

THE CONTRIBUTION OF CONTRACT FARMING IN THE IMPROVEMENT OF PINEAPPLE PRODUCTION IN RWANDA: CASE STUDY OF UCOCUAN IN NGOMA DISTRICT

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Abstract: Agriculture sector has a very important impact in development of the countries especially for Low developed countries. The main objective of this research was to assess the contribution of contract farming in improving socio-economic development of rural farmers in Rwanda, case study of UCOCUAN (cooperative union) pineapple growers in Ngoma District. A sample size of 63 respondents to be employed for the identified target population was scientifically computed. Linear and OLS models have been used to estimate a relationship between dependent variable and independents variables. The methods of analysis used were descriptive statistics and regression analysis to estimate the parameters of the agricultural mobile services function through SPSS (16.0) and STATA (13.0) software. The result of the regression analysis indicated that assess the contribution of contract farming in improving socio-economic development of rural farmers in Rwanda is statistically significant. A p-value of 0.0000 tells us that our model as a whole fits significantly better than an empty model. Based on these objectives, the first hypothesis indicated that there was a significant contribution of contract farming on sustainable production of pineapples in the improvement of socio-economic development of pineapple growers in Rwanda a case study of Ngoma district at 1% level and 5 % level respectively where (p-values <0.05). According to the findings of the model, the factors (such as X_1 , X_2 , X_3 , and x_4) have significantly contributed to high market profit of pineapple production in study area. The results indicated that contract farming has been contributed significantly to Payment of school fees(x_1), payment of medical insurance(x_2), installation of water/ electricity(x_4), money saving(x_5), and buying other foods at a 1% level. According to the findings of the model, the second hypothesis indicated the contract farming has significantly contributed to different independent variables such as (x_1 , x_2 , x_4 , x_5 , and X_{75}). However, the contract farming has more contribution on farmers' user than no users. An increase in number of contract farming for farmer for sure the pineapple production will be sustained in Rwanda especially in the rural areas of Ngoma district.

Keywords: contribution, farming, Agriculture, pineapple growers.

1. INTRODUCTION

This study used UCOCUAN as case study (cooperative union) of pineapple growers in Ngoma District work with Inyange industries (Inyange Industries is a leading food processing company created in Rwanda, manufacturing a variety of products under modern and hygienic production facilities: high quality mineral drinking water, fruit juices, milk and other dairy products) it is the cooperative currently cooperative which is implementing contract farming in eastern province of Rwanda.

Contract farming can be defined as agricultural production carried out according to an agreement between a buyer and farmers, which establishes conditions for the production and marketing of a farm product or products. Typically, the farmer agrees to provide agreed quantities of a specific agricultural product. These should meet the quality standards of the purchaser and be supplied at the time determined by the purchaser (FAO, 2000).

Small-scale farmers often face a lot of difficulties in production and marketing of their produce. They usually sell their produce individually at the farm gate to middlemen or on open local markets at given prices. This reduces farmers to just price takers irrespective of the costs they have to incur in the production and marketing process. Furthermore, they have to bear a high risk of being not able to market their produce (Benites et al, 1998).

To develop a commercially viable Sector in Rwanda, it will be important to bulk up agricultural production. Under PSTA II, cooperatives of farmers agreed to plant similar crops and pool resources. but the approach needs to be complemented with technical assistance on production and marketing, as well as management training and marketing assistance. Therefore, under PSTA III alternative methods of bulking up such as contract farming are proposed to link small farmers with markets. The different models can be implemented in the Sector, depending on the crop and farmers' preferences. Civil society and farmers groups will play an active role in policy implementation. Also Rwanda enjoys warm and humid climate ideal for tropical fruits such as banana, passion fruit, and pineapple (NAEB, 2009).

Pineapple ranks among the three fruits in Rwanda after avocado and fruits banana. National annual production for the top 3 fruits is 81697t, 69226t and 31329t respectively and covering respective areas of 15620ha, 15904ha and 1961ha (Masimbe et al, 2014). pineapples generate more revenue as they yield more per unit area cultivated and earn higher prices per unit weight compared to other crops. They can provide income throughout the year even during the periods when no other crops are available for sale. In this regard, pineapple sub-Sector was identified to have the potential of improving the livelihood of small scale farmers in Rwanda, as such, this sub-Sector benefits support from National Agricultural Export Development Board and other private projects (NAEB, 2009).

Contract farming thought is a best alternative to improve the Rwandan agriculture Sector, it is why the study of contribution of contract farming in improving socio-economic development of rural farmers in Rwanda came in order to highlights the benefits exists in contract farming in Rwanda, case study of Pineapple growers in Ngoma District as case of interest.

2. RESEARCH METHODOLOGY

2.1. Study Area:

The cooperative union UCOCUAN is composed with 6 cooperatives namely KOPANABA in Sake Sector, KOABANAMU in Mugesera Sector, KAPANAZA in Jarama Sector, KAPAIZA in Zaza Sector, KODAIMU in Mutenderi Sector and KOVAR from Rurenge Sector in Ngoma District.

2.2 Description of the study area:

Ngoma District is one of the 30 Districts of Rwanda, one of the 7 Districts which made up the eastern province of the country. It shares common border with: Rwamagana District to its North-west, Kayonza District to its North-east, Bugesera District to its west, Kirehe District to its east and finally the country of Burundi to the south of the District. Ngoma District is divided into 14 Sectors, 64 cells and 473 villages. Ngoma District is divided into 14 Sectors (imirenge): Gashanda, Jarama, Karembo, Kazo, Kibungo, Mugesera, Murama, Mutenderi, Remera, Rukira, Rukumberi, Rurenge, Sake and Zaza. The District of Ngoma is part of low lands of the East, a region essentially marked by hills of a low slopes, with an average altitude of between 1400m and 1700 m above sea level. The relief of the District influences its climate, which leads to a creation of a temperate climate prevalent in low altitudes. The annual average temperature around 20°C .The thermal and pluviometric rhythm is marked in whole by the alternation of the rainy season, with intramural variations linked to the general movement of massive air currents coming from the Indian Ocean.

Primary data were collected from respondents through issue of questionnaires. Some of the respondents who were able to interpret and follow the questions in the questionnaires were guided by the researcher and were delivered the required information.

2.3 Data collection:

The questionnaires were used to obtain qualitative and quantitative, interviews was also used where the respondents grouped in different categories of cooperatives which helps to collect data from respondents. Face to face discussions was conducted by researcher together with respondents in order to get the information necessary for the study. Participants were selected according to age and gender to allow free expression as much as possible. Observation is a method for collecting data, used in the field to observe and record people's action and behavior (Mathai, A.J, 2010).

2.4 Empirical models:**2.4.1 Linear regression equation:**

In the case of assessing the contribution of contract farming in improving socio-economic development of rural farmers in Rwanda, a linear regression model was used. The Socio-economic development of rural farmers in Rwanda has been taken as dependent variable while the contract farming has been taken as independent variables. Data collected were analyzed using frequency tables, means and percentages, Ordinary Least Square (OLS) regression model. In this study, linear estimation model used to determine the factors influencing contract farming in improving socio-economic development of rural farmers.

The empirical model of the assessing the contribution of contract farming in improving socio-economic development of rural farmers in Rwanda is specified using the formula below:

$$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \dots + \alpha_n X_n + \epsilon \dots \dots \dots (2)$$

Where:

Y: is the total household agricultural productivity per ha.

α_0 : is the intercept

$\alpha_1, \alpha_1 \dots \alpha_n$: are the regression coefficients of independent variables (X_1, X_2, X_n respectively)

ϵ : is the error term

Y= Total pineapple production in tones

X_1 = Total Land located to pineapple cultivation in Ha

X_2 = Labor in term of men per day

X_3 = Education level in term of years spent in class

X_4 = Experience in term of years spent in mobile services use

X_5 = Age of respondents in of years

X_6 = Price of pineapple produce per kg

X_7 = Total amount of Credit in term of Rwf

X_8 =Capital (seeds/seedlings, pesticides and materials/tools used) in term of Rwf

α : is the intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are parameters to be estimated

ϵ =Error term

3. RESULTS AND DISCUSSION**3.1 Descriptive characteristics of pineapple growers and Economic situation of pineapple growers in Ngoma District****3.1.1 Descriptive characteristics of pineapple:**

Results shown that 26 (41%) were male while 37 (59%) of all respondents were female. The females are being greatest in numbers in general. These results are confirmed by the research by (NISR, 2014 where a higher percentage of employed females is employed in agriculture (82%) compared to males (63%) and a higher percentage of employed persons in rural areas is farmers (83%).

It is shown that 14.3% of all respondents are aged less than 30 years, followed by the respondents aged between 30-40 years with the percentage of 34.9 %. Also it is followed by 36.5% age between 40-50 years, 6.3% which were aged between 50-60 years old and above people who were aged above 60 years were representing 7.9% of all respondents. From this results, the highest value of respondents was lying between 40-50 years, this is not far different from the report by (NISR, 2013) showing that the majority of Agricultural operators in season B 2013 were in the age group of 55 and above. the result shows that 40(63%) respondents attended primary school, 14(22%) secondary school, 2 (3 %) have university level, while 1 (4%) completed vocational training and only 6(8%) never attended school.

(Abdulai, A. and P. Hazell, 2005) explains that the more the rates of skilled people in agriculture, the more the adoption of profitable production system. For that, it is for importance for the cooperative to encourage their members to attend school or training courses. This study is in relation with agricultural season survey 2013 season B, indicating that 64.1% of agricultural operators completed the primary level education (NISR, 2013).

3.1.2 Economic situation of pineapple growers in Ngoma District:

1. Respondents owning their land in Ngoma District:

Table 3.1: Respondents having their own land

Valid	Frequency	Percent
Yes	62	98.4
No	1	1.6
Total	63	100.0

Source: Field data, 2015

As shown in the table above it is evident that 62(98.4%) have their own land and 1(1.6%) has no land.

3.2 The size of the land ownership:

Table 3.2: Representation of land size from respondents

Valid	Frequency	Percent
Less than 1ha	37	58.7
Between 1-2 ha	21	33.3
Between 2-3 ha	3	4.8
Above 3 ha	1	1.6
Total	62	98.4
System	1	1.6
Total	63	100.0

Source: Field data, 2015

The results from the field study reveal that most farmers have the land holding less than to 1 ha of land as represented by 37(58.7%). It is also followed by those farmers who are having the land varying 1-2 ha of land as reported by 21(33.3%) of all sampled population. There is also a category of respondents which have the land size varying 2-3 ha of land represented by 3(4.8%) and 1(2%) respondents who said that he has above 3 ha. There is only one respondent representing (1.6%), who said that he has no land. According to the report of Ministry of Agriculture and Animal Resources, the landholdings are very small with more than 60% of households cultivating less than 0.7 ha, 50% cultivating less than 0.5 ha, and more than 25% cultivating less than 0.2 ha. (MINAGRI, 2009).

3.3 Linear regression analysis of the Factors contributing to the sustainable pineapples production in Ngoma District:

Factors that contributed to the sustainable pineapple production were, availability of improved seeds, availability of fertilizers, extension services, insured market, access to land, access to bank credits, Postharvest facilities and government support.

$Y=f$ (availability of improved seeds, availability of fertilizers, extension services, insured market, access to land, access to bank credits, Postharvest facilities, government support).

By considering this form of equation, the researcher developed regression model as follow:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon$$

The results found from data analysis were summarized in table below.

Table 3.3: Regression analysis of Factors contributed to sustainable production of pineapples

Explanatory variables	Coef.	Std. Err.	t	P>t
X1	0.0792231	0.5933636	0.13	0.014
X2	-0.7859949	2.62824	-0.30	0.066
X3	0.0765797	0.45046	0.17	0.026
X4	64.20045	17.96381	3.57	0.001
X5	1783.634	302664.6	0.01	0.059
X6	2.211145	0.7840027	2.82	0.007
X7	0.8698079	0.5181971	1.68	0.099
X8	0.4980694	0.1296299	3.84	0.000
Intercept	5637327	1276625	4.42	0.000
Number of obs = 63		Prob > F = 0.0000		
F(8, 54) = 46.51		R-squared = 0.8733		

Source: Field data, 2015

With 63 observations in our data set were used in the analysis of this research study, with a p-value of 0.0000 and R^2 of 0.8733 tells us that our model as a whole fitted significantly better than the empty. The results indicated that many factors such as availability of improved seeds, extension services, insured market, access to land, postharvest facilities, and government support (X_1 , X_3 , X_4 , X_5 , X_7 and X_8) have significantly contributed to sustainable production of pineapples and improved social-economics development of pineapples growers in Rwanda a case study of Ngoma district at 1% level and 5% level respectively because their (p-values < 0.05).

It is usually expected that a unit increase in the improved seeds the pineapple production should be increase by 0.08 units. Otherwise an increase of a unity of X_8 (government support) the production will be increased by 0.5unit. This also is supported by the study of (Lawal & Oluloye 2008) where they used the parameter estimates of the probit model to identify the factors influencing farmers' decision to adopt improved maize varieties. The results suggest in line with previous studies that farmer's education, farm size, and access to extension service exert positive and significant influence on adoption of contract farming. The regression model developed by the researcher should be expressed as

$$Y = 5637327 + 0.0792231x_1 + (-) 0.7859949x_2 + 0.0765797x_3 + 64.20045x_4 + 1783.634x_5 + 2.211145x_6 + 0.8698079x_7 + 0.4980694x_8$$

According to the findings of the model, the factors (such as X_1 , X_2 , X_3 , x_4 , x_5 , x_7 , , and X_8) have significantly contributed to sustainable pineapple production in study area. Here it fair to reject the alternative hypothesis. Other research mention the contribution of improved seed (Maruod E.et al, 2013) Reported that the adoption of improved seed is an important component of agricultural productivity, food security and sustainable economic growth. From the findings of highlighted the importance of access to land in contract farming by saying that Secure rights to (Lorenzo Cotula, Camilla Toulmin & Julian Quan., 2006) land are also a basis for shelter, for access to services and for civic and political participation. They are also a source of financial security, as collateral to raise credit or as a transferable asset that can be sold, rented out, mortgaged, loaned or bequeathed. Moreover, secure access to land creates incentives for the user to invest labor and other resources in it, so as to maintain or enhance its value and sustain its productivity, and to access social and economic development opportunities. (Deininger, K., & Squire, L., 1998.)

Findings have confirmed the results obtained that government support is important in implementation of contract farming, (Williamson, 1979). Revealed that economic institutions and practices have been created to reduce uncertainty, ensure that firms can specialize and invest in specific assets, and increase the frequency of exchange For example, legal systems, trade associations, grade and standards systems, informal codes of conduct, and certification procedures (Williamson, 1979).

4. CONCLUSION

According to the findings of the model, the factors (availability of improved seeds, availability of fertilizers, extension services, insured market, access to land, access to bank credits, Postharvest facilities, government support). Have significantly contributed to sustainable pineapple production in study area. Pineapple is the only fruits that Inyange industries is not importing outside of the country and the federation of pineapple grower has proved a satisfaction in terms of quality standards and availability of raw materials , Inyange has to increase their demand to secure farmers for sustainable production. Inyange Industries should decentralise their service to farmers for better satisfaction in terms of quality standards and quantity.

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