The sub Saharan Journal of Social Sciences and Humanities (SJSSH)
ISSN: 2619-8894 (Online), 2619- 8851 (Print)

Influence of Institutions on Lead Farmers' Performance in Projects Applying the Rural Initiatives for Participatory Agricultural Transformation (RIPAT) Approach

[1] *Dominic E. Ringo and Justin K. Urassa[2]*

[1] Research, Community and Organizational Development Associates (RECODA), Nanenane Themi Ground – Njiro, Arusha - Tanzania. Email: ed@recoda.or.tz
[2]Sokoine University of Agriculture, Department of Policy Planning and Management. Email: urassa@sua.ac.tz

Received: September 13, 2022; **Accepted:** November 28, 2022; **Published:** June 28, 2023

Abstract: *The use of lead farmers (LFs) in facilitating the uptake of agricultural technologies has been recognized as among the solutions to the declining capacity of government agricultural extension services. However, the performance of LFs during and after the project depends very much on the institutional eco-system in place. This paper examines how various institutions influence the performance of LFs. Using a cross-sectional research design, a sample of 384 farmers was selected randomly from a population of 1800 farmers in Karatu and Singida districts. Data were collected through a questionnaire, focus group discussion and key informant interviews. Qualitative data were analysed through content analysis and SPSS was used for quantitative data. The findings show eleven institutions, grouped into four categories, to influence the performance of LFs. The categories are local government authority, research institutions, non-governmental organizations and the community. Based on the Friedman test, perceptions of the respondents regarding the importance of institutions in enhancing the performance of LFs showed significant differences (p = 0.000). Also, comparisons among the institutions showed a significant difference (p = 0.00) except that there was no significant difference (p = 0.104) between Ward Development Committees and Village Assemblies. It is concluded that institutions do influence the performance of LFs through creating a conducive environment and providing moral incentives for the LFs to execute their roles during and beyond the project life, thus, enabling them to act as community change agents and social entrepreneurs. Based on the good performance of LFs in ensuring uptake of technologies by fellow farmers, and the enhancing role played by institutions, it is recommended that LFs and farmer groups as an institution should be integrated into the government extension system.*

Keywords: *Institutions, lead farmers, farmer performance, agricultural technologies, RIPAT approach*

1. Background Information

Increasing agricultural productivity is a key to economic growth for many developing countries, especially in Sub-Saharan Africa (SSA). In SSA, agriculture contributes quite substantially to employment, Gross Domestic Product (GDP), export earnings and food security (AGRA, 2014; Larsen and Lilleø, 2014). However, low agricultural productivity has been an endemic problem due to, among other reasons, the underperformance of public extension services in offering technical agricultural advice to farmers and assuring them of the necessary inputs and services. To address these limitations, community-based extension approaches have become important in filling the gap by making use of the farmer-to-farmer extension (F2FE) approach (Lukuyu *et al.*, 2012). The approach employs lead farmers (LFs) in the facilitation of project activities including uptake of agricultural technologies.

The study on which this paper is based was inspired by the definition of LFs adopted under the RIPAT approach, that is, LFs are people who have developed social entrepreneurship as agents for change and are among more successful farmers among project participants (Vesterager *et al.*, 2017). The common definition is by Scarborough *et al.* (1997), that LFs are those individual farmers who have been selected by other farmers to perform technology-specific farmer-to-farmer extension (F2FE) after being trained in the use of the technology in question. In simple terms, Karuhanga *et al.* (2012) define LFs as selected farmers trained by experts who, in turn, share their knowledge and skills with other farmers in the community. The effectiveness of LFs in responding to the extension service delivery needs is based on the voluntary adoption and expansion of their services to various organizations in the absence of any direct external promotion (Simpson *et al.*, 2015). Projects applying the Rural Initiatives for Participatory Agricultural

Transformation (RIPAT) approach have been using LFs in the implementation of improved agricultural technologies aiming at the development of small-scale farmers.

Among the roles played by LFs is self-adoption of the technology in question which makes them become role models, teachers and trainers of other farmers, facilitators of adoption and monitors of the same (Vesterager *et al.*, 2017). LFs as agents of change tend to narrow the farmer-extension ratio and facilitate the uptake of technologies at reduced costs since they are from within the community and work as volunteers with no salaries or allowances. Feder *et al.* (2004) maintain that farmers learn best from fellow farmers implying that LFs sometimes facilitate better project activities compared to public extension officers. From the definitions of LFs, their roles are expected to go beyond simple message delivery to making them principal agents of change in their communities (Lukuyu *et al.*, 2012) and social entrepreneurs (Vesterager *et al.*, 2017). According to Thompson *et al.* (2000), social entrepreneurs are people who can realize where there is an opportunity to satisfy some unmet needs that the welfare state will not or cannot meet, and who gather together the necessary resources and use them to make a difference. Therefore, LFs as agents of change and social entrepreneurs are expected to perform their roles beyond the project lifespan.

The performance of LFs and the sustainability of their roles beyond the projects' lifespan are affected by several factors varying from socio-economic, institutional and personality traits. Institutions are among the key aspects in the development and sustainability of community development efforts. This is because institutions influence the actors' behaviour so, they are very important in ensuring the performance of LFs during and after the project lifespan. Huntington (2015) defines institutions as stable, valued, recurring patterns of behaviour. That is, institutions are mechanisms which govern the behaviour of a set of individuals within a given community. According to Hindriks and Guala (2014), an institution refers to integrated systems of rules that structure social interactions. According to Vatn (2005), institutions influence individuals and their motivations thus, they can influence the performance of LFs as well. The study is inspired by the definition of institution put forward by Haro-Marti *et al.* (2013) that, institutions are rules and procedures that are created, communicated, and enforced through channels widely accepted as official. Specifically, the study combines the definitions from various scholars thereby considering an institution as a social structure with a purpose in which people cooperate and influence their behaviour and because it has rules and can enforce them, institutions influence the way people live. Institutions can be either informal (customs or behaviour patterns important to society) or formal (institutions created by entities such as the government and public services).

The study considers institution and organization as closely associated terms and sometimes inseparable. This is consistent with the observation by North (1990) that if institutions are the rules of the game, organizations are the players who play the game according to the rules. In the same vein, Uphoff and Buck (2006) contend that, although rural institutions can represent diverse patterns of behaviour, they can also function as organizations or structures of recognized and accepted roles that serve a purpose. According to Wang and Yang (2021), institutions shape leadership performance through their organizational culture, resources, governance structures, training, and ethical frameworks.

The study was guided by the institutional theory which generally considers the processes by which structures, including schemes (a structured framework or plan-outline), rules, norms, and routines become established as authoritative guidelines for social behaviour. According to Scott (2008), institutional theory is a widely accepted theoretical posture that emphasizes rational myths, isomorphism and legitimacy. Scott (1995) further indicates that to survive, organizations must conform to the rules and belief systems prevailing in the environment. Scott and Meyer (1983) emphasize that institutional theory seeks to explain the elaboration of rules and requirements to which organizations must conform if they are to receive support and legitimacy.

While it is known that institutions influence human actions, it is not yet known clearly how exactly they influence LFs' actions and, hence, their performance. Therefore, the study on which the manuscript is based endeavoured to answer three research questions: 1) Which institutions facilitate the performance of LFs, 2) What is the contribution of the institutions on the performance of LFs i.e., how the institutions influence the performance of LFs, and 3) What is the effect of collaboration (interplay) among the institutions in facilitating the performance of LFs.

2.0 Methodology

2.1 Study Area

The study was conducted in Karatu and Singida Districts in Arusha and Singida Regions respectively (Fig. 1). Geographically, Singida and Karatu are found in the central and northern parts of Tanzania, respectively. Karatu District experiences varied climatic conditions whereby in the Eyasi Basin, the annual rainfall is between 300 and 400 mm, while it ranges between 900 and 1,000 mm per year in Karatu Town. Karatu has three agro-ecological zones namely: uplands, midlands and lowlands, with altitudes ranging from 1,000 to 1,900m above sea level (KDC, 2001; Meindertsma and Kessler, 1997). The principal crops grown in the highlands include wheat, barley, beans, maize, coffee, flowers, pigeon peas, sorghum, finger millet and sunflower while in the midlands and lowlands the main crops grown are

maize, beans, pigeon peas, sorghum, millet and sunflower (URT, n. d.). Onion is a common irrigated crop in the lowlands of Lake Eyasi, especially in Mang'ola Ward.

According to URT (2013), the climatic condition of Singida District is generally semi-arid with an average annual rainfall of about 590 mm ranging from 350 mm to 750 mm per year. The district's land physical features are dominated by lowlands and plains with some highlands of plateaus. The principal crops grown include maize, sunflower, groundnuts, sorghum, millets, onions and sweet potatoes. Both districts were faced with a shortage of extension officers (URT, 2013 and URT, n.d.).

The selection of the study areas (Fig. 1) was based on the fact that the projects applying the RIPAT approach have been implemented in the two districts for four years, where the contribution of LFs to the projects can be assessed (Lilleør and Sørensen, 2013). Normally, projects applying the RIPAT approach last for 2 to 4 years. The project in Karatu (Endabash division) started in 2008 and ended in 2012, while that in Singida (Ilongero division) started in 2012 and ended in 2015.

2.2 Research Design, Sampling and Sample Size

The study adopted a cross-sectional research design which has been recommended by several scholars, such as (Babbie, 1990; Bailey, 1998; and Delice, 2010) due to its cost and time effectiveness in data collection. The design entails the collection of data on more than one case at a single point in time. Through the design, one collects a body of quantitative and qualitative data on two or more variables which can then be examined to detect patterns of association (Bryman, 2012). According to Babbie (1990), the design is also useful for descriptive purposes as well as for the determination of relationships between variables at the time of the study. Moreover, the design allows the use of other methods of data collection such as observation and the use of official records.

The study population (N) included the 1800 households that had benefited from the RIPAT projects in Karatu and Singida Districts. The sample size (n) was 384 households; the number was determined using Cochran's formula (Cochran, 1977; cited by Bartlett *et al.*2001) whereby:

$$n = \frac{z^2 p (1 - p)}{e^2}$$

$$n = \frac{z^2(pq)}{e^2}$$

where:

n = sample size.

z = a value on the abscissa of a standard normal distribution (from an assumption that the sample elements are normally distributed), which is 1.96 or approximately 2.0 and corresponds to a 95% confidence interval.

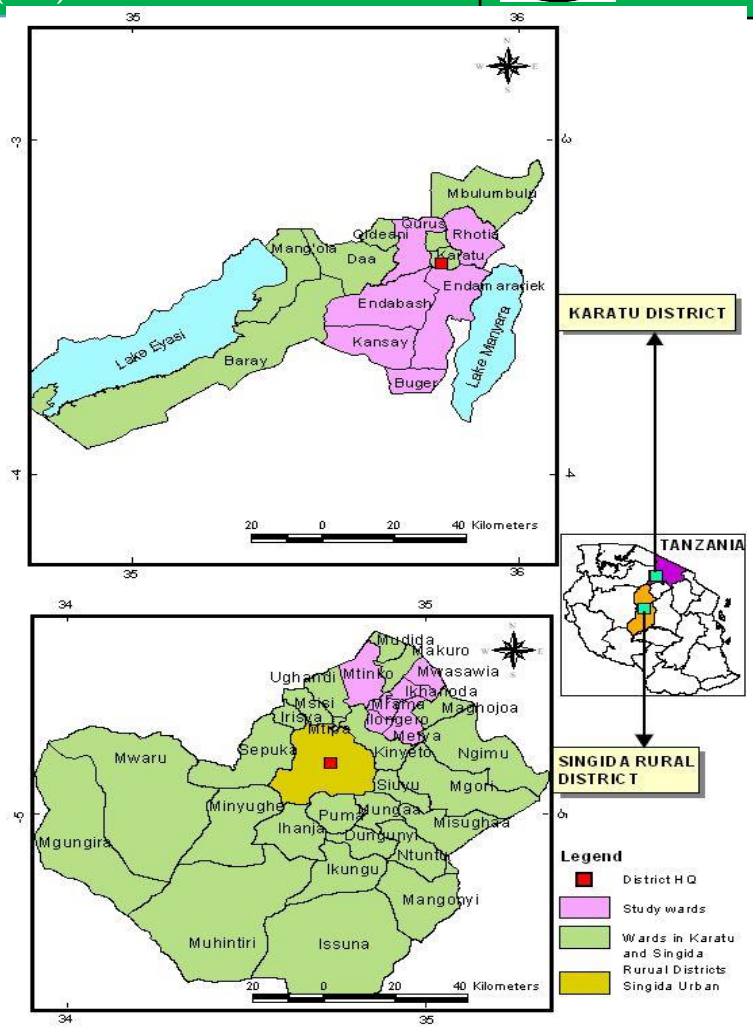

Figure 5.1: Maps showing the study area.

p = estimated variance in a population from which the sample is drawn, which is normally 0.5.

Using a Z-value of 1.96, a p-value of 0.5, a q-value of 0.5, and a d-value of 0.5% (which is equivalent to 0.05), the sample size (n) was determined to be 384 households, as shown below:

$= 1.96^2 (0.50 \times 0.50)/0.05^2 = 384.$

The study used multistage sampling where a simple random sampling method was employed to select respondents from the identified strata and a purposive sampling method was used to select the strata. In addition, a stratified proportionate sampling technique was used to ensure that more respondents were obtained from Karatu District which had more participants in the projects applying the RIPAT approach compared to Singida District. The strata were districts, wards and types of farmers (LFs and non-LFs). Male and female representatives of households were selected through systematic sampling. The population comprised two sub-populations of lead farmers and non-lead farmers. Both subpopulations were obtained from RIPAT project officers/managers who had complete lists of RIPAT beneficiaries in the research areas. The first one was selected randomly using random numbers created in MS Excel using

the "=RAND ( )" command, which generated random numbers. This was done at the ward level where a sampling interval for a relevant sub-population was obtained by dividing the sub-population N by the sub-sample size (n) to obtain the sampling interval k, i.e. N/n = k. Then, after the first respondent was selected, every k^{th} person was selected until the sub-population was exhausted.

Besides the LFs and non-LFs, 20 key informants (KIs) were selected purposively. KIs included people who were considered to be knowledgeable about the RIPAT approach, including Extension Officers (EOs), District Project Coordinators (DPCs), village government leaders and Programme Leaders/Managers from RECODA who are the implementers of the projects using the RIPAT approach. Moreover, focus group discussion (FGD) participants (men and women) were selected from members of groups of the projects applying the RIPAT approach in each ward. There were men groups separated from women to get views of both groups on areas related to institutions and the performance of the LFs.

Institutions linked with the performance of LFs were identified through Participatory Rural Appraisal (PRA). Specifically, the institutional analysis tool was applied. FGDs with LFs and secondary information gathered from project reports such as project coordination meetings and evaluations categorized the institutions into two categories i.e. institutions within and outside the project area.

2.3 Data Collection

Both primary and secondary data were collected for complementary reasons. Primary data were collected through a survey using a structured questionnaire whereas FGDs and key informant interviews (KIIs) were guided by an FGD guide and a checklist respectively. In addition, the Participatory Rural Approach (PRA) was used to facilitate the institutional analysis exercise. While the questionnaire was administered to respondents to capture their perceptions regarding the importance of institutions in enhancing the performance of LFs, KIIs were meant to gather in-depth information regarding the identified institutions with the performance of LFs. The FGDs coupled with the use of a PRA tool namely the Venn diagram, focused on institutional analysis. With the use of the Venn diagram, the relative importance and interactions of each institution in terms of influence on LFs were depicted and a discussion on how each institution influences LFs was conducted.

Secondary data were collected from district profile reports; Research, Community Organisational Development Associates (RECODA) - implementing organization publications and project quarterly reports explaining among other things the activities undertaken by LFs. Therefore, in each of the six wards involved in the study, three (women/men, LFs and non-LFs) FGDs were organized making a total of 18 FGDs, with a total of 116 participants. In addition to facilitating the acquisition of in-depth information regarding the institutions *vis-à-vis* LFs performance, KIIs and FGDs were conducted to allow triangulation.

3.4 Data Analysis

Qualitative data from the PRA, FGDs and KIIs were analysed using content analysis, whereby codes and themes were developed for the various arguments. Some data collected through PRA were analysed in the field directly with the help of the PRA teams. In this regard, the PRA teams drew Venn diagrams indicating the importance and interaction of existing institutions as far as the performance of LFs is concerned. Quantitative data were processed and analysed using the Statistical Package for Social Sciences (SPSS) version 20 whereby descriptive statistics (i.e. frequencies, standard deviation, means, minimum and maximum values of variables) were determined to indicate the degree of institutional importance as per respondents' scoring. Performance of LFs was considered as execution of their designated duties, including implementation of selected technologies promoted in their duty area, training and conducting follow-ups to farmers on agricultural technologies being promoted and facilitating the formation of farmer groups. Respondents assigned scores to each of the seven institutions, identified through the FGDs, reflecting their judgement of the influence of the institutions on LFs performance. Findings from the survey were compared with the FGD findings to check for validity.

3.0 Results and Discussion

3.1 Identification of institutions influencing the performance of LFs

Data from the institutional analysis, FGDs with LFs and non-LFs (NLFs) and secondary information indicate that there were different institutions within and outside the project areas as discussed below.

3.2 Institutions within the Project Areas

Institutions within the project areas were well known to both LFs and non-LFs. So, through the FGDs (LFs and non-LFs) and KIIs with the RECODA Programme Leader and local government officials, eight institutions were identified within the project areas which include: i) RECODA as the implementing organization (IO), ii) District Councils (DCs), iii) Ward Development Committees (WDCs), iv) Ward Agricultural Resource Centres (WARCs), v) Ward and Village Agricultural Extension Officers (WVAEOs) office, vi) Village Councils (VCs), vii) Village Assemblies (VAs) and viii) Farmer groups (FGs). The institutions and their roles related to the performance of LFs are summarized in Table 1.

Table 1: Institutions Influencing the Performance of LFs and their Roles

Institution	Roles in influencing the performance of LFs.
i). RECODA as the implementing organization (IO)	- Facilitates the selection of LFs using the set criteria under the RIPAT approach. - Describes the roles of LFs and builds their capacity accordingly in areas related to facilitation skills, agricultural technologies and soft skills (personalities). - Ensures good collaboration and coordination with local government. - Guides the acquisition of quality agro-inputs and engages in the production of planting materials. - Guides the use of the RIPAT Manual. - Introduces LFs to the community as social entrepreneurs and community agents of change. - Supports the project kick-off (community sensitization and mobilization) and conducts quality control and certification during project implementation.
ii). District Councils (DCs)	- Collaborate with LFs through working with extension officers who are supervised by the District Project Coordinators (DPCs) based on the set Memorandum of Understanding (MoU) between DC and the IO. - Introduce LFs to other projects implemented in the districts. - DPCs facilitate the introduction of projects and LFs at the ward and village levels. - Monitor the work of LFs, especially in quarterly meetings and as deemed necessary.
iii). Ward Development Committees (WDCs)	- Decision makers on the project spreading villages in which LFs and EOs will work. - Discuss the performance of projects and that of the LFs from various villages. - Introduce the project and LFs to new villages and institutions in the ward. - Help in recommending villages to be targeted by the intended project.
iv). Ward Agricultural Resource Centres (WARCs)	- Centres for LFs' to meet with extension officers and among themselves. - Places for setting groups and/or demo plots for various agricultural technologies transfer. - Centres of information and sources of various reading materials and audio-visuals such as videos (Digital Video Discs - DVDs).
v). Ward and Village Agricultural Extension Officers (WVAEOs)	- EOs collaborate with LFs in project spreading to neighbouring villages. - EOs introduce LFs to the community as their assistants so that they can gain credibility - EOs report the performance of projects and LFs in the formalized meetings e.g., WDCs, and District Management Teams (DMTs). - EOs link LFs with other projects/organizations.
vi). Village Councils (VCs)	- Discuss the new projects including the roles of LFs before meetings with community members. - Plan and convene Village Assemblies (VAs) to introduce the projects and /or LFs. - Encourage the group to abide by the by-laws in the VAs and emphasize the need for enforcement.
vii). Village Assemblies (VAs)	- Selection of group members some of whom become LFs. - Introduce LFs as social entrepreneurs and community change agents.
viii). Farmer groups (FGs)	- Select LFs. - A place where LFs get training; first as technical LFs and later as spreading LFs. - A platform for LFs to practice what they have been trained on.

Source: Survey data.

Generally, observation from the study shows that farmers' groups begin as informal[1] institutions but, within the project lifespan they become formal institutions after being registered under local government regulations; so, in this study farmer groups are treated as formal institutions because they were registered. The influence of institutions on the performance of LFs begins when participating farmers (group members) are selected at the village assembly (VA) based on a set criterion where some of the members are later selected to become LFs (Vesterager *et al.*, 2017). The implementing organization (IO) trains LFs together with EOs to become community-based experts responsible for enhancing the adoption and spreading of project interventions. It was learned from the programme leader (PL) of the IO that while the selection of LFs is based on the criteria set by the RIPAT approach, the introduction of the LFs at the VA and their working with EOs follows the local government structure i.e. District Council, ward and village together with related institutions at various levels including District Project Coordinator (DPC), Ward Development Committee, Village Council, and Village Assembly. The project manager from Karatu revealed that the main role of the IO is to facilitate the implementation of projects based on the RIPAT approach where the use of LFs is mandatory hence, is required to build LFs' capacities accordingly.

However, even though Ward Agricultural Resource Centres (WARCs) were found within the project areas, they were less known and were considered to be less important because they were few with inadequate facilities that were not fully utilized (URT, 2016a). The study learned from the district's staff that in Singida district, there were only two out of the 21 WARCs needed, while in Karatu District (KIIs) there was only one out of the 14 WARCs needed. Generally, the institutions mentioned in Table 1 influenced the performance of LFs through a created positive and supportive environment which empowers LFs to excel by exercising the laydown/given authorities in enforcing the set bylaws, procedure and roles. This complies with Wang and Yang (2021) that, effective leadership within an institution is a product of the interplay between leaders and the institutional context in which they operate i.e., organizational culture, resources, governance structures, training, ethical frameworks etc.

3.3 Institutions outside the project area

Institutions outside the project area were mostly known to LFs' because of the extra training received from various experts and study visits they made to those institutions. Through the FGDs that consisted of LFs and KIIs with programme leader and extension officers, institutions outside

[1]Informal institutions are socially shared rules, usually unwritten, that are created, communicated and enforced outside officially sanctioned channels while formal institutions are defined as rules and procedures that are created, communicated and enforced through channels widely accepted as official.

the project areas were identified. These include i) Tanzania Agricultural Research Institute (TARI) Centres; ii) Farm Africa; and iii) Sokoine University of Agriculture (SUA). It was learned through the IO Programme Leader (PL) that the main roles of these institutions were to act as a source of technologies (planting materials and crop management) and technical backstopping. The institutions influenced the performance of LFs by exposing them to a wider range of knowledge and experience which build the understanding and confidence of the LFs in the execution of their roles. The KII said:

> *We received improved banana varieties and pigeon peas from TARI-Tengeru and Selian respectively, while orange-fleshed sweet potatoes (OFSP) were obtained from SUA. We had to get an instructor from SUA to train the RECODA staff who in turn trained EOs and LFs on crop management and post-harvest handling to take advantage of the nutritional value of the OFSP. In addition, LFs visited SUA and TARI exhibitions to see and discuss various improved agricultural technologies.* (KII - from RECODA, August 2017).

LFs have been visiting research stations as these are sources of technologies and experts who can give details of the performance of the technologies as well as boost the understanding and confidence of the LFs and consequently influence their performance in the uptake of agricultural technologies. According to Swiergiel (2007), farmers' study visits, especially LFs, are very important because they offer an opportunity to see things of direct use on their farms. Hence, institutions which are found outside the project have a direct influence on the performance of LFs. Sometimes experts from the research institutions train the staff from implementing organizations (IO) who in turn train LFs. The training empowered LFs with understanding and confidence in the execution of their roles as community change agents and social entrepreneurs. Direct connection of LFs with various institutions not only enhances the performance of LFs through networking with reputable sources of information and planting materials but, also ensures sustainability in the execution of their intended roles during the project lifespan and beyond. A Lead Farmer shared this:

> *As a Lead Farmer, I visited agricultural exhibitions at TARI - Selian and later on the researchers from Selian nominated me to be among the pigeon peas seed producers under the quality declared seed (QDS) programme. Since then, I have been producing seeds for TARI-Selian and myself. However, when I train my fellow farmers, I sell seeds to them and get a good income. Moreover, they visit me as a Lead Farmer and I can call them for technical advice not only on pigeon peas but, also on other crops (A Lead Farmer, Karatu District; August, 2017).*

LFs have well-prepared local platforms (farmer groups), formalized collaboration with government extension officers (EOs), and are well-known in the community therefore, being connected with the right institutions is very important in the execution of their roles. This is in line with the findings of Kiptot and Frienzel (2019) that strong producer associations and farmers' groups, coupled with the extension of informal, multi-institutional networks that support the creation of knowledge and learning process are among the key components contributing to the sustainability of the LFs programme.

3.4 Relative Importance of Institutions in Influencing the Performance of LFs

The study inquired from the project participants (LFs and non-LFs) about their perception of the relative importance of the seven institutions known to them in influencing the performance of LFs. Descriptive statistics, i.e. frequencies, standard deviation, means, minimum and maximum values, were used to determine the degree of institutional importance as per respondents' scoring. The implementing organization had the highest mean score followed by farmer groups (FGs) and then Ward and Village Agricultural Extension Officers (WVAEOs). Village assembly (VA) had the lowest mean score (Table 2). Although WARCs were found within the project area they were not included in the analysis because they were hardly known to Non-LFs.

Based on the Friedman test, the perceptions of respondents regarding the importance of institutions showed significant differences (p=0.000). Further analysis that involved comparing one institution to another, showed significant differences (p=0.00) for all institutions except that there was no significant difference (p=0.104) between the Ward Development Committee (WDC) and Village Assembly (VA).

Table 2: Degree of institutional importance to LFs as assessed by LFs and NLFs (n = 384)

Institution	Mean	Std. Deviation	Minim.	Maxim.
1. Implementing organization (IO) – RECODA	4.12	.409	3	5
2. Farmer groups (FG)	3.84	.453	3	5
3. Ward and Village Agricultural Extension Officers (WVAEOs)	3.05	.493	2	5
4. Village Council (VC)	2.93	.488	2	5
5. District Council (District Project Coordinator -DPC)	2.32	.529	2	4
6. Ward Development Committee (WDC)	2.17	.425	2	4
7. Village Assembly (VA)	2.13	.337	2	3

The highest score for IO can be explained by findings from the FGDs and KIIs. Based on the FGDs with LFs and Non-LFs, IO pioneered the projects and has been facilitating the implementation and monitoring of the project activities. On the same note, KII said:

> *"When IO manages to instil the required capacity to the LFs and facilitate well the development of farmer groups, the groups go beyond project lifespan and become local institutions with the LFs working as social entrepreneurs and community change agents" (IO KII, September 2017).*

These findings are in line with the observations by Lukuyu *et al*. (2012) and Vesterager *et al.* (2017) that the roles of LFs ought to go beyond simple message delivery to make them principal agents of change in their communities and social entrepreneurs. Regarding the influence of IO on the performance of LFs, it was learned from the FGDs and KIIs that the IO trained LFs on various agricultural technologies mainly through learning by doing at farmer field school (FFS)/group plots. Tailor-made courses under RECODA Academy[2] were organized for special technologies and skills such as *para-vets* (animal health auxiliaries in service to small-scale farmers), skills on community sensitization and mobilization, and group formation and facilitation.

It was also learned from some FGDs that farmer groups enabled farmers to work together and ease the channelling of all project interventions, especially through group plots where learning by doing was practised. This explains why farmer groups ranked second (Table 2) in terms of importance to LFs. A study by Lilleør and Sørensen (2013) showed that among the reasons behind the good performance of the projects applying the RIPAT approach is the formation of strong farmer groups which help the farmers to transform from weak to strong-willed farmers. Farmer groups influence the performance of LFs through weekly meetings at farmers' field school (FFS)/group plots which create a platform for LFs to learn and in turn to practice what they have learnt.

3.5 Effects of Interaction (Interplay) among Institutions in Influencing LFs' Performance

Selected FGDs with LFs and KIIs with DPC, PL and EOs were used in discussing the importance and interaction of institutions influencing the performance of LFs.

3.5.1 Importance and relationship of institutions

The identified institutions (both within and outside the project areas) with the potential to influence the performance of LFs were listed and their importance was discussed, based on the roles played. Using the Venn diagram during the FGDs with LFs and non-LFs, different-sized circles were drawn (Fig. 2) to indicate the importance each institution had on LFs' performance. In this regard, big circles represent highly important decision-makers while small circles represent little importance. The size of the circle reflects the importance of the institution; the distance between the circles indicates the degree of interaction between the institutions; where a large overlap means high interaction; and no overlap indicates lack of interaction.

The list of the institutions was given number 1 to 11 as follows: 1) District Council (District Project Coordinator - DPC), 2) Ward Development Committee (WDC), 3) Ward Agricultural Resource Centre (WARC), 4) (Ward and Village Agricultural Extension offices - EOs), 5) Village Council (VC), 6) Village Assembly (VA), 7) Implementing Organization (IO), 8) Farmer groups (FG), 9) Tanzania Agricultural Research Institute (TARI), 10) Sokoine University of Agriculture (SUA) and 11) Farm Africa (FA).

The results of the institutional analysis show that IO, DC, FGs and EOs have larger circles than the rest resembling the findings in Table 2 which were also ranked higher in terms of importance. TARI and SUA were among the important institutions found at the periphery and outside the project areas respectively. The rate of importance given to each institution was based on their roles in influencing the performance of LFs as indicated in Table 2 and Section 5.6.3. The findings show that the institutions outside the project area were of equal importance to the ones found inside the project area.

Contrary to the scores from the survey, whereby the village assembly (VA) was ranked low (Table 2) meaning a less important institution, it was noted during the FGDs that the institution was equally important (Fig. 2). Through KIIs with DPC it was revealed that the importance of VA was based on its uniqueness as an important forum for giving a final decision on whether groups should be formed or not. On this, the DPC said:

> *"... it is the village assembly which approves or disapproves the formation of farmer groups. Moreover, the village assembly is an important platform for introducing LFs to the community and establishing and/or enforcing by-laws which create a conducive environment for good performance of LFs" (Karatu DPC, September 2017).*

The village assembly consists of every person who is a resident of the village and who has attained the apparent age

[2](RECODA Academy)
i. Capacity building to various rural development actors on the application of RIPAT Approach,
ii. Offering tailor-made courses to final year students and graduates from courses related to agricultural and community development on how best they can engage with community economic development projects;
iii. Capacity building for community-based experts (extension officers, local institutions and Lead Farmers) in facilitating the adoption, up-scaling and sustainability of the project activities (Vesterager *et al.*, 2017).

of eighteen years. So what is proposed as a by-law at the ward committee or village council receives its final endorsement in such a forum (URT, 2016b).

Nevertheless, the failure of some village authorities to convene VAs regularly could have influenced the survey respondents to perceive the institution as of low importance to the performance of LFs. This is implied in the quote below:

> *"The village assembly would have been very instrumental in enhancing the performance of LFs in our village. However, such meetings are rarely convened by the village leaders." (A Male Key Informant, Karatu district, September 2017).*

From the institutional analysis, the participants scored the VA higher probably because they were imagining a situation where the VAs are regularly convened.

Although the WARC can play a very important role in the facilitation of improved farmers' access to technical and economic information as stipulated under the Agricultural Sector Development Programme (ASDP) - II (URT, 2016a), the Agricultural Extension Block Grants (EBG) which were meant for, among other things, establishment and development of WARCs were not released, a thing which made them non-functional. SUA and TARI were rated as more important institutions because of being the sources of many improved agricultural technologies used in the project areas and at the same time availing technical backstopping. Farm Africa was rated less important because of being the main reliable source of dairy goats; nonetheless, the goats could also be obtained from elsewhere.

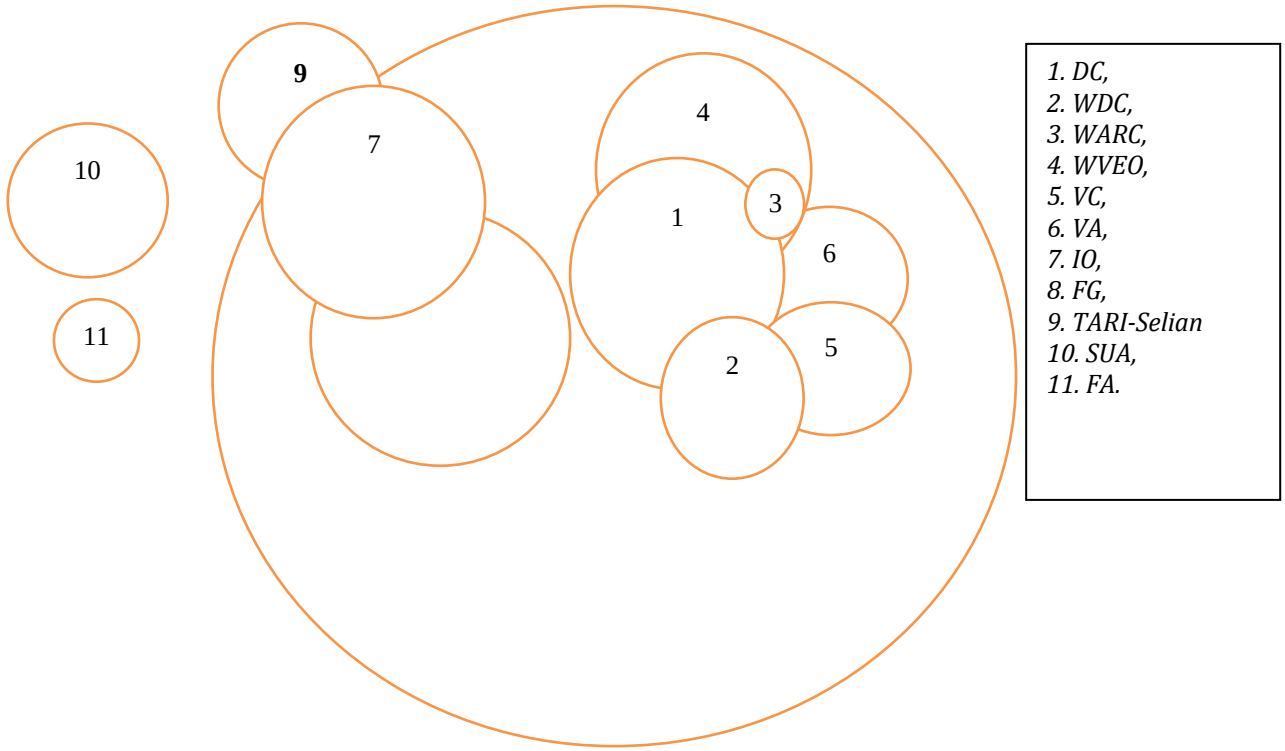

Figure 2: Venn diagram showing important institutions and their relationships in influencing the performance of LFs

Key: Representation of the cycles

1.	Importance	***Less important***	***Important***	***More important***
2.	Relationship	High interaction	No interaction	
3.	Big outer circle	Project area		

The above-mentioned institutions can be categorised into four groups, i.e., i) those falling under local government authorities (DC, WDC, WARC, EOs, VC and VA), ii) research institutions (SUA and TARI), iii) NGOs (RECODA and Farm Africa) and iv) community (farmer groups). However, the interaction of the institutions did not follow that pattern except for the institutions under the local government authority (LGA). Some of the TARI centres have research activities in the project area but, the modes of collaboration including MoUs signed with the IO differed from one to another. For the case of LGA, only one MoU was signed to cater for all the institutions under their jurisdiction. It was found further that there was a strong interaction between IO and farmer groups, especially during

the RIPAT 'start phase[3]' but in the RIPAT 'spreading' phase the strong interaction (interplay) of the groups shifted to EOs as it became mandatory for the EOs to collaborate with LFs.

The institutions under LGAs, at various levels and based on their areas of operations, were responsible for setting community development plans and conditions conducive for the LFs to operate including by-laws establishment and enforcement. Hence, LGAs availed an important interaction (interplay) of LFs and EOs to work together in spreading the project interventions and ensuring its sustainability.

3.5.2 Formalized collaboration between IO and LGA

The use of LFs for the development of small-scale farming is not officially recognized (formalized) under the government extension system and LGAs. It was learned from PL of the IO that formalizing the collaboration between IO and LGA is one the first things that need to be put into place in the projects applying the RIPAT approach. According to Vesterager *et al.* (2017), meetings with district officials are conducted to inform the district about the funded project and to agree on the procedures for collaboration by stipulating roles and responsibilities in a written MoU. The study revealed that, from the beginning of the project, the District Project Coordinator (DPC) is nominated together with a list of the villages to be covered in the RIPAT Start phase and additional villages to be targeted in the subsequent RIPAT Spreading phase using LFs and EOs. The DPC from Singida emphasized the efforts made by district officials and IO to operationalize the MoU through attending project quarterly meetings, joint trainings between EOs and LFs, joint planning of field days, and sharing various project reports.

The functional MoU under the RIPAT approach improve the performance of LFs by being mainstreamed into the government extension approach hence, all the institutions under the LGA comply with the stipulated roles of the LFs. The performances of the LFs are further improved as they access the use of existing government structures like formal meetings to promote agriculture technologies. Singida District Agriculture, Irrigation and Cooperative Officer (DAICO) acknowledged how the shortage of extension officers was alleviated through the use of LFs and that they couldn't reach all the farmers without support from LFs. One of the LGA officers said:

> *"In this case, when EOs feel that LFs are of help to them, they will recognize them publically and assign them specific roles to play to reap the expected outcomes". (LGA officer for Singida District, September 2017).*

The recognition of the LFs in public by the District Council (DC) improves morale and the performance of LFs as they become more acceptable to the community and are regarded as local experts working to assist the government extension officer. The study observed that the average extension-farmers ratios for Singida and Karatu were 1:2,195 and 1:825 respectively, which are much higher than the 1:600 ratio recommended for Tanzania (ASHC, 2015). Hence, the interaction (interplay) of LFs and EOs helps in narrowing the extension-farmers ratio to enable the majority of the farmers to access new agricultural technologies and the capacity to turn knowledge into actual development.

3.6 Advocacy for Local Institutions to Support LFs

To enhance the performance of LFs, it was deemed necessary to study how the ideas of LFs have been perceived and enforced in the project area. Through key informant interviews (KIIs) with DPCs from Karatu and Singida, it was learned that the use of LFs is not a new thing to many projects and development actors but, what is not common is the extensive use of LFs in collaborating with EOs. They explained the way institutions under LGAs are flexible to comply with different extension approaches including the use of LFs especially when properly advocated by the IO.

The study noted the existence of the functional farmer groups[4] five years since the end of the project's lifespan. The evaluation of projects applying the RIPAT approach by Aben *et al.* (2013) identified the need for the development of sustainable institutional structures to support the approach by building links with government institutions and influencing local agricultural policy and practices. Generally, such links bridge the 'institutional gap'. A key informant interview with the IO Programme Leader revealed that the RIPAT Manual was revised to incorporate the idea of facilitating the evolution of farmer groups into local institutions to fill the observed institutional gap. Vesterager *et al.* (2017) explained the systematic way of forming local institutions under projects applying the RIPAT approach which begins with the formation of farmer producer groups that graduate to farmer producer association and then market association. This is similar to what Pors (2018) refers to as local institutions and their development indicators. That is, the RIPAT approach facilitates the formation of democratic rural organizations (DROs) through community mobilization of farmers (producers) and savings groups which later form producer and marketing associations. Malisa (2016) has also reported on the importance of such local institutions (farmer groups and associations) in influencing decision-making of households, and of decision-makers.

[3]Projects applying the RIPAT approach are divided into two phases. The 1st phase is RIPAT 'Start' dealing with building the capacity of LFs and EOs who become responsible for the 2nd phase of RIPAT 'Spreading' (Vesterager et al., 2017).

[4]Functional farmer groups under projects applying the RIPAT approach refers to a group with above 20 members, meeting as per their constitution with an average attendance of about 70% and the leaders are elected democratically.

The development of local institutions based on the implemented project can influence the performance of LFs to work as social entrepreneurs and agents of change in the community by creating a conducive environment (policy) and providing moral incentives. The engagement and performance of LFs are improved through advocacy whereby institutions, especially the project implementing organization (IO) convince the communities and decision-makers with facts from the roles played by LFs in facilitating the up-take of agricultural technologies beyond the project's lifespan through the registered groups (local institution). Mkomagi *et al.* (2015) support the idea of creating strong and sustainable local institutions upon ending donor support as one of the exit strategies in development interventions. Such local institutions will not only ensure the sustainability of project interventions and the roles of LFs but, also enable LFs to perform as community agents of change and social entrepreneurs.

4.0 Conclusions and Recommendations

Based on the findings of the study, it is concluded that institutions which influence the performance of LFs can be grouped into four categories: i) local government authority (DC, WDC, WARC, WVAEOs, VC and VA), ii) research institutions (e.g., SUA and TARI) and iii) NGOs (RECODA and Farm Africa) and iv) community (farmer groups). It is also concluded that the level of importance an institution has, in terms of influence on LFs performance, differs from one institution to another but, each of the mentioned institutions is important in enhancing the performance of LFs. The most important institution is RECODA as the implementing organization, followed by farmer groups and Ward and Village Agricultural Extension Offices. It is further concluded that institutions' main contribution relates to the creation of a conducive environment (local organizational structure and policies), and moral incentive for LFs to execute their roles during and beyond the lifespan of the project when they act as community change agents and socio-entrepreneurs. Lastly, it is concluded that interaction (interplay) among institutions enhances the performance of LFs as demonstrated by the collaboration between LFs and WVAEOs in the study areas.

The study, therefore, recommends that:

i) Since farmer groups are among the important institutions influencing the performance of LFs, there is a need for the government to devise a way through which all EOs in the government extension system work through farmer groups.

ii) Owing to the close interaction between LFs and EOs in ensuring the uptake of technologies and sustainability, the use of LFs should be institutionalized in the government extension system.

iii) Further studies should be conducted to establish how the interaction among the different institutions can be deepened for enhancement of the performance of LFs and community development in general.

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