

Full Length Research Paper

Fostering collective action at landscape level: Success factors of smallholder innovation platforms in the Eastern Highlands of Kenya and Uganda

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Strong and vibrant smallholder groups provide opportunities to the community to play a role in rural development and benefit from it. However, most of those groups do not have the capacity to individually influence rural development. Bringing groups together facilitates access to combined knowledge and leverages complementary assets. This study identifies factors influencing the success of two smallholder innovation platforms in Embu and Kapchorwa. A five-level likert scale survey questionnaire was administered to 68 groups from the two platforms that had experienced significant development in their group's capacity as a result of these platforms. Principal component analysis was used to extract indicators defining dimensions used to measure the success of these platforms. Multiple regression analysis was used to fit the model of successful linkages. The results indicate that ownership, motivation and leaders commitment skills and motives play critical roles in the success and sustainability of smallholder innovation platforms.

Key words: Success factors, smallholder innovation platforms, collective action, rural development, East Africa.

INTRODUCTION

The success of any sustainable rural development initiative is determined largely by the local-level solutions derived from community involvement. This is because community members are cognizant of the processes that bind them into the challenges affecting them and therefore have possible solutions to addressing these challenges (Werhane et al., 2010). In order to address these challenges smallholders are in dire need of services that are lacking in their community. Smallholder groups have been in existence and have tried to come up with solutions to the numerous constraints which smallholders face.

The idea of smallholder groups and collective action continues to be advocated for by policy makers, donors

and practitioners as a valid rural development approach (Markelova and Mwangi, 2010; Bernard and Spielman, 2009; Toenniessen et al., 2008).

This is because they increase opportunities to access, manage and share resources. They help the actors involved to recognise connections between their individual issues. These groups are also an operative means that empower the smallholders and build their capacity to formulate and express the needs and concerns within their group to influential economic actors and policy makers.

Due to the imminent challenges that come along with the growing market demands, information and improved technology demands, smallholder groups, depending on the characteristics of their units, have demonstrated inability to individually solve these numerous constraints (Lourenzani and Silva, 2010). Associations between groups are emerging to ease access to resources which are beyond the capacities of individual smallholder groups.

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Such associations involve various actors with varying expectations, thereby acting as platforms that enable these actors intensify their production systems and adapt to continuous sudden changes in their environment which presupposes continuous innovation. For this study, we refer to these platforms as smallholder innovation platforms.

Nederlof et al. (2011) defines smallholder innovation platforms as associations of various actors brought together by their mutual interests to exchange knowledge and develop joint action which bring about positive change in their livelihoods, enterprises and/or other interests. The purpose of these platforms is usually to strengthen the involved actors through acquiring resources or providing services which the various actors are interested in, but which they cannot individually provide (Ahuja, 2000). Kirsten et al. (2009) describes some of these needs as; high cost of technologies, low inherent and declining soil fertility, unfavourable and poorly implemented policies, poor infrastructure, and unfair competition from open market operation. Smallholder innovation platforms play a critical role in articulating the needs of the various factors involved to improve their ability to respond effectively. These platforms provide a mechanism for negotiation and decision making in the delivery of strategic development plans and in the sharing of responsibilities for their implementation (Tanui et al., 2012). Through these platforms, smallholders connect generally with actors in socially, politically and economically influential positions (Woolcock and Sweetser, 2002). There are increasing evidences on how smallholder innovation platforms have attracted smallholders to participate in rural development more effectively (Markelova et al., 2009). Most of the evidences are based on increase in household income, access to higher value markets and therefore greater income for smallholder farmers, and even growth of market opportunities (Saigenji and Zeller, 2009; Winter et al., 2005).

Much has been written on the theory of smallholder innovation platforms that looks more broadly at their role not only in connecting and managing boundaries between multiple actors, but also in performing numerous functions in dynamic innovation processes (Kilelu et al., 2013; Nederlof et al., 2011; Hirvonen, 2009). Not much is known on how these platforms function and what they are capable of achieving (Critchley et al., 2006). There is need to broaden this understanding by identifying the factors that contribute to successful and effective functioning of these platforms. It is in this context that the paper seeks to examine the factors that enable smallholder innovation platforms to be successful and sustainable. In other words, it explores the attributes under which innovation platforms at community levels have succeeded through involving smallholders to be part of the rural development outcomes favourable to their setting. The paper is based on a case study of two

already existing smallholder innovation platforms in Kenya and Uganda. These platforms involve various smallholder groups with shared values of sustainability, local ownership and involvement, profitability, adaptability and volunteerism aimed at improving productivity and income of the smallholders.

The paper is organised as follows. Section 2 draws a conceptual framework that associates the factors being examined to provide an understanding of how these factors link with each other and the platform actors. This is followed by the case description and research design in section 3. We present the findings in section 4, followed by a discussion of the findings in section 5. We end with the conclusion in section 6, where we highlight the implications of the findings.

Conceptual framework

This study focused on seven factors otherwise known as dimensions, which conform to Ostrom (1990) design principles for collective action to sustain and (Stuckey et al., 1995) partnering options for second level organization, to determine how these smallholder platforms function in addressing their common needs. They provide a collated range of dimensions and indicators that platform actors can fulfil; we apply these dimensions to understand the operational structures of these innovation platforms. We start conceptually by hypothesizing that successful linkages between various platform actors is a function of the following dimensions; ownership, motivation, leaders commitments skills and motives, leadership processes, and financial stability. The measure of successful linkages is determined as an aggregation of two other dimensions; organizational growth and networking. Within our conceptual framework we look at smallholder innovation platforms according to their role of tending the smallholder groups engaged in the platform. The smallholder innovation platform has intermediary actors who provide access to information resources, contact, technical assessment and financing to the smallholder groups. These intermediary actors fall into three broad categories; government agencies, research agencies and development agencies. Integrating these insights we construct an analytical framework presented in Figure 1 to unravel the success factors of smallholder innovation platforms.

The framework places the dimensions as the arena that describes the operational structure of these platforms, with the platform actors around these dimensions. We apply the analytical framework to answer the main objective of this paper.

Case Description and Research Design

Description of the innovation Platforms

The study was conducted on two already existing small-

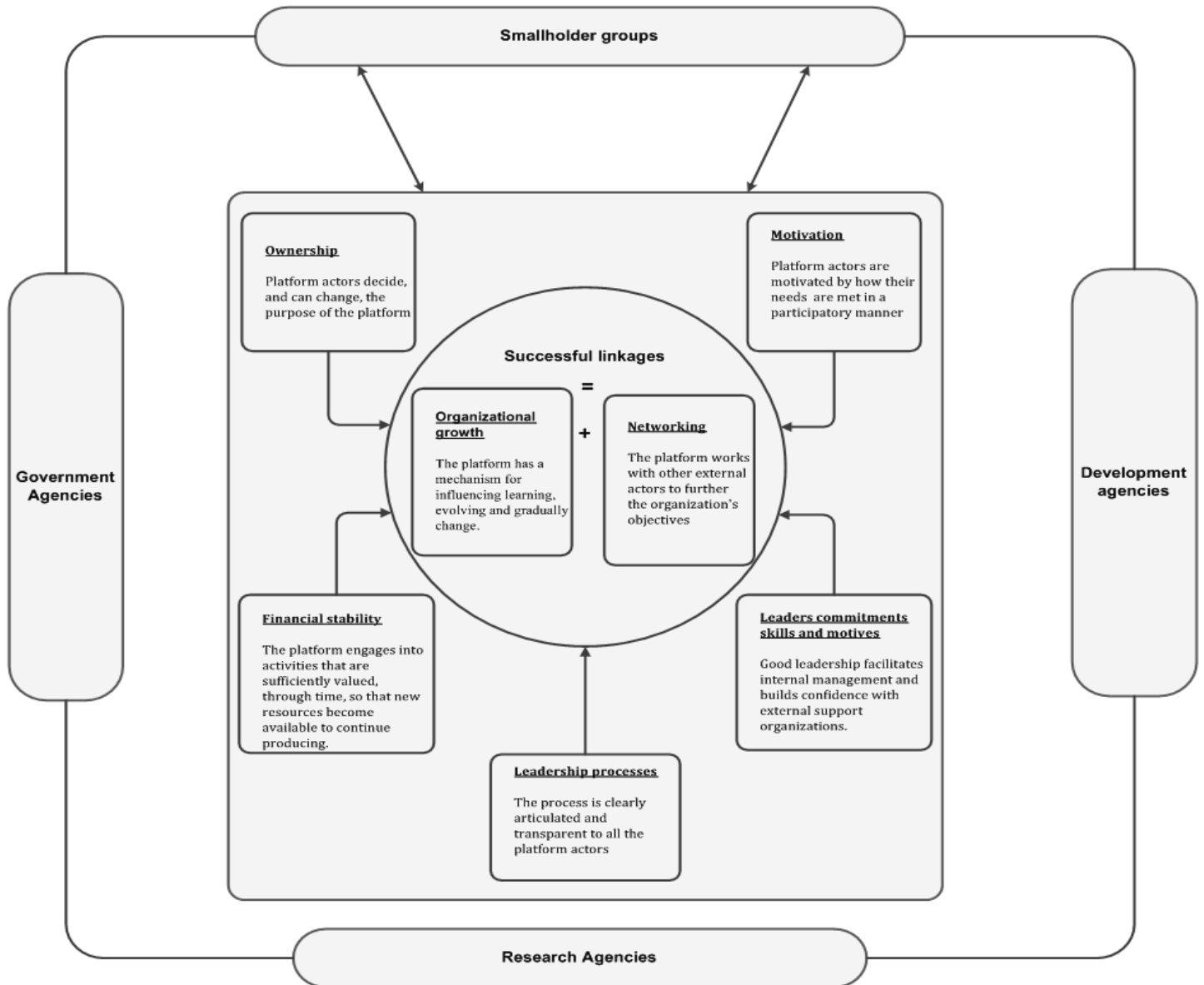


Figure 1. Analytical framework for the analysis of success factors of smallholder innovation platforms. Source: Own elaboration based on Ostrom, 1990; Stuckey, 1995.

holder innovation platforms in two sites; Embu County situated on the eastern highlands of Kenya and Kapchorwa District situated on the eastern highlands of Uganda. These two platforms provide an institutional structure which thrives in achieving sustainable conservation practices that benefit the smallholders through sufficient production and improved livelihoods.

Embu County in Eastern Kenya occupies a total area of 708 Km². It is along the slopes of Mt. Kenya forest which covers an estimated 230 Km². The rest of the area is under subsistence agriculture with agro forestry being widely practiced in many parts as a means of soil and water conservation to ensure sustainable land use. The predominant land use system in Embu is natural forest, tea and coffee in the upper midland zones, mixed small-

scale cultivation of food crops, dairy cattle rearing as well as semi-extensive livestock production in the midland and lower zones. Kapingazi river catchment with an area of 61.23 Km² is part of the larger upper Tana River Catchment. It originates from Irangi forest (Gaciigi) downstream to Ngomano where it drains into river Rupingazi at the lower parts of Embu Town. Kapingazi river catchment area has a riparian platform comprising of diverse smallholder groups who benefit from the river. The platform was formed in 2004 as a sponsored initiative by the International Fund for Agricultural Development (IFAD) through the Mount Kenya East Pilot Project on Natural Resource Management (MKEPP). The main aim of the platform is to promote environmental conservation and improved agricultural practices through

training and support to the smallholder groups within the catchment area.

Kapchorwa District in Eastern Uganda is approximately 65 kilometres northeast of Mbale, the nearest large city. Subsistence agriculture is the main economic activity with millet, potatoes, beans, bananas, and onions as the major crops. Animal husbandry is also practiced; the livestock domesticated are mainly cattle, goats and chicken. In Kapchorwa District, an indigenous platform of smallholder groups was formed in 2003 with a shared vision for integrated Natural Resource Management (INRM) - the Kapchorwa District Landcare Chapter (KADLACC). The formation of KADLACC was a culmination of three years of collective action and collaborative effort between farmer groups, Non-Governmental Organizations (NGOs), local government, research and conservation organizations, and individual community members. KADLACC, therefore, is a district level platform of smallholder groups for linking livelihoods and conservation through strategies for increased access, control and stewardship of the elements of production among community members.

Study Design and data Collection

The study engaged groups within the platforms undertaking a variety of activities collectively, which are broadly categorised as; livestock production groups, crop production groups, financial groups, conservation groups and commodity groups. Selection of the small holder groups was done through a stratified random sampling procedure. Groups were stratified based on typology with consideration on mixed groups and women groups. A list of 159 groups; 84 from Embu and 75 from Kapchorwa - was used to determine the sample size and select groups that participated in the survey. A sample size of 68 groups was determined. Using the random number generator, 68 groups were randomly selected—36 from Embu and 32 from Kapchorwa. Number of groups based on typology was determined proportionately from each site. Out of the 36 groups from Embu, eight were women groups and 28 were mixed groups. Of the 32 sampled groups from Kapchorwa, 16 were women groups and 16 were mixed groups. A questionnaire survey was verbally administered to nominated participants who came together and represented each group. The number of interviewees was three representatives per group and included two officials and one ordinary member. For this study, seven dimensions which conform to: Ostrom (1990) design principles for collective action to sustain; and Stuckey et al. (1995) partnering options for second level organization were used. Each dimension was explained by six indicators which were assessed through a five-ordinal level likert rating scale with the following description; 1 – totally disagree, 2 – disagree, 3 – not sure, 4 – agree, and 5 – totally agree. The five

independent dimensions used to model the success of the platform were; ownership, motivation, financial stability, leaders' commitments, skills and motives, and leadership processes. Successful linkage, the dependent variable, was measured using two other dimensions; organizational growth and networking.

Data Analysis

The statistical process of analysing the likert scale data involved: Unidimensionality analysis; Principal component analysis; Reliability analysis; Weighting of the dimensional scores; Multiple regression analysis.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were used to determine unidimensionality and to maximise the confidence that the resulting indicators were valid for factor analysis (DeVasu, 2002). The KMO statistic indicated the proportion of defined variance of the dimensions by the underlying indicators; high values (between 0.5 and 1.0) implied that factor analysis was useful with the data (Kaiser, 1974). Bartlett's test of sphericity statistic tested the hypothesis that the correlation matrix was an identity matrix, which would imply that indicators were unrelated and therefore unsuitable for structure detection. Small values (less than 0.05) implied that factor analysis was useful with the data (Bartlett, 1950).

Principal component analysis was done to reduce the number of indicators in each dimension into a set of significant ones. Indicators were retained by evaluating their construct validity and examining their structure or relationships within each dimension. The process of extraction was based on the four key concepts of factor analysis which were: Communalities; Pattern of factor loading; Explained variance; Factor rotation. The test for reliability was done using the Cronbach's alpha criterion. Each dimension with an alpha statistic greater than or equal to 0.6 reflected internal consistency of the indicators combined in the dimension. The operating assumption was that if a set of indicators measured the same dimension, then the responses to these indicators were correlated beyond the possible random error or systematic error (Kidder and Charles, 1986).

The rationale behind weighting the scores was to moderate the problem of combining scores that are not equivalent. To ensure the contribution of each indicator was equivalent, the scores were multiplied by their respective factor loading value.

The weighted values for the dimensions were then obtained by summing the weighted indicator values for each dimension. For this study, there were seven dimensions; therefore each weighted dimension score was calculated as follows:

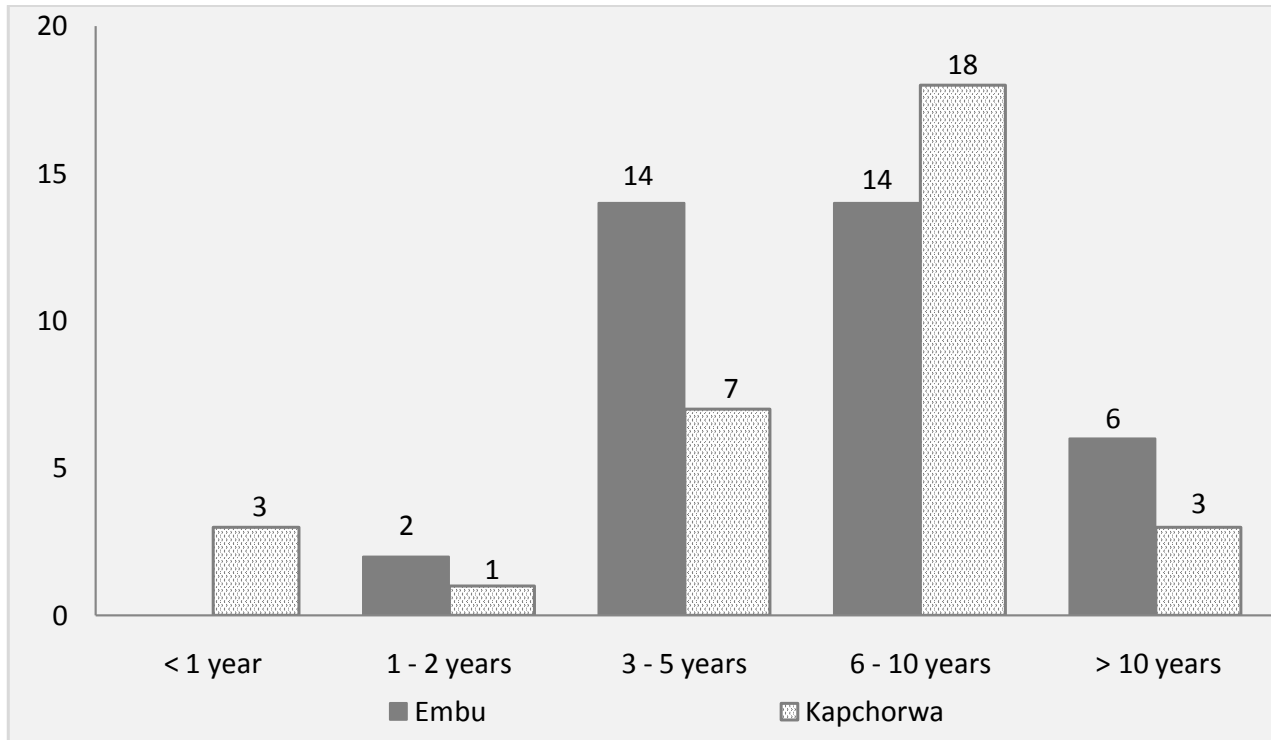


Figure 2. Number of years the groups within the platforms existed.

$$V_i = S_i * F_i$$

$$DS_j = \sum_i^6 V_i$$

Where:

V_i = Weighted score for i^{th} indicator

S_i = Score of i^{th} indicator

F_i = Factor loading of i^{th} indicator

DS_j = j^{th} dimension score

j = Dimension, $j = 1, 2, \dots, 7$

Multiple regression analysis was used to test the effects of the independent dimensions on the single dependent variable. Stepwise regression approach was used to find the most tight-fisted set of predictors that were most effective in predicting the dependent variable. The expression of the fitted model was as follows:

$$\hat{Y} = b_0 + b_1x_1 + b_2x_2 + \dots + b_5x_5$$

Where:

\hat{Y} = the dependent variable (Successful linkages)

x = the independent dimensions (Predictors)

b = the coefficient estimates

Findings

Groups characterisation

On average, the 68 groups reportedly existed for seven years (range: <1 - 13 years) at the time of interview, with

most groups existing between 6 - 10 years. These groups varied in number of activities they were involved in collectively, these included; single activity (37%) – only one activity, dual activities (34%) – two activities and multiple activities (29%) – at least three activities. Figure 2 displays the number of years the groups had been in existence in each of the platforms. From the figure it is evident that the two platforms have experienced significant growth over the years with at least 27 new groups (11 groups for Kapchorwa, 16 groups for Embu) formed after the platforms was established.

Looking at the functionality and number of activities carried out within the platform (Figure 3), groups that carried out one activity collectively focused more on livestock production (36%) and environmental conservation (28%). Of groups on dual activity, 30 per cent had environmental conservation as one of their group activities. For the groups that carried out multiple activities, 29 per cent had environmental conservation as one of their activities.

Dimension Characteristics

Ten indicators from the five independent dimensions that were extracted from factor analysis and which were common for both sites were selected. From a t-test analysis, these indicators were found to be significantly different for the two sites. Table 1 shows the indicators and their mean values for their respective sites. From table 1

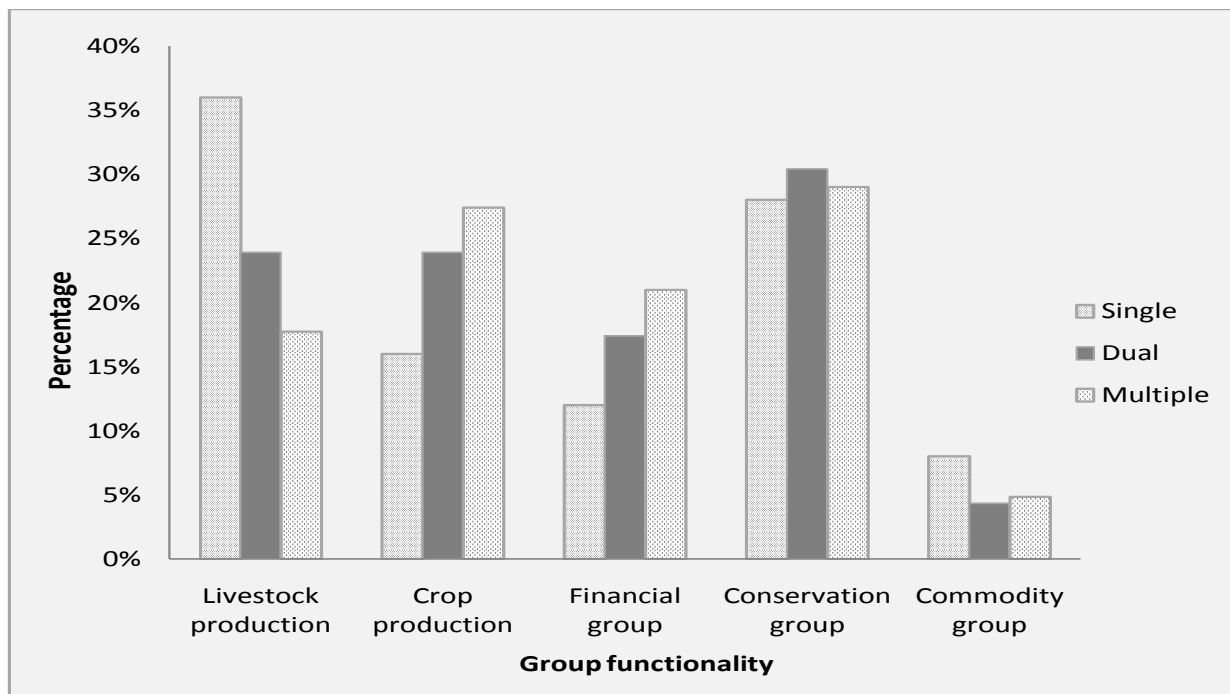


Figure 3. Percentage of groups based on functionality and number of activities.

Table 1. Mean values of the significant indicators for the two platforms.

Dimensions	Indicators code and description	Mean values per site	
		Kapchorwa	Embu
Ownership	O3 - Represents common interests of the groups involved	3.42	2.62
	O5 - Develop a circle of mutual support	3.48	3.15
	O6 - Supports and facilitates planning processes	3.38	3.06
Motivation	M3 - Carries out functions in defense of interests of involved actors.	3.66	2.73
	M4 - Responds to real and felt needs of the actors.	3.61	3.04
Financial stability	F1 - Maintains records and accounts	3.67	2.99
	F2 - Enhances transparency to its member organizations	3.88	3.21
Leaders commitment and motives	LM2 - Leaders represent the collective interests of the actors	3.89	3.25
	LM5 - The platform ensures workload is distributed adequately amongst the leaders	3.95	2.80
Leadership processes	LP4 - Democratic and participatory leadership selection	3.75	2.64

it is evident that Kapchorwa platform had potentially higher levels of success as compared to the Embu platform.

Statistical tests

The KMO measure of sampling adequacy and Bartlett's

Table 2. Estimated values of the variables fitted in the model using the stepwise approach

Model	Unstandardised Coefficients		Standardised Coefficients		Sig.
	B	Std. Error	Beta	T	
Motivation	0.84	0.15	0.39	5.61	<0.001
Ownership	0.48	0.04	0.31	11.19	<0.001
Leaders commitment, skills and motives	0.63	0.13	0.33	4.83	<0.001

test of sphericity indicated that factor analysis was useful with the data that was collected. The KMO statistic was greater than 0.5 and the Bartlett's test of sphericity was significant (p value < 0.05) for all the dimensions in both sites. The cumulative variance gave the percentage of explained variation of each dimension per site. The lowest percentage was 60.28% which was greater than 60% therefore considered an adequate percentage of the explained variation. The Cronbach's alpha value displayed values greater than 0.6 for all the dimensions in both sites. The trend of alpha when items were deleted was decreasing for most of the variables.

Regression analysis of the dimensions

Test for normality of the dependent variable showed that the variable was normally distributed (Shapiro-Wilk = 0.27). Test for linearity displayed that the correlation was significant (Sig. (2 tailed) < 0.001) which implied a significant linear relationship between the dependent variable and independent dimensions that were tested. Standardised residual values (Minimum=-2.60, Maximum=1.84) indicated there were no outliers in the data. In testing for the assumptions of independence of errors, Durbin Watson statistic = 1.77 confirmed that there was no serial correlation among residuals. Collinearity diagnostics for the excluded dimensions showed that the minimum tolerance values for all the excluded independent variables were greater than 0.10, therefore multi collinearity was not a problem.

The five independent dimensions were fitted in the model using the Stepwise approach. The constant was not significant; not including it in the model raised the value of R^2 . The p -value for ANOVA (p < 0.001) indicated that the combined effect of the independent variables was significant. From stepwise approach (Table 2), three independent dimensions were significant (p -value < 0.001); motivation, ownership, and leaders commitment skills and motives.

The overall relationship between the dependent variable and the independent dimensions ($|r| = 0.99$; $r^2 =$

0.99; p -value < 0.001) indicated that there was a significant correlation and the regression line fitted the model well. The following model was fitted:

$$\text{Successful linkages} = 0.84 * \text{Motivation} + 0.48 * \text{Ownership} + 0.63 * \text{Leaders commitment skills and motives}$$

DISCUSSION

Overall, three factors indicated significant influence to the success and sustainability of the two smallholder platforms: Motivation; Ownership; Leaders commitments, motives and skills. Fafchamps (2005) explains that the involvement of the smallholder groups into organizational activities enhances the overall economic growth that they experience. According to Amudavi(2003), platforms provide strong leverage for improvement in organizational performances. Samii et al. (2002) consider these platforms as instruments for accelerating organizational learning and coordinating the member groups involved.

Groups felt that they owned their networks because they were fully involved in implementing the network activities. The platforms enabled the smallholders learn and practice integrated natural resource management activities which included; digging of trenches, planting of trees along the river banks, digging of wells, intercropping multi-purpose tree species with their crops on farm amongst other activities. It is known that platforms enhance broader knowledge sharing that ensures that all involved member organizations get equal opportunities to be better informed about possible options and choices (Halseth and Ryser, 2007).

Another reason for the confidence in their platform was that the platform committee members linked with other stakeholders from outside their platform who trained the groups on new technologies. The groups also linked and interacted with other groups during workshops, trainings and seminars, where they learned from one another. During exhibitions and field days groups were able to display their products to other groups as well as getting to see what other groups do as they learn from each other.

Amudavi (2003) explains that such interactions encompass more collaborative relations between external actors and smallholders as well as new forms of interaction and learning.

The groups felt that their platforms have been successful and sustainable because of the leaders that they have in their groups. Most groups indicated that their leaders were committed in supporting them to achieve their group objectives. Some of the support included training the group members on what they had been trained during the seminars and doing follow up to ensure that their members were practicing what they have been taught the right way. The leaders were considered to be having sincere motives towards their individual groups as well as the network goals; they ensured frequent meetings to update groups on the progress of the network activities and they mobilised groups so that they could develop their groups work plans which would help in prioritizing network activities for the year. Groups also mentioned that their leaders in the network were skilled and had knowledge on group dynamics, conflict resolution, leadership skills, as well as group formation.

Looking at leadership processes over the years, most groups indicated that they do have constitutions that govern leader's selection. However, because the positions are voluntary and extremely involving they always re-elected the same leaders they had been having in office for more than the terms they were supposed to serve. This could be attributed to the fact that most of the trainings that these platforms had received were offered to the group leaders because most of them are literate and had so much experience in practicing most of the platform activities. The smallholder groups were not very much concerned on the leadership processes but more concerned on their leaders' commitments, skills and motives towards the platform. McDonald and Warburton (2003) attribute these to trust among members to conduct collaborative activities and reliable knowledge sharing between the member groups. From the study, groups mentioned that even though they received support from their platform, the financial support they got at times was not enough for them to achieve their individual groups' objectives, but did not deny them from carrying out p activities collectively. Asthana et al. (2002) explains that collaborations are easy to maintain so long as there are sufficient human resources and clearly defined common goals. Interviewees gave testimonials to the value of grassroots microfinance in helping them better manage money, extend loans and diversify their livelihoods.

CONCLUSIONS

This paper has shown that smallholder innovation platforms are useful for engaging smallholder groups into rural

development initiatives. This is made possible by ensuring the engagement and effective participation of the various actors within the platforms. The interest of the platform actors is sustained because of the operational structure and arrangement of the platform which ensures that all actors involved have a contribution to make and an obvious benefit to derive from the activities in the platform. The model derived in this paper gives an idea on what dimensions are considered critical for successful smallholder innovation platforms. Through these platforms, smallholder groups were able to share resources, invest in available opportunities, share information and access external support among other advantages. Building on this approach it is possible to create and strengthen smallholder innovation platforms of various typologies and functionality. The findings of this study are important for policy makers and practitioners working under rural development initiatives in transforming their approaches and operations that provide mutual benefits to a wide range of platform actors.

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