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The contribution of capacity building (technical training) on increased area under production and productivity: A case study of Koturu Cooperative Western Province Rwanda

Uwase Valentine and Aisha Msantu

Department of International Development Nexus International University, Uganda.

ABSTRACT

The contribution of capacity building (technical training) on increased area under production and productivity: A case study of Koturu Cooperative Western Province Rwanda was studied. The Government of Rwanda recognizes the central role that cooperatives have to play in promoting inclusive, sustainable development and economic and has put a lot of effort in supporting cooperatives, but some cooperatives are still encountering challenges both externalities and internal challenges which are caused by lack of good governance skills, misuse of property, members side selling, lack of market linkages, low literacy, inactive membership and poor financial management. The research question was: What is the contribution of capacity building on increased area under production and productivity? Within the basis on the following objective: To determine the contribution of capacity building (technical training) on increased area under production and productivity. Data collection was done among 159 respondents, members of KOTURU cooperative with 60% male and 40% female. Key informant interviews were done cooperative technical and supporting staff (Cooperative Agronomist, sales officer, and the manager) to triangulate results from cooperative member's respondents. All respondents confirmed that they have received at least one training since they joined KOTURU. The training on farming practices and access to improved inputs allowed them to increase their area under production by 34.78% and the productivity increased.

Keywords: capacity building, technical training, production and productivity

INTRODUCTION

Rwanda is a landlocked country situated in central Africa. The country lies 75 miles south of the equator in the Tropic of Capricorn, 880 miles 'as the crow flies' west of the Indian Ocean and 1,250 miles east of the Atlantic Ocean - literally in the heart of Africa. The Altitude ranges from 1000m to 4500m above the sea level.

Rwanda is one of the seven countries that constitute East Africa. It is a small country that measures only 26,338 square km, bordering Uganda, Tanzania, Burundi, and the Democratic Republic of the Congo. The results of the Rwanda household survey of 2019/2020 show Rwanda have a total resident population of 12.300.000, mostly populated with a density of 416 people/km^2 and the mean number of persons per household is 4.4 [1].

Administrative divisions of the country include five provinces: Northern Province, Western Province, Southern Province, Eastern Province, and the City of Kigali. Rwanda is further divided into 30 districts, 416 sectors, 2,148 cells and 14,837 villages, which are the smallest politico-administrative entities of the country [2].

The Rwandan economy is mainly based on the service and agriculture sectors. The agriculture sector contributes about 35% to the national GDP, employing about 70% of the population in Rwanda [3]. It has been the main driver of growth and poverty reduction, pulling

1.7 million people above the poverty line in only five years. With increased commercialization, the agriculture sector has been the driving force for about 45% of poverty reduction in the last decade. 81.3 percent of all households (about 2,034,942 households) are food secure, have an acceptable diet, and use a low share of their budget to cover food needs [4]. Between 2000 and 2016, Rwanda's economy grew by 5.9 percent per year on average, and by 2016 it was more than 3.5 times larger than in 2000 [5]. During the same period, the Gross Domestic Product (GDP) per capita increased from USD 242 to USD 729. Exports have seen rapid growth from a low base, with 13.2 percent growth per annum between 2000 and 2016, while imports grew on average by 10 percent per annum, such that imports, and exports increased their combined share of the economy from 31 to 48 percent.

The annual decrease of GDP by six percent throughout 2016 was attributed mainly to bad weather that affected agricultural production and the completion of big infrastructure projects that constrained the performance of the industry sector [6]. Despite solid progress since 2000, poverty remains widespread and pervasive. In 2010/11 (the most recent living standards survey), 45 percent of the population lived below the national poverty line, and 24 percent was considered extremely poor (lived below the national food poverty line). The national poverty line is frugal, witnessed by the large difference between poverty based on the national poverty line (45 percent) and poverty based on the international $1.25 a day line (63 percent) [7].

To alleviate poverty, Rwandan Government's has developed development plan such as Vision 2020, aims to increase the contribution to GDP of services and industry to 57 percent and 19 percent, respectively, while decreasing agriculture's contribution to 24 percent [8]. As in many countries, poverty has important geographical dimensions. Half of the rural population lives below the poverty line, compared to 22 percent of the urban population. More than 90 percent of the poor live in rural areas [9].

Cooperative movement in Rwanda started in 1949 since then cooperatives remained control under political interest until promotion policy of cooperatives amended by 1988 and in 2018 the policy was revised entitle as National policy cooperative in Rwanda [10]. Three years later, Rwanda Government announced the revised cooperative law of No 14/5/2021 with the purpose to determines the establishment, organisation and functioning of cooperatives. [11] stated that most of Rwandans are doing businesses through cooperative, currently number of cooperatives registered are estimated to be 10,103cooperatives and members estimated to be 5.2 million. People with share capital estimated as 49,797,022,184 Frw and cooperatives are categorized basing on ten main economic sectors in additional to saving and credit. Among the primary cooperative, majority of cooperatives are from agricultural sector which counts 52% and least percentage are fishery cooperative with 0.9%. Union cooperatives counts 1.5%, federations cooperative 0.1% and saving and credit cooperatives (SACCOs) represents 4.4% of cooperative registered in Rwanda.

Rwanda's cooperative sector has grown rapidly over the last ten years. This has been achieved through the support of Government of Rwanda, which has always given emphasis to the development and promotion of cooperatives to facilitate their activities and enhanced the structure of the cooperative movement in Rwanda [12]. In Rwanda, the law 48/2013 established Rwanda cooperative Agency (RCA) to be a public institution in charge of promotion, registration, and regulation of Cooperatives.

Aim of the study

The aim of this research was to assess the contribution of capacity building (technical training) on increased area under production and productivity of Koturu Cooperative Western Province Rwanda

Specific objective

To determine the contribution of capacity building (technical training) on increased area under production and productivity.

Research Question

Regarding research questions, this study responds to the below question:

a. What is the contribution of capacity building on increased area under production and productivity?

RESEARCH METHODOLOGY

Zone of study

Rwanda is currently composed of two layers of government (central and local) and of six administrative entities. The country is divided into four Provinces and the City of Kigali which are also further divided into 30 districts. Moreover, the districts are further divided into 416 Sectors. Additionally, the sectors are further divided into 2148 cells and lastly, these cells are divided into 14837 villages. KOTURU Cooperative is in Western zone of Rwanda, this zone is one of the four provinces composing Rwanda. It was created in early January 2006 as part of a government decentralization program that re-organized the country's local government structures. The province is located is western part of Rwanda, neighboring Republic Democratic of Congo in North. Western Province is composed with seven districts, 96 sectors, 538 cells with a superficies of 5,882 km2. Western province accounts for 2408 Cooperatives, among them 1233 are agricultural

cooperatives. (MINALOC, 2018).

This study has been carried out to farmers grouped into KOTURU and horticulture cooperatives in the district of Rubavu and Nyabihu.

Data collection method

In this research, the researcher used mixed researcher methodology both quantitative and qualitative and the source of data was both primary and secondary. Primary data was collected from farmers located in Western provinces those are members of the cooperatives grouped and trained by a horticulture project.

Cooperative's members were asked the questions to capture cooperatives activities they are receiving, benefits of cooperative members, income, activities they do and how covid 19 impacted their cooperative. The questionnaire included production questions, demographics and marketing. For in-depth understanding the researcher used qualitative methods whereby key informant interviews with technicians has been used. [13] About secondary data, a desk review was used, these are national data about cooperatives and about western region.

Targeted population

A population is a complete set of individual objectives or measurements having some common observable characteristics. The target population of this study comprised of farmers grouped together in KOTURU cooperative with a shared objective of producing horticulture crops and selling those crops. The crops include mainly carrots, cabbages and broccoli. The targeted population included men, women and youth (with age <30 years). The population of those farmers are 265 members.

Sample size

According to [14], sampling is the process of collecting a number of individuals or objects from a population such that the selected group contains elements representative of the characteristics found in the entire group. The study used descriptively survey design. Descriptive survey design therefore is appropriate because it enabled the researcher to gather information concerning the role of cooperatives in rural development. Simple random technique was used where the entire group in the defined population had an equal and independent chance of being selected as members of the sample.

The sample size is calculated using the following Morgan's formula [15]:

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

$$n= \frac{265}{1+265(0.05*0.05)} = \frac{265}{1+0.662} = 159.44 = 159$$

Where:

n is the sample size of the study.

N is the total population of the research and

e (0.05) is sampling error

Using this formula, the researcher calculated the sample size as follows:

n=

Therefore, the sample of the research is 159 members of KOTURU cooperative. Also, the researcher used a random technique to choose the cooperative's leader and a census to staff for key informant interviews. A census is an attempt to enumerate the entire population; understand that a census is needed for information about every small part of the population. (McLennan, 1999). KOTURU had only 3 staff, these are, 1 agronomist, 1 marketing & sales agent and an accountant. Those people were all interviewed because they are responsible of different unit within the cooperative and those unit were linked to this study objective.

Conceptual framework

Figure 1: CONCEPTUAL FRAMEWORK
Source: Researcher (2022)

The conceptual framework (Fig 1) of the study explained the relationship between cooperatives (Independent variable) and rural development (dependent variable). There are number of factors under independent variables such as technical training, cooperative services, and market linkages which affect the dependent variable. Under the dependent variable rural development, there are determinants of that such as increased productivity, improved access to inputs and income.

Dataset and data processing

Data has been cleaned to eliminate outliers and verify the accuracy of data collected. Cleaning has been done using excel and Stata 14. Cleaned data stored in a dataset for easy analysis.

The researcher collected data using digital platform Akvo Flow and data were exported in excel. The variables in the dataset include demographics (name of the respondent, age, number of members of the households, sex, locations), farming practices, training attended, area planted before/after joining the cooperatives and on marketing (quantity sold per crop and unit prices). Those variables allowed the researcher to get answers to the research questions.

Data analysis

After data cleaning, the qualitative and quantitative analysis happened. With quantitative data, statistical analysis has been performed using Stata 14 to generate descriptive statistics and percentages. Qualitative data collected from technicians who has been involved in the implementation of the activities were interpreted qualitatively [16].

Ethical Considerations

Ethical considerations refer to a set of values that are generally acceptable in the course of carrying out a study. One such very crucial value involves the anonymity and confidentiality of respondents. Anonymity refers to when neither the researchers nor the readers of the results can identify a response with a given respondent while confidentiality refers to when the researcher can identify a given person's responses but promises not to reveal them publicly [17]. The researcher kept anonymous the respondents' identifications and kept confidential their information as promised during consent forms. Consulted literature has been acknowledged and cited as planned by Nexus International University guides and plagiarism test has been applied at the end of the study.

RESEARCH FINDINGS

Characteristics of respondents.

KOTURU Cooperative Description

KOTURU is a cooperative formed since 19th June 2017 and registered under Rwanda Cooperative Agency (RCA). The cooperatives have 255 members and have a purpose of producing and business of leguminous. Men are 60 % and 40% women. The cooperative produce leaks, cabbage, carrot, green pepper and spinach. The marketplace for their produce is from Rubavu to Nyabugogo, Kabuga and their vision is to increase member's nutrition and target the export market. The general assembly is the key organ in taking all cooperatives decision. The cooperative has also administration committee composed by four people: The chairman, Vice Chair, Secretary and 2 advisors. All holds secondary education level. This committee works closely with auditors committee which is responsible of following up the use cooperatives money. The cooperative employs three staff who are paid by the

cooperative: the agronomist, market & sales agent, and the accountant.

Gender

Gender is about the equal distribution of women and men. Respondents included both men and women. 60% of respondents are men and 40% women. This percentage is sufficient because it is in alignment with the cooperative's membership of men and women.

Table 1: Gender representation among respondents

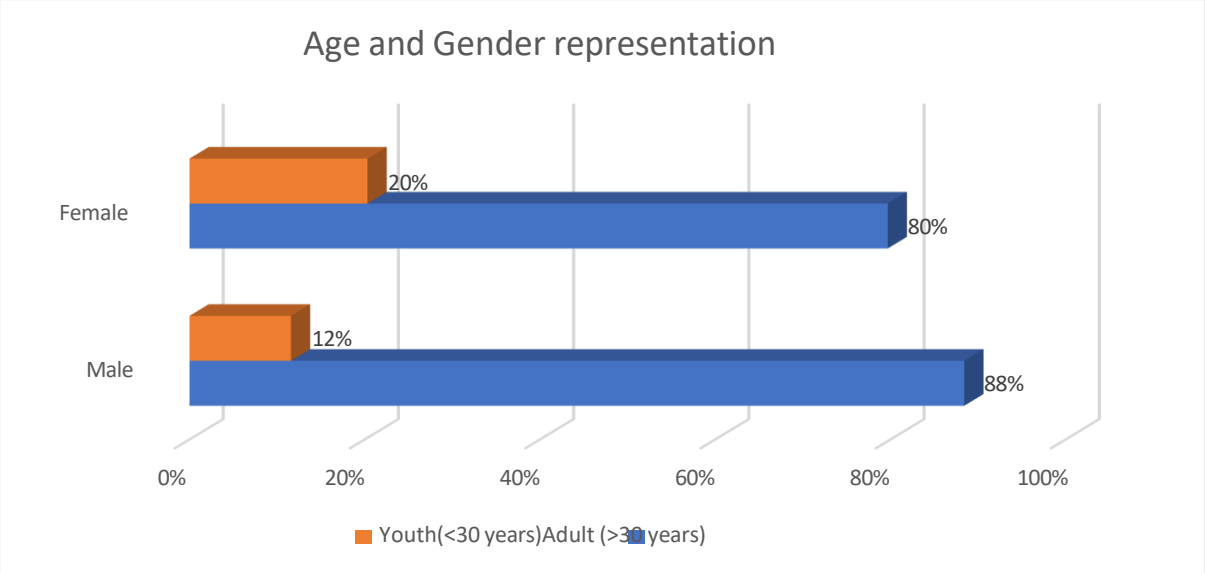
Gender	Freq.	Percent	Cum.
Male	95	59.75	59.75
Female	64	40.25	100
Total	**159**	**100**	

Source: Primary data, 2022

Age

It is important to view the age category of respondents. This help the research to assess how youth, adult and older population are involved in cooperative activity. Results shows the mean age is 43 years, where the minimum age of respondent is 19 years old and 77 years. Looking at youth, it is defined as population of age less than 30 years. Among respondents by each gender, young female representative is 20% and young male is 12%. The figure below shows the representation. Comparing the demographic data and the youth participation, is shows there is an opportunity for KOTURU to increase more young ones who participate in horticulture activities, more than 50% of households of respondents has young ones in their families. Therefore, there is an opportunity to bring more young ones into Agri business through awareness. Since young ones are energetic and can easily use technology that will be a value addition to the cooperative.

Figure 2: Respondent's age and gender representation.



Source: Primary data, 2022.

Table 2: Age of respondents

Variable	Obs	Mean	Std. dev	Min	Max
Age	159	43.01258	12.87918	19	17

Source: Primary data, 2022.

Household demographic

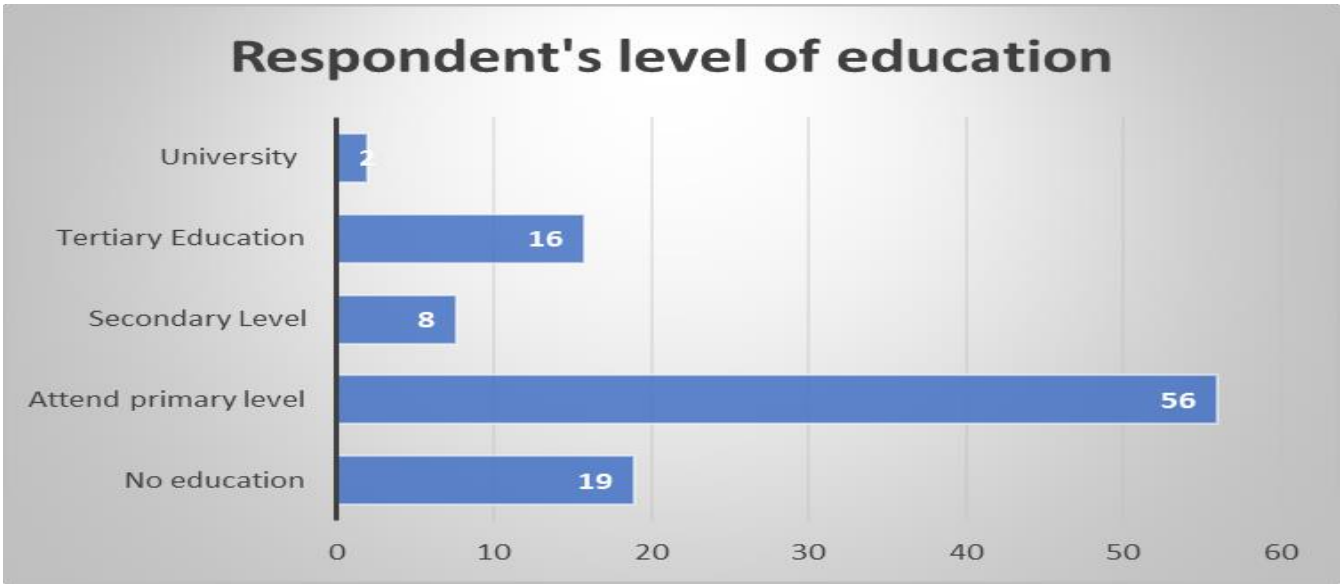
From the respondents 61% are households head, and 39% has other relationship with households. 26.4% are spouse, 5.7% daughter, 5.7% mother and 1.3% sister to their household heads. The average size of the households is four people per household. Results shows households has

at least one young people. In addition, 50.1% households have children under five, this give KOTURU a responsibility to make sure members are trained on nutrition and especially those household with under five children to ensure their optimum growth.

Education level

Members of KOTURU have different level of education which is not far from other farmers in rural areas. High percentage (56%) has attended primary education, with 19% without any formal education and 2% of people who attended University. The challenges of education remain a problem across many cooperatives.

Figure 3: Respondent's level of education



Source: Primary data, 2022.

Type of training received

Respondents mentioned they have received technical training from the time they become members of the cooperative. Provided training are on various topics. Participants confirmed have got training on:

1. Soil analysis and management, crop and seed selection, and nursery preparation and management
2. Open field and protected horticulture, crop management, and pest and disease control
3. Harvesting and post-harvest handling, marketing, and cooperative development and benefits
4. Farmers field day
5. Business to Business (B2B) meeting
6. Participatory demo review (with the Cost Benefit exercise)
7. Nutrition training
8. Cooperative management training (my co-op training)

To see the role of cooperatives, respondents were asked if they have got training before joining the cooperative and after. Only 14% of respondents had received training before joining the cooperatives but after joining the cooperative all interviewed farmers (100%) have received at least one training. Those trainings are delivered by the Cooperative agronomist or project working directly with the cooperative. The more farmers are trained the more there are willing to improve their farming activities and business. The table below shows percentage of respondents who attended each type of training organized throughout the season.

Table 3: Respondents participation to trainings

Topics	N	Percentage
Soil analysis and management, crop and seed selection, and nursery preparation and management	150	92.6
Open field and protected horticulture, crop management, and pest and disease control	148	91.4
Harvesting and post-harvest handling, marketing, and cooperative development and benefits	136	84
Training on Cooperative Management	91	56.2
Nutrition training	82	50.6

Source: Primary data, 2022.

From the key informant interview the Cooperative Chairperson he confirmed the cooperative has been offering those training to its members. They use their cooperative agronomist, and the cooperative is working with projects supporting them like HortInvest and HINGA WEZE projects. He added "Grouping farmers in cooperatives allows to easily share technical knowledge and has allowed us to be able to attract projects to support us", whereas when it is done individually by each farmer it becomes difficult.

Cooperative Agronomist confirmed "I have been training members on good agricultural practices, I organized those training before the start of the season and I make field visit to their plot. I have seen impact of those training whereby production has increased; farmers adopted diseases management practices and have increased their area under production because they were confident KOTURU will guide on how they should manage any issue coming in the field".

Adoption of training provided and increased productivity

It is important for cooperatives members after being training to apply what they have learnt. This was asked to respondents to see if the trainings have an impact on their lives. 94% of the respondents have applied what they learnt in the training.

Table 4: Respondents who have applied what they learnt

Variable	Freq.	Percent	Cum.
Apply what you leant:			
No	9	6.67	6.67
Yes	143	94.33	100
Total	**150**	**100**	

Source: Primary data, 2022.

When farmers are adopting what they have learnt, will share the content with the neighboring farmers. In this research respondents were asked if they have share what they learnt, 80% has shared the content and the 20% did not saying the reason was all their neighbors are also members of the cooperative. This shows how cooperative benefit is spilled over in the community.

Table 5: Respondents who shared what they have learnt

Sharing what you learnt	Freq.	Percent	Cum.
No	31	19.5	19.5
Yes	128	80.5	100
Total	**159**	**100**	

Source: Primary data, 2022

KOTURU members used to produce onions in traditional way, where the planting was not done following spacing between rows and between plants. But after the training, 95% of KOTURU members have adopted that practice. And we have seen when you plant with recommended spacing, you get high production that one's using traditional approach". Stated by KOTURU agronomist in the interview.

DISCUSSION

Results showed that 100% farmers after joining KOTURU cooperative have received at least one training on good agricultural practice and nutrition. This impacted their farming practices where 72% have increased the area under production and productivity with an increase of 34.7%. Those findings align with John (2003) showed that agricultural extension programs provided to farmers positively impacted the value of crop production and productivity.

[18] revealed that the impact of training has been positive and had made farmers become better managers in their farm practice. Farmers trained by the cooperative became able to gather and share information through networking to improve their farming jobs. Farmers changed in behaviour, and perform their job better as compared to before training.

CONCLUSION

The findings related to the first objective indicate that KOTURU cooperative has provided training to its members on good agricultural practices, nutrition and cooperatives management. Those training reduced the farmers losses and allowed them to increase the area under production which resulted into increased productivity.

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