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Agricultural Income Determinants among Smallholder Farmers: Case of Northern Part of Burundi

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Abstract

About 90 percent of Burundi population depends on agriculture for their livelihoods. Agriculture employs the majority of labor force and is the basis source of income particularly for people living in rural areas. Agricultural income determines the purchasing power of many people living in rural areas. It is therefore important to examine the determinants of agricultural income for proper policy formulation that will help to improve welfare of farmers. The main objective of this study is to analyze the determinants of agricultural income among smallholder farmers in Northern part of Burundi. Based on field survey which covered 218 respondents and using linear regression, we found that among 8 variables used in the analysis, only the family size and the farm size have shown significant effects on agricultural income at 1% and 10% levels respectively. Some suggestions were also mentioned to sustain the agricultural returns, the well-being of farm households and to improve the rural infrastructure.

Keywords: Determinants, agriculture, small holder farmers, livelihood, Busoni district

Introduction

Agriculture has played a leading role in the growth of economies and simultaneously it reduced the poverty and transformed the wealth of many Latin American Countries, however, the application of similar concept has not occurred yet in sub-Saharan Africa (Ibekwe *et al.*, 2010).

The most part of the African countries, specifically countries in Sub-Saharan are yet to meet the criteria in order to be a competitive player in a growing agricultural revolution and the productivity still lags far behind when compared to rest of the world (Babatunde and Qaim, 2010).

Agriculture remains a powerful engine room for the development and an area of employment that provide job opportunities for people without job in rural areas because of their linkages to urban centers (Dethier and Effenberger, 2011).

According to Liang *et al.* (2012) validate that the impact generated upon by the policy on rural livelihoods differs from the collection of household. There is higher amount of off-farm

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entire household income from the small farms (Knerr, 2012).

Hence, these outcome imply that the abilities of both farm business and farm households to be of assistance to administer weather, climate and market risks allied through agriculture production in line with income from the farm household diversification changes over space and time by particular demographic and economic factors connected with those farms household (Mishra *et al.*, 2010).

In relation to that, Démurger *et al.* (2010) have made known that Economic reforms in most parts of rural China have derived many privileges to diversify both within-farm and off-farm activities.

To fully facilitate and improve the income diversification for rural farm household, take positive steps to develop rural infrastructure by such as supplying electricity and establishing good quality access to markets (Fausat, 2012).

Diversification of properties, farming activities, and income is more vital to respective rural household in African (Barrett and Reardon, 2000) with such diversification into off-farm, earnings contributes a sound percentage to the household and the availability of agricultural development institutions would greatly support the access of credit facilities and eventually improve income in rural areas (Fausat, 2012).

Joliffe (2004) proposes that education could be an influencing factor to which growing in numbers the educational accomplishment regarding farm households is believed to impact on others activities instead of farm work that likely to result in workforce out of agriculture with higher returns in other jobs.

Mishra *et al.* (2009) exposed that rationale of basic farm policy is to elevate good income for the farmers and to improve living standards, the policy need to be adjusted to suit the changes in farm household and its businesses over time period.

The present study was undertaken with the following specific objectives.

- a. Examine some socioeconomics characteristics
- b. To examine the determinants agricultural income among smallholder farmers.

Income determinants

Burundian economy and the livelihood of its more than 90 percent of people entirely based on agriculture with this 90 percent plus of the population live in 1.5 million smallholder farming (Curtis, 2013; FAO, 2013; Beck *et al.*, 2010; USAID, 2012; WFP, 2004).

The households which produce 95 per cent of the country's food supposed that owning a land into agricultural productions are some of the pivotal aspects of rural livelihoods in Burundi (WFP, 2008), and most household in the entire country including Kirundo Province on the northern part of the country and they generate their income from agricultural production.

Burundi is grouped into three parts of livelihood, 75% of population depends primarily on agriculture, 14% rely on both agriculture and livestock, and the residual 11% survive from temporary employment, small business, and paid jobs WFP (2004).

According to IFAD (2012) have understood that unfavorable effects of lengthened drought, as resulted in the boosting of crops related pests and apparently reduced in land productivity were common in the eastern and northern regions of Burundi.

WFP (2004) accepted that population growth in Burundi with the influx of refugees have attributed to the intense pressure on the land.

IFAD sustained its solid facts that the average farm size within Burundi is narrowing, with the soil dramatically losing its fertility and degraded. At the same instance, literally all public land has been distributed or occupied by people.

Lacking food security and raising malnutrition are turning out chronic for an increasing percentage of households. According to Démurger *et al.* (2010) believed that Economic reforms in some rural parts of China have driven fair privileges to broaden both within-farm and off-farm activities.

With regard to taking part in those activities it merely plays vital functions by raising level of rural farmers' income. Adenegan *et al.* (2013) exposed that those factors such as farm size, income, land tenure, food security, level of education those were linked to the gender factor, these variables had strong impact on the commercialization of agriculture and opposed that household were impacted from gender and distribution of household resources into commercialization of agricultural food crops in Ido Local Government Area of Oyo state, Nigeria.

Comparing with gender, number of females were more than males involve in food crop farming; with level of education for a good number of the farmer-respondents are low (-Dadzie and Acquah, 2012). According to Oni *et al.* (2009).

Exposed the results that a family labour with more female has a high possibility of increasing agricultural productivity, suggesting that women are needed to increase agricultural services.

Dose (2007). proposed that Human capital are important and involve some good some roles in diversification and secure earnings, Démurger *et al.* (2010) had stated that within-farm and off-farm activities play an important role in growing rural households' income and proceed to gender and age bias in admittance to off-farm tasks that seen dominated by young people and mostly they are male.

According to Delgado and Siamwalla (1997) to diminish risk, diversifications of agricultural production were decided by most African farmers and tend to produce very few commodities for export. Senadza (2011)

discovered that the results shown collection of non-farm income increased income inequality between the Ghana's rural households.

According to Carletto *et al.* (2007) the analyzed results of the Rural Income Generating Activities (RIGA) set of data verified the earlier findings that that rural non-farm economy plays a crucial role in the generation of income for those households in rural areas. Majority of farmers are seen to be occupied in cash crops but with off-farm income supplementation in Kenya (Wanyama *et al.*, 2010).

Research method

Study area

The Gisenyi zone is one of the 5 zones of Busoni district located in the northern part of Burundi and was selected as a study region because it is located in Bugesera natural region which currently encounter cyclical periods of drought.

Busoni district has a total land area of 420.89 square kilo meters, while the Country total area is 27,834 square kilo meters. Busoni altitude is between 1500 and 1700m, the total population of Busoni district is 121 626 inhabitants.

The climatic conditions in Gisenyi zone of Busoni district is characterized by two rainy seasons, which usually starts in September and ends in November. The second rainy season is from January to May.

Between these two seasons a short period of dry season is inserted throughout the month of December and the dry season last from June to September.

The average temperature is 20.9 degree Celsius per month, with maximum temperature of 27.1 degree Celsius and minimum temperature of 14.8 degree Celsius.

Rainfall varies between 700mm in the Bugesera depression and 1200mm on Bweru heights. Recent years, the Bugesera region

experiences disruptions rainfall and the province have always had a deficit of rainfall especially in its Bugesera (MPDRN and UNDP, 2006).

The 95% of the population of Busoni District are primarily engaged in the production of food and industrial crops. Due to the drought the agriculture production dropped sharply in recent years. Kirundo province, once considered as Burundi's food basket, is now facing recurrent food shortages because of low rain fall. The problem lies with the inconsistency of the soil conditions.

If without rainfall for almost two weeks, the soil tends to be completely dry and the harvest is lost, Muvunyi said (IRIN, 2009).

The recent assessment mission estimated that 35,710 households in three municipalities are highly food insecure, 10,710 households in Bugabira; 17,000 households in Busoni; and 8,000 households in Kirundo (USAID and R Bdi, 2010).

According to Muvunyi IRIN (2009), 307 families in Busoni have fled their homes in Gatare.

Data collection and sampling procedure

The data used in this study were collected through a field survey conducted in July 2012 in Gisenyi zone Busoni district, Kirundo province in the northern part of Burundi. A random sampling approach was adopted where the questionnaires were administered through individual structured interviews with the head of the households.

A total number of 218 households were surveyed. The interview was conducted in both centers; Kubanero and Rugarama.

A team of six people were involved in the administration of the questionnaire after being

trained. Organized questionnaires were asked to gather information from the household heads.

Before the data collection process began, the data collection team discussed with the local leader of the community to gather basic information about the community. Small holder farmers with many years of experiences were identified and selected for interview.

Those farmers their main source of livelihood was through agriculture and they were important for the study because they were able to recall some solid years back, according to Mubaya *et al.* (2012) those people were as good source to capture information related to their livelihood in the past.

This study used the descriptive statistics to examine the socio economics characteristics of interviewers and multiple regression analysis was use to examine the determinants of income among the smallholder farmers.

Results and discussion

The socioeconomic characteristics of the respondents are shown in table 1. The study indicated that the household with 4-8 members ranked highest with 48.6% while household with more than 12 members ranked lowest with 0.9%. It is obvious that households with higher family members tend to generate higher income from agriculture due to family labor than those with few members.

The result revealed that the most respondents were the male representing 88.1% while females were 11.9%. This means that, the most men have the only duty for the family and female headed family are fewer relatively to the male headed families in the study area because of the cultural and belief.

Table 1: Socioeconomics characteristics of the surveyed smallholder farmers

Socioeconomic Characteristics	Frequency	% of total	Mean	Standard deviation
Household size				
1-4	70	32.1	5.97	2.424
4-8	106	48.6		
8-12	40	18.3		
12 +	2	0.9		
Age				
20-30	50	22.9	43.37	13.357
30-40	46	21.1		
40-50	58	26.6		
50-60	41	18.8		
60-70	19	8.7		
70-80	3	1.4		
80 +	1	0.5		
Gender				
Male	192	88.1		
Female	26	11.9		
Marital Status				
Single	4	1.8		
Married	201	92.2		
Widowed	9	4.1		
Divorced	4	1.8		
Educational Qualification				
Illiteracy	128	58.7		
Primary school	78	35.8		
Junior high school	4	1.8		
Secondary school	8	3.7		
	218	100		

Source: Field survey, 2012

The age distribution of respondents demonstrated that most respondents fall between 40-50 age groups while very few are above 80 years representing 26.6% and 0.5% respectively.

This implies that agricultural income is common among the young household heads that they can work hard and could bear to take the risks from agricultural income.

The result also revealed that most respondents are married 92.2 while 1.8% is divorced and single. Most respondents had Illiteracy accounting for 58.7%, 1.8% only obtained junior high school education, 35.8% attended primary school and 3.7% been to secondary school.

This surprises that average educational level is low among the households' head that could certainly affect their agricultural income.

Multiple regression analysis was used to examine the determinants of agricultural income among smallholder farmer's households in the study area. The general form of the model:

$$Y = B_0 + B_1 PNFM + B_2 AG + B_3 GND + B_4 EDCL + B_5 MRTST + B_6 FMSZ + B_7 FRTL + B_8 CNDTIRGT + u_i$$

Where:

Y = Agricultural income

FS=Family size

AG = Age of respondent

GND=Gender

EDCL = Educational level of household head

MRTST=Marital status

FMSZ= Farm size

FRTLTV=Fertilization level

CNDTIRGT=Condition of irrigation

Ui = stochastic term.

Table 2: Regression analysis

Variables	Coefficients	Std Error	t-value	Probability
(Constants)	0.830	0.611	1.359	0.176
Family size	0.303***	0.086	3.539	0.000
Age	-0.046	0.047	-0.978	0.329
Gender	0.055	0.186	0.294	0.769
Education level	0.130	0.081	1.596	0.112
Marital status	0.040	0.167	0.239	0.811
Farm size	4.434*	0.000	1.832	0.068
Fertilization level	-0.097	0.107	-0.912	0.363
Condition of irrigation	0.017	0.108	0.162	0.871

Note: *, *** indicate significance at 10% and 1% levels respectively

The fundamental objectives of the regression is to determine how the explanatory variables.

Determine agriculture income in Busoni district Gisenyi zone and to ascertain the population variation of agriculture income that is explained or captured by these variables.

The fulfilment of these objectives is justified by the regression equation:

$$Y = 0.830 + 0.303FS - 0.0465AG + 0.055GND + 0.130EDCL + 0.040MRTST + 4.434FMSZ - 0.097FRTLTV + 0.017CNDTIRGT + ui$$

$R^2 = 0.100$, $R = 0.317$, Adjusted R square = 0.066, Durbin-Watson = 2.030, and $F = 2.909$.

The coefficient of multiple determined of 0.100 shows that about 10% of the variation in the agriculture income in the study area has been captured by the model.

Although the number is not very high, it is practically enough for us to explain economics phenomenon. The multiple-correlation coefficient of 0.317 also indicates positive relationship between the variables.

The coefficients on explanatory variables family size, gender, educational level, marital status, farm size, and condition of irrigation

conformed to the expected outcome while only family size is statistically significant. The F-statistic is significant and Durbin-Watson statistic reveals a minimal autocorrelation of random variables.

Some coefficients on explanatory variables such as age and fertilization level are not reliable with the theoretical forecast and have t-value that is statistically insignificant. This may be resulted from the unreliability of agriculture income data. The fact that this equation does not fit well for the targeted area, it needs caution in the interpretation of the result but the model cannot obviously be rejected.

Conclusion and recommendation

Agriculture is the main source of income for the large majority of Burundians especially for those who are living in rural areas. The purpose of this study is to examine the determinants of agricultural income among stallholder's farmers in Northern part of Burundi. Regression analysis was run to achieve the objective of this study.

Among 8 variables used in the analysis, only the family size and the farm size have shown significant effects on agricultural income at 1% and 10% levels respectively.

When household size increases by one person, agricultural income increases 30.3% Burundian currencies, an increase of one ha in farm size will lead to an increase of 44340 Burundian currencies of farmer's income.

Based on our findings, the following recommendations are hereby suggested:

- Because of high population growth that reduces farm size among families, the flow of improved agricultural technology to farmers should be considered and will help to increase farmer's income. Farmer's access to credit from microfinance organizations will help to purchase farm inputs that will be used in the agricultural process, thereby, contributing to increase agricultural income.
- In order to maintain and facilitate the well-being of farm households; encourage the small household farmers to rely on off-farm income to support farm households because by only depending on agricultural income is not sufficient. Hence, the well-being of farm can play a significant role to reduce the sudden influences from income variations.

References

- Adenegan, K. O., Adams, O. and Nwauwa, L. O. E. (2013). Gender Impacts of Small-Scale Farm Households on Agricultural Commercialization in Oyo State, Nigeria, *British Journal of Economics, Management & Trade*, 3(1): 1-11.
- Babatunde, R. O. and Qaim, M. (2010). Impact of off-farm income on food security and nutrition in Nigeria, *Food Policy*, 35: 303-311.
- Barrett, B. C. and Reardon, T. (2000). Asset, Activity, and Income Diversification among African Agriculturalists. *Some Practical Issues*, pp. 1-41.
- Beck, J., Citegetse, G., Ko, J. and Sieber, S. USAID (United States Agency for International Development). (2010). *Burundi Environmental Threats and Opportunities Assessment (ETOA)*
- Carletto, G., Cavarrubias, K., Davis, B., Krausova, M., Stamoulis, K., Winters, P. and Zezza, A. (2007). Rural income generating activities in developing countries: re-assessing the evidence. *Journal of Agricultural and Development Economics*, 4(1): 146-193
- Curtis, M. (2013). Improving African agriculture spending: budget analysis of Burundi, Ghana, Zambia, Kenya and Sierra Leone.
- Dadzie, S., K. N. and Acquah, H. de-G. (2012). Attitudes toward Risk and Coping Responses: The Case of Food Crop Farmers at Agona Duakwa in Agona East District of Ghana. *International Journal of Agriculture and Forestry*, 2(2): 29-37
- Delgado, L. C. and Siamwalla, A. (1997). Rural economy and farm income diversification in developing countries, *MSSD discussion paper No. 20*.
- Démurger, S., Fournier, M. and Yang, W. (2010). Rural households' decisions towards income diversification. Evidence from a township in northern China. *China Economic Review*, 21: 32-44.
- Dethier, J. and Effenberger, A. (2011). Agriculture and Development. A Brief Review of the Literature, Policy Research Working Paper No. 5553
- Dose, H. (2007). Securing Household Income among Small-scale Farmers in Kakamega District: Possibilities and Limitations of Diversification, *GIGA Research Programme: Transformation in the Process of Globalization*
- FAO (Food and Agriculture Organization of the United Nations), (2013). *FAO, Initiative soaring food prices*
- Fausat, A. F. (2012). Income diversification determinants among farming

- households in konduga, borno state, Nigeria. Academic Research International, 2(2): 555-561.
- Ibekwe, U. C., Eze, C. C., Ohajianya, D. O., Orebiyi, J. S., Onyemauwa, C. S. and O. C. Korie, (2010). Determinants of Non-Farm Income among Farm Households in South East Nigeria
- IFAD, Republic of Burundi. (2012). Enabling poor rural people to overcome poverty in Burundi
- IRIN (Integrated Regional Information Networks), (2009). BURUNDI: Thousands flee food crisis in north, <http://www.ethiojps.org/MyNoteBookNwsItems.html>, (accessed march, 2013).
- Jolliffe, D. (2004). The impact of education in rural Ghana: examining household labor allocation and returns on and off the farm. Journal of Development Economics, 73: 287– 314.
- Knerr, B. (2012). Determinants of farm income and agricultural risk management's strategies the case of rain fed farm households in Pakistan's Punjab, international rural development. Ph.D Thesis, Kassel University, Germany.
- Liang, Y., Li, S., Feldman, W. M. and Daily, C. G. (2012). Does household composition matter? The impact of the Grain for Green Program on rural livelihoods in China. Ecological Economics, 75: 152–160.
- Mishra, A. K., Erickson, K., Harris, M., Hallahan, C. and Uematsu, H. (2010). Determinants of Farm Household Income Diversification in the United States. Evidence from Farm-Level Data. Paper presented at Agricultural and Applied Economics Association (formerly the American Agricultural Economics Association) Annual meeting, July 25-27, 2010, Denver, Colorado. USA.
- Mishra, A., El-Osta, H. and Gillespie M. J. (2009). Effect of agricultural policy on regional income inequality among farm households. Journal of Policy Modeling, 31: 325–340.
- MPDRN and UNDP (Ministère de la Planification du Développement et de la Reconstruction Nationale and Programme des Nations-Unies pour le Développement). (2006). Programme d'Appui à la Gouvernance, Monographie de la commune Busoni
- Mubaya, C. P., Njuki, J., Mutsvangwa, E., P., Mugabe, Mugabe, F., T., Nanja, D. (2012). Climate variability and change or multiple stressors? Farmer perceptions regarding threats to livelihoods in Zimbabwe and Zambia. Journal of Environmental Management, 102: 9-17
- Oni, O., Nkonya, E., Pender, J., Phillips, D. and Kato, E. (2009). Trends and Drivers of Agricultural Productivity in Nigeria, Nigeria Strategy Support Program (NSSP), Report 001
- Senadza, B. (2011). Does Non-farm Income Improve or Worsen Income Inequality? Evidence from Rural Ghana. African Review of Economics and Finance, 2(2): 104-121.
- USAID (United States Agency for International Development). (2012). BEST Analysis: Burundi
- USAID and RBdi (United States Agency for International Development and Republic of Burundi). (2010). Food Security Alert
- Wanyama M., Mose L. O., Odendo M., Okuro J. O., Owuor G. and Mohammed L. (2010). Determinants of income diversification strategies amongst rural households in maize based farming systems of Kenya. African Journal of Food Science, 4(12): 754-763.
- WFP (World Food Programme), Republic of Burundi. (2004). Food Security and Vulnerability Analysis Report
- WFP (World Food Programme), Republic of Burundi, (2008). Comprehensive Food Security & Vulnerability Analysis (CFSVA).