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## Effect of Institutional Factors on Profitability of Small Scale Banana Production in Rwanda

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**ABSTRACT:** Despite the declining trends of banana production in Rwanda and the study area in particular there is barely any study conducted to investigate the cause and effect. This study analysed the effect of institutional factors on profitability of small scale banana producers in Ngoma District; Eastern Province- Rwanda. Multi stage sampling techniques was used to select respondents. Structured questionnaires collected data from 191 banana growers. Multiple linear regression models were used to identify institutional factors influencing profitability and gross margin. Multiple linear regression models were used to analyse profitability of banana growers using Stata version 13. The key institutional factors such as extension services, cooperative membership and credits accessibility positively had influence on profitability of banana production. The cost benefit ratio indicated the profitability index of 1.59 indicating that banana production enterprise is totally profitable. In order to increase profitability of bananas in the study area, there is also need to increase extension services through increasing extension work ratio and mobilizing, sensitizing farmers to join agriculture cooperatives and linking farmers to financial institutions.

**KEYWORDS:** Profitability, Small scale producers, Gross margin, multiple regression, Ngoma district, Rwanda

### I. INTRODUCTION

Banana ranks fourth as the world's most important starch crop and its yields of carbohydrates per unit area are very high. It is the fourth most widely-grown food crop after rice, wheat and maize (Bathan & Lantican, 2010a). Approximately one-third of the bananas produced globally are grown in sub-Saharan Africa. In East Africa the crop provides more than 25% of food energy requirements for more than 100 million people of East Africa. But banana productivity has been declining, from more than 18kg, per bunch annually (Tripathi et al., 2009). The average shift and productivity decline has been attributed to the increasing severity of production constraints (Alemu, 2017). In Rwanda Banana is the second major food crop in Rwanda next to beans. It is used both as food and cash crop (Mutarutwa, 2014). The crop is grown all over the country by small-scale farmers, but principally in three provinces namely: Eastern (Kibungo) and Western (Gisenyi and Cyangugu). According to Institut des Sciences Agronomiques du Rwanda (Niyongere et al., 2012), banana is the top crop in Rwanda. Exclusively small-scale farmers grow- it and occupying 35% of the country cultivated land. The perennial nature of the banana crop is important for food security and income generation in the peasant farming communities. The cash income from bananas is important as 60-80% and the remaining 20-40% for the rest of crops. The daily consumption of bananas in Rwanda is the highest in the world (250g per capita). However banana production has been declining since 2013 to 2015 from 3,228,821Mt to 1,862,869 Mt and below the target levels of the country production projections (MINAGRI, 2014&2015). In order to increase the profitability of banana it is important to know factors that drive profitability of banana production in Rwanda which is lacking. The findings from the study will close the knowledge gap in the study area and suggest ways to increase the profitability of banana.

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## II. METHODOLOGY

### Study area

This study was conducted in Ngoma district of Eastern Province of Rwanda since it is the best producer of banana compared to other Districts of Eastern province with big area under banana production.

### Research design

This study was a cross section survey design. It employed both descriptive survey and econometric analysis. Multistage sampling techniques were employed. The study used both primary and secondary data. Primary data inform of qualitative or quantitative to be obtained using questionnaires while secondary data was gathered from documented published books and journals.

### Target population

This study was conducted in Ngoma District and targeted farmers producing banana. Currently the total population under study is 366 people for both sexes. Out of this population only 191 banana farmers were selected.

### Sampling Techniques

Three multi-stage sampling techniques were used to select respondents from the selected districts. In the first place purposive sampling was used to select one district out of seven districts of Eastern Province based on their current levels of banana production. In the second stage proportionate sampling was used to sample respondents; the sample size of each stratum was proportionate to the population size of the stratum as the banana cooperative differs in number of farmers. Finally, simple random sampling to select farmers from each of the pre-selected sectors and cells.

### Data collection instruments

Primary survey data was collected from banana producers through a structured questionnaire which includes both closed and open-ended questions. Secondary data on the cost of inputs was collected from Minagri, reports and publications. For primary data collection, a questionnaire Data analysis tools

The data collected was summarized, coded, and entered in the computer using SPSS and Microsoft Office Excel and analyzed by using STATA computer program, version 13. Both descriptive and quantitative analysis was carried out. The results were presented through text, tables and figures accompanied by interpretations.

### Application of Multiple linear function

The following multiple linear regressions was used to analyze how institutional factors affect banana farming profitability:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_1 X_3 + \beta_2 X_4 + \beta_1 X_5 + \beta_2 X_6 + \beta_1 X_7 + \beta_2 X_8 + \beta_1 X_9 + \beta_2 X_{10} + u$$

Where;

Y= Profit

B<sub>0</sub>=Constant

B<sub>1</sub>=Coefficients to be estimated

X<sub>1</sub> = Distance to Road

X<sub>6</sub>=Trainings on fertilizer use

X<sub>2</sub>= Distance to Market

X<sub>7</sub>= Trainings use of improved cultivars

X<sub>3</sub>= Distance to Financial Institutions

X<sub>8</sub>= Cooperative membership

X<sub>4</sub>=Extension Services

X<sub>9</sub>= Accessibility to Credits

X<sub>5</sub>= Trainings on farm records

X<sub>10</sub>= Accessibility to Farm Inputs

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U=error term

Gross margin analysis

Gross margin is the difference between the gross farm income (GI) and the total variable cost (TVC), that is,  $GM = GFI - TVC$  Where: GM = Gross Margin (Frws/hectare); GFI=Gross Farm Income (Frws/hectare) and TVC = Total Variable Cost (Frws/hectare).

### III. RESULTS AND DISCUSSION

**Table 1** indicated that extensions services influenced significantly the farmers' profit from banana producers in the study area. Access to production and market extension services were expected to have a positive effect on the profit from banana production (Barrett 2008). Farmers who frequently receive extension service are more likely to have knowledge of production, handling, quality standards and market information on input and output prices and our findings are in line with the results of (Zeberga, 2010).

Access to credit had influenced the profitability from banana production; access to credit increases the farmers' capacity to purchase farm inputs like fertilizers, seeds and pesticides. We expected the profit of banana sold to increase with access to credit, however, this study indicates that access to credit has a negative effect on net farmer's income, this may be due to higher interest rates from commercial banks. As reported by Abu (2015) access to credit provides farmers with income that can be used to pay for market transactions and increase the quantity of marketed produce and our findings contradict with the study of Abu (2015), who found that access to credit gave farmers in Ghana funds to buy improved varieties, and produce and sell more groundnuts.

Results from table1, showed that cooperative membership was statistically significant to influence the profitability from banana production. Cooperative membership participation reduce the bargaining power and transaction cost from costly purchased inputs to vulnerable farmers either by subsidizes or by credits. The participation in cooperative as it is one way to alleviate poverty from small holder farmers has a positive and significant effect on the increased farmer's gross farm income. This is a contradiction to Ito, Bao, and Su (2012) also who indicated that smallholder farmers opt to self-exclude from participating in agricultural cooperatives if the costs of membership are greater than the returns obtained from membership.

**Table 1: Institutional factors affecting banana profitability**

Revenues	Coef.	Std. Err.	T	P> t
Distance to Road	-20458.5	16329	-1.25	0.212
Distance to Market	9896.16	8881.02	1.11	0.267
Distance to Financial Institutions	-3454.23	9675.61	-0.36	0.722
Distance to Water source	-15806.6	15997.81	-0.99	0.324
Extension Services	1296588	533316.9	2.43	0.016*
Trainings on farm records	-1870625	1101815	-1.7	0.188
Trainings on fertilizer use	2180605	1005010	2.17	0.118
Trainings use of improved cultivars	-1105865	859133.5	-1.29	0.288
Cooperative membership	-705011	371444	-1.9	0.051*
Accessibility to Credits	892945	422835.2	2.11	0.038*
Accessibility to Farm Inputs	665429	648205.9	1.03	0.308
_cons	4483643	539636.6	8.31	0.000

Number of Obs= 80; F(9, 70)=2.11; Prob> F=0.039; R-squared= 0.213; Adj R-squared =0.112

in the study area due to its high profitability index greater than to zero. The estimated total revenue and net farm income

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obtained in this study further indicates that banana cultivation in the study areas is still small scale and largely for domestic consumption. Gross margin per season per hectare was estimated at \$233.89, while the net farm income (NFI) which represents the return to management and labour was calculated at \$200.89.

**Table 2: Profitability of banana production**

Variables	Unit of measurement	Obs	Mean
Area	Ha	191	1.3
Yield	Kg/ha	191	19,797
Price	Frws/Kg	191	205
Gross Farm Margin	Frws/Ha	191	4,054,323
Fixed Cost	Frws		
Cost of land	Frws/ha		0
S/B Total			0
Operational cost	Frws/ha		
Cost of seeds	Frws/ ha	191	844,344
Cost of Inorganic	Frws/ ha	190	137,174
Cost of Pesticides	Frws/ ha	191	768,628
Labor Cost in 2017A	Frws/ ha	189	176,095
Cost of organic manure	Frws/ ha	191	270,393
Total Cost ( F. C+ V.C)	Frws/ ha	191	2,553,133
Net Farm Income	Frws/ ha	190	2,127,818
Cost Benefit ratio (CBR)			1.59

## IV. CONCLUSION AND RECOMMENDATIONS

The key findings in this study confirmed that institutional factors affecting banana profitability were extension services, cooperative membership and credits accessibility. Thus the study recommends that, government of Rwanda and related stake holders to increase the numbers of extension worker providers to reduce the farmers' extension worker ratio for the purposes of technology transfer through trainings, information dissemination on banana production.

The study recommends the Ministry of Agriculture and Animal Resources in Rwanda and related stake holders to emphasize on current polices of promotion of cooperatives through mobilization and sensation of rural farmers.

Policy makers and implementers in Rwanda in order to strengthen the current strategies of access to credit through designing polices aimed at mobilizing and sentizing farmers to use credits and reducing agricultural interest rates.

In order to increase profitability there is need for policy makers and implementers in Rwanda to design policies that encourage better prices, access to market outlets, reduce production costs and use of agriculture inputs.

### Further Research

Based on financial and time constraints, this study was limited profitability of banana small scale producers. Further study should be taken economic efficiency of banana production in the study area and Rwanda in particular.

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## REFERENCES

- [1] Abraham, B., Araya, H., Berhe, T., Edwards, S., Gujja, B., Khadka, R. B., . . . Styger, E. (2014). The system of crop intensification: reports from the field on improving agricultural production, food security, and resilience to climate change for multiple crops. *Agriculture & Food Security*, 3(1), 4.
- [2] Abu, B. M. (2015). Groundnut market participation in the Upper West Region of Ghana. *Ghana Journal of Development Studies*, 12(1-2), 106-124.
- [3] Alemu, M. M. (2017). Banana as a Cash Crop and Its Food Security and Socioeconomic Contribution: The Case of Southern Ethiopia, Arba Minch. *Journal of Environmental Protection*, 8(03), 319.
- [4] Ali, I., Sulumbe, I., & Shettima, B. (2010). Analysis of profitability and poverty reduction of yoghurt processing industries in Maiduguri Metropolitan area of Borno state, Nigeria. *Global Journal of Agricultural Sciences*, 9(1), 63.
- [5] Mutarutwa, N. C. (2014). The impact of the Girinka one cow per poor family program on household income in Gatsibo District, Rwanda.
- [6] Tripathi, L., Mwangi, M., Abele, S., Aritua, V., Tushemereirwe, W. K., & Bandyopadhyay, R. (2009). *Xanthomonas wilt: a threat to banana production in East and Central Africa*.