafa (2014) describe lack of access to credit as the main cause of poor performance of irrigation by smallholder farmers in Swaziland and Zimbabwe, respectively. Simpson et al. (2003) state that communities already over-stretched by daily financial needs are unable to contribute resources to project initiatives. Thus, socioeconomic factors have a substantial influence on the ability of farmers in smallholder irrigation to utilise development opportunities (Omogbee et al., 2013). Accordingly, Agwu and Edun (2007) advise that access to credit enables smallholder farmers to purchase farm inputs and to hire farm labour.

The irrigation potential in Migori County remains largely underutilised. Migori County has an irrigation potential of 16,500 hectares

that can be irrigated using water from Rivers Kuja and Migori to increase food production from 12,011 metric tons to 136,810 metric tons (GIBB Africa, 2011). However, despite this potential, Kenya National Bureau of Statistics [KNBS] (2018) describe Migori County as being 32% food insecure, twice the figures recorded in Nyeri and Meru Counties. In an attempt to reverse the food insecurity status in Migori County, the National Irrigation Authority (NIA) proposed construction of Lower Kuja Irrigation Project in Migori County, comprising 15 smallholder irrigation projects (GIBB Africa, 2011). Lower Kuja Irrigation Project was commissioned by NIA in 2015. However, to date, the project has only utilised about 400 hectares out of the intended 1,000 hectares under phase one of the project. Consequently, the study considered the inability by the smallholder irrigation projects under Lower Kuja Irrigation Projects in Migori County to satisfactorily utilise the developed acreage under irrigation as a problem that presents an area of interest for research.

#### *Literature Review and Research Focus*

Access to financial resource by project beneficiaries is considered by practitioners in project management as a contributing factor in project performance. According to Salami et al., (2009), smallholder farmers are constrained by limited access to credit, which causes them to cut down on food production. De Silva and Sandika (2012) state that demand and acquisition of credit and farmer training rises with increase in knowledge on management practices. Consequently, De Silva and Sandika conclude that credit, amongst other factors could considerably increase income of smallholder farmers. Likewise, Okello et al., (2014) argue that a large proportion of agricultural and food provision tasks are undertaken by women, who are constrained in access to agricultural credit due to lack of collateral. In agreement

with Okello et al., Sulo et al., (2012) add that inadequate access to credit facilities is one of the factors that limit women from adopting new technologies in agriculture. Sulo et al. also highlight the fact that women lack collateral to access credit. Similarly, Salami et al., (2010) conclude that dependence of smallholder farmers on personal savings for investment in agriculture limits opportunities for commercialisation. Salami et al. add that most farmers cannot benefit from commercial and national development banks or formal micro-credit institutions due to lack of collateral and/or poor credit history. Consequently, smallholder farmers are forced to rely on savings, relatives' remittances and informal money lenders to mobilise resources for farming, and while micro-finance institutions have devised innovative instruments to access millions of previously un-bankable clients, farmers in poorer rural areas and/or smallholder agricultural sectors whose livelihoods is characterised by seasonal investments, risks, and returns have largely not benefitted from these efforts (Salami et al., 2010).

Kenya has not been spared its share of challenges in financing of smallholder farmers. Describing access to bank credit by smallholder farmers in Kenya as a major challenge despite the fact that the country has a relatively well-developed banking system, Government of Kenya [GOK] (2010) states that besides the risks associated with agribusiness that makes use of land as collateral unattractive to the formal banking sector, corruption, political interference in operations of State-owned banks, and a dysfunctional court system in the past has given rise to a culture of defaulting leading to a high number of non-performing loans. Inevitably then, commercial banks have had to charge high interest rates to remain afloat (GOK, 2010). Further, financial institutions that were set up by the GOK to provide

agricultural credit to farmers at low interest rates have not performed as was expected. Stating that financial parastatals such as the Agricultural Finance Corporation that were established by the government soon after independence have largely been mismanaged and run down, (GOK, 2010) adds that these financial institutions are no longer important sources of finance for agriculture, and that farmers have resorted to seeking credit from cooperatives, NGOs and community-based lending institutions. High costs of bank credit has further driven smallholder farmers from banking halls, thus aggravating the lack of access to credit by smallholder farmers.

The focus of smallholder irrigation project has largely revolved around physical infrastructure at the expense of interventions in other critical factors such as access to financial resource. For instance, despite the development of 1,000 hectare for irrigation under phase one of Lower Kuja Irrigation Project in Migori County in 2015, the project is yet to register satisfactory performance. GIBB Africa (2011) listed the expected outcome of Lower Kuja Irrigation Project as including an annual crop production of 68,405 tons per farmer, increase in monthly farm incomes from Kenya shillings 1,600 to 57,700, and an injection of a net revenue of Kenya shillings 1.3 billion in the economy of Migori County. According to African Women's Studies Centre-University of Nairobi [AWSC-UON] (2014), despite its enormous irrigation potential, 34% of the population in Migori County experience chronic food insecurity. Food and Agricultural Organization [FAO] (2008) argue that despite the enormous funds dedicated to agriculture, rural agriculture continue to perform poorly, and add that there is little to show for the funds spent in smallholder agriculture. Thus, FAO advise on review of agricultural financing to include savings by farmers, crop insurance, money

transfer and equipment leasing arrangements. The study found that, whereas other researchers identify lack of finances as causing poor performance in smallholder irrigation projects, there is a gap in knowledge on how capacity building in financial resource mobilization influences performance of smallholder irrigation projects. Therefore, the study viewed financial resource mobilisation as a critical factor in performance of smallholder irrigation projects in Migori County.

### **Methodology of Research**

#### *General Background of Research Methodology*

The objective of the study was to examine the influence of farmer capacity building in financial resource mobilisation on performance of smallholder irrigation projects in Migori County, Kenya. The study hypothesis was framed in the form of an alternate hypothesis stating: H1: There is a significant relationship between farmer capacity building in financial resource mobilisation and performance of smallholder irrigation projects in Migori County, Kenya. In the study, financial resource mobilisation is an independent variable and refers to personal savings and assets, agricultural cooperative societies, commercial banks, non-governmental and governmental organisations. In the study, capacity building refers to inputs into project management that aim to improve the ability of smallholder irrigation projects to “produce, perform or achieve” their tasks and objectives effectively and efficiently in line with the objectives of Lower Kuja Project. Commercial banks listed in the study were Kenya Commercial Bank, Equity Bank, Cooperative Bank and ABSA. Non-governmental organisations listed in the study were CARE (K) and One Acre Fund, while governmental organisations listed in

the study were Uwezo Fund, Women Development Fund, Youth Fund and Agricultural Finance Corporation.

The study adopted pragmatism as a philosophy. Pragmatism enables use of mixed research approach in social and natural settings, without the restrictions that are inherent to either constructivism or positivism (Feilzer, 2009). The restrictions inherent to constructivism and positivism limit objectivity in social research (Morgan, 2014). Thus, Morgan argues that an individual’s perspective or tradition has influence on an individual’s view of life. The study adopted cross-sectional and correlational research design. Cross-sectional and correlational research design is cheaper compared to longitudinal and experimental design (Levin, 2006; Rindfleisch et al., 2008; Sekara, 2003), and is useful in defining relations between variables (Curtis et al., 2016). The study used Resource Based View (RBV) Theory (1959) by Edith Penrose to explain the importance of financial resource in performance of smallholder irrigated agriculture. RBV theory by Penrose views an organisation as a pool of resources. The theory considers resources of a firm as a fundamental predictor of a firm’s competitive advantage and performance. Whereas resources may be categorised in different ways, tangible resources are those that facilitate execution of business process, while intangible resources are ones that might result in competitive advantage by allowing organisations to incorporate unique and valuable practices (Ruivo, Oliveira, & Neto, 2015). As noted by Hitt, Carnes, and Xu (2016), RBV is based on two assumptions of resources; that resources are heterogeneously distributed across organizations; and non-transferability of productive resources from one organization to another without incurring cost. Thus, RBV holds that only an intangible resource that is valuable, rare, hard to imitate

and without strategically equivalent substitutes is critical in sustaining a firm's competitiveness (Ruivo, Oliveira, & Neto, 2015). RBV is relevant to the study as it notes that adequate financial resource ensures organisational performance. Thus, the study views the relationship between personal savings and assets, agricultural cooperative societies, commercial banks, non-governmental organisations and governmental organisations, and performance of smallholder irrigation projects as explainable by RBV. However, critics of the theory argue that it is not possible to test RBV due to lack of a methodology to measure intangible resources (Kozlenkova, Samaha, & Palmatier, 2014).

*Sample of Research*

The study used Krejcie and Morgan (1970) Tables to select a sample of 341 respondents from the population of 2,815 that comprised registered members in 15 smallholder irrigation projects operating under Lower Kuja Irrigation Project. The sampling frame encompassed 2,815 registered members in the 15 smallholder irrigation projects. Data collection lasted 5 days, comprising one day for briefing of farmers' leaders and recruitment of 15 research assistants, three days for administration of the questionnaire, and one day for debriefing of the leaders and research assistants.

*Research Instruments and Procedures*

The study used questionnaire as its research instrument. The questionnaire had three parts; an introduction, preliminaries, and research queries. The research instrument was piloted in Lower Sio Irrigation Project in Busia County. This is because of the similarities between Lower Kuja Irrigation Project and Lower Sio Irrigation Project in terms of the development approach that had been used by the NIA in establishing of the two projects, and also due to similarity in socio-economic characteristics of individuals in the two areas of two. The communities from both Lower Kuja Irrigation Project and Lower Sio Irrigation Project reside in the western region of Kenya, and both undertake fishing, livestock rearing and mostly subsistence agriculture.

Instrument validity was achieved through peer review and criticism by research supervisors (content validity), comparison of observed test scores with existing conditions (criterion validity) and correlation and differentiation of test scores (construct validity). Content, criterion and construct validity ensure instrument validity (Urbina, 2004).

Instrument reliability was achieved by use of Cronbach's alpha coefficient ( $\alpha$ ) given by Equation (1) below.

$$\alpha = \frac{n}{n - 1} \times \frac{S_t^2 - \sum (S_i^2)}{S_t^2} \dots\dots\dots \text{Equation (1)}$$

Where:

- $\alpha$  = Cronbach's coefficient alpha.
- n = number of items in the test.
- $S_t^2$  = variance of total scores in the test.
- $\sum (S_i^2)$  = sum of the variance of item scores.

Urbina (2004) describes Cronbach’s alpha ( $\alpha$ ) range as from 0-1.0 (where <0.5 is unacceptable; 0.5-0.6 is poor; 0.6-0.7 is questionable; 0.7-0.8 is acceptable; 0.8-0.9 is good; while >0.9 is excellent).

*Data Analysis*

The study classified data using of a 5-Point Likert Scale, where: <1.5 (strongly disagree),  $1.5 \leq 2.5$  (disagree),  $2.5 \leq 3.5$  (neutral),  $3.5 \leq 4.5$  (agree), and >4.5 (strongly agree).

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + \epsilon, \dots\dots\dots \text{Equation (2)}$$

Consequently, the data was analysed using descriptive statistics comprising central tendency (mean) and variability (standard deviation); and inferential statistics comprising linear regression analysis (Pearson's correlation analysis at 5% significance level). Pearson's correlation equation adopted the following form:

Where:

Y = performance of smallholder irrigation projects

a = Y intercept.

b<sub>1</sub>, b<sub>2</sub>, b<sub>3</sub>, b<sub>4</sub>, b<sub>5</sub> = regression coefficients.

$\epsilon$  = error term

The study conducted Analysis of variance (ANOVA) using least significant difference test at  $p = 0.05$ , and compared the means using SPSS computer package.

**Results of Research**

*Descriptive Statistics*

The participants were asked to give information on various aspects of project organisation. Tables 1-5 below present findings of the study.

**Table 1. Personal savings and assets**

	Mean	Std. Dev.
I am not aware of any organization that gives loans to farmers.	2.395	1.033
I have never received a loan from any organization for farming.	2.872	1.241
I have never applied for a loan from any organization for farming.	2.932	1.288
I only use my personal savings and assets for farming.	3.086	1.341
I prefer to use my personal savings and assets for farming.	3.427	1.160

**Table 2. Agricultural cooperative societies**

	Mean	Std. Dev.
I am a member of a cooperative society that gives loans to farmers.	1.825	0.674
I use loans from the cooperative society for farming.	1.792	0.630
Loan conditions by cooperative societies are easy to meet.	2.469	0.694
I repay loans from the cooperative society from sale of farm produce.	1.878	0.655
I prefer to use cooperative society loans for farming.	3.175	1.186

**Table 3. Commercial banks**

	Mean	Std. Dev.
I have an account with a commercial bank that gives loans to farmers.	1.825	0.674
I use loans from the commercial bank for farming.	1.792	0.630
Loan conditions by commercial banks are easy to meet.	2.469	0.694
I repay loans from the commercial bank from sale of farm produce.	1.864	0.597
I prefer to use commercial bank loans for farming.	2.988	1.261

**Table 4. Non-governmental organisations (NGOs)**

	Mean	Std. Dev.
I am a member of an NGO that gives loans to farmers.	1.994	0.852
I use loans from an NGO for farming.	1.991	0.836
Loan conditions by NGOs are easy to meet.	2.573	0.806
I repay loans from the NGO from sale of farm produce.	2.062	0.899
I prefer to use NGO loans for farming.	3.427	1.183



**Table 5. Governmental organisations (GOs)**

	Mean	Std. Dev.
I am a member of a GO that gives loans to farmers.	1.727	0.531
I use loans from the GO for farming.	1.766	0.513
Loan conditions by GOs are easy to meet.	2.380	0.639
I repay loans from the GO from sale of farm produce	1.816	0.465
I prefer to use GO loans for farming.	3.279	1.217

*Diagnostic Tests*

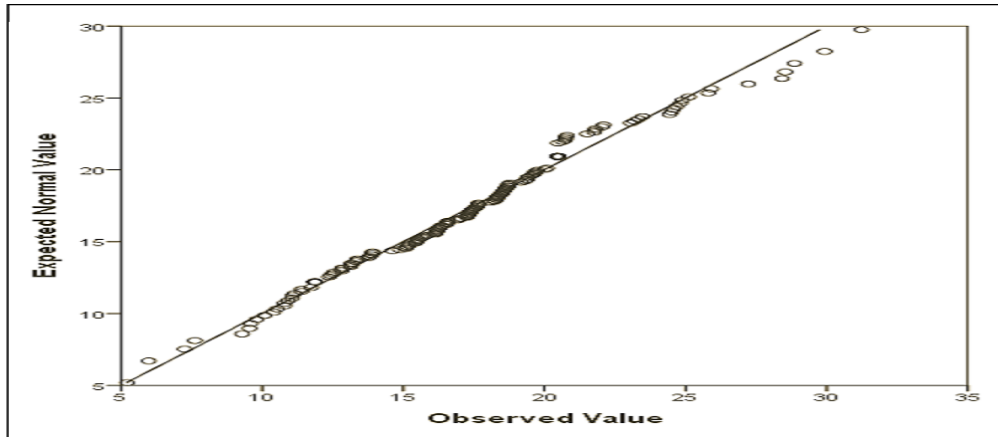
Diagnostic tests included test for normality, heteroscedasticity, autocorrelation and multicollinearity.

Kolmogorov Smirnov test and Shapiro Wilk test results, presented in Table 6, and Quantile-Quantile (Q-Q) plot, presented in Figure 1 were used to test for normality. Table 6 shows that *p*-value for project organisation is < 0.05, implying normally distributed data. Figure 1 shows that observed and expected normal values ley

along the 45<sup>0</sup> line, thus affirmed normality of the data set. According to Paul and Zhang (2009), Quantile-Quantile (Q-Q) plot enables resolution on normality of dependent and independent variables, and is useful when exploring data prior to calculation of correlation coefficients or fitting regression curves at early stages of analysis, and indicates aptness of a linear regression model.

**Table 6. Normality test (Kolmogorov-Smirnova, Shapiro-Wilk and Q-Q test)**

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Farmer capacity building in financial resource mobilisation	0.187	336	.009	0.912	336	.0004



**Figure 1: Normal Q-Q Plot for Performance of Smallholder Irrigation Projects**

Heteroscedasticity test results, presented in Table 7, was ensured by use of Levene test. Table 7 shows that *p*-value for

project organisation is  $< 0.05$ , implying no heteroscedasticity in the data set.

**Table 7. Heteroscedasticity test (Levene test)**

	Levene Statistic	Df1	Df2	Sig.
Farmer capacity building in financial resource mobilisation	3.081	1	335	.010
Performance of smallholder irrigation projects	2.817	1	335	.030

Autocorrelation test results, presented in Table 8, was determined using Durbin-Watson test. Table 8 gives test results value of 2.000, implying no autocorrelation. Morgan (1966) states that Durbin Watson

statistic value of 2 implies no autocorrelation, while 0 implies positive autocorrelation, and 4 implies negative autocorrelation.

**Table 8. Autocorrelation test (Durbin-Watson test)**

Model	Durbin-Watson
1	2.000a

Multicollinearity test results, presented in Table 9, determined using collinearity statistics, gives VIF for farmer capacity building in financial resource mobilisation as 1.077 and VIF for performance of

smallholder irrigation projects as 1.834. VIF values below 5 imply low multicollinearity (Keith, 2006).

**Table 9. Multicollinearity test (Collinearity statistics)**

Collinearity Statistics	Tolerance	VIF
Farmer capacity building in financial resource mobilisation	.729	1.077
Performance of smallholder irrigation projects	.408	1.834

*Inferential Statistics*

The study used Pearson’s regression analysis to test the following alternate hypothesis: H<sub>1</sub>: There is a significant relationship between farmer capacity building in financial resource

mobilisation and performance of smallholder irrigation projects in Migori County. Findings of the study are presented in Tables 10-12 below.

**Table 10. Model summary**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error
1	.801 <sup>a</sup>	.641	.636	.319

a. Predictors: (constant): personal savings and assets, agricultural cooperative societies, commercial banks, non-governmental organisations, and governmental organisations.

**Table 11. Analysis of variance (ANOVA)**

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	61.041	5	12.208	118.405	.000 <sup>b</sup>
	Residual	34.128	331	0.103		
	<b>Total</b>	<b>95.169</b>	<b>336</b>			

a. Predictors: (constant): personal savings and assets, agricultural cooperative societies, commercial banks, non-governmental organisations, and governmental organisations.  
 b. Dependent variable: performance of smallholder irrigation projects.

**Table 12. Regression Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.081	.102		10.598	.000
	Personal savings and assets	.678	.143	.772	4.741	.000
	Agricultural cooperative societies	.816	.105	.851	7.771	.000
	Commercial banks	.611	.147	.678	4.156	.000
	Non-governmental organisations	.719	.144	.814	4.993	.000
	Governmental organisations	.602	.145	.673	4.152	.000

## Discussion

### *Descriptive Statistics*

According to Tables 1 - 5, non-governmental organisations (3.427) and personal savings and assets (3.427) are the most preferred source of credit, followed by governmental organisations (3.279), agricultural cooperative societies (3.175), and lastly commercial banks (2.988). From the results, while farmers are aware of at least one financial institution, farmers were not keen to acquire loans from financial institutions, but preferred to depend on personal savings. However, while the results suggest favourable response towards governmental organisations and agricultural cooperative societies, commercial banks appear to be least favoured as a source of credit. Dlamini et al., (2014) state that smallholder farmers have low access to credit. Similarly, Ashraf et al., (2009) indicate that lack of access to credit has led to difficulties for farmers in meeting export standard requirements for European markets.

The study found that in addition to lack of information on financial institutions, there was misinformation and distrust regarding operations of commercial banks based on a belief that commercial banks would possess their farms if they failed to repay loans. This finding raises a question on why farmers would think that loan conditions by commercial banks are difficult to meet, yet they are not members of these institutions. No wonder then, respondents reported that they had not used loan facilities from commercial banks to farm. The results thus show that the importance of financial resource mobilisation has not been fully assimilated by smallholder irrigation projects in Migori County. It also emerged that the smallholder irrigation projects did not have a strategy for production resource mobilisation. Not surprising then, the comments by Omoregbee et al. (2013) that socio-economic factors influence the ability of farmers to use

opportunities in smallholder irrigation projects.

### *Inferential Statistics*

As provided by Table 10,  $r=0.801$ ,  $r^2 = 0.641$ , indicating that personal savings and assets, agricultural cooperative societies, commercial banks, non-governmental and governmental organisations have a strong influence on performance of smallholder irrigation projects; and explains 64.1% of variation in performance of smallholder irrigation projects. Likewise, Table 11 shows that  $p = 0.000$  (below 0.05) and that  $F_{\text{calculated}} = 118.405$  (above  $F_{\text{critical}}$ , [2.2413]). Hence, the regression model is significant in explaining influence of personal savings and assets, agricultural cooperative societies, commercial banks, non-governmental and governmental organisations on performance of smallholder irrigation projects. Machethe et al. (2004) and Dlamini et al. (2014) identify lack of credit as a major contributor to poor performance in the smallholder irrigation sector.

In addition, test of significance (Table 12) shows that personal savings and assets ( $\beta=0.678$ ,  $p =0.000$ ), agricultural cooperative societies ( $\beta=0.816$ ,  $p =0.000$ ), commercial banks ( $\beta=0.611$ ,  $p =0.000$ ), non-governmental organisations ( $\beta=0.719$ ,  $p =0.000$ ) and governmental organisations ( $\beta=0.602$ ,  $p =0.000$ ) are significant at  $p <0.05$  and 95% confidence level. This implies that financial resource mobilisation (personal savings and assets, agricultural cooperative societies, commercial banks, non-governmental and governmental organisations) has a significant influence on performance of smallholder irrigation projects in Migori County. Hence, the study accepted the alternate hypothesis ( $H_1$ ). Dlamini et al., (2014) argue that inaccessibility of credit inhibits commercialisation of smallholder irrigation.

### **Conclusion and Recommendations**

The study concluded that farmer capacity building in financial resource mobilisation has significant influence on performance of smallholder irrigation projects. The study also concluded that while farmers in smallholder irrigation projects in Migori County are aware of institutions that offer loan facilities, farmers have a more favourable opinion on loan facilities by non-governmental organisations, but are hesitant to engage with cooperative societies, commercial banks or government based organisations. This was strengthened by the fact that farmers are not members of any cooperative society, nor did farmers have an account with any commercial bank or governmental organisation, thus making it difficult for farmers to qualify for loan facilities by these institutions. Thus, the study recommends that Migori County Government develops a framework to educate smallholder irrigation projects in Migori County on benefits and demerits of using personal savings and assets, agricultural cooperatives society loans, commercial bank loans, non-governmental and governmental organisation loans. Further, the study recommends that the county government develop a framework to assist smallholder irrigation projects in the county qualify for financial resource through loan facilities provided by financial institutions. Further, the study recommends that the county government enlist services of organisations with experience in community credit to provide credit facilities to smallholder irrigation projects in the county. In addition, the study recommends use of longitudinal and experimental research design to examine influence of farmer capacity building in financial resource mobilisation on performance of smallholder irrigation projects in Migori County. This is because the study used cross-sectional and

correlational research design. This would provide additional data for use in comparison with that from the study

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