Analysis of Gender Roles in Plantain Production and Commercialization in the Banana Bunchy Top Disease Affected Area of South Region, Cameroon

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ABSTRACT--- ***The objective of this study was aim to examine the gender roles in production and commercialization of plantain/banana on small farm holdings in the banana bunchy disease affected area as well as examining the various type of labour available in the area. Field survey was conducted in three major plantain production and commercialization villages in the region. It used primary and secondary data collected using the Harvard analytical framework, Focus group discussions, key informant interviews and semi-structured interviews using the snowball and purposive sampling techniques to obtain data from 141 respondents. The major descriptive results reveal that: the sample was made of 46.1% of females and 53.9% of males. The age range of the respondents was from 15 to 76 years with the most active population falling within the age range 36-45 years. Two main types of labour were identified: family and hired labour and 10 factors were identified which affected these labour types. The results of the logistic regression showed that age, level of education, years of experience in plantain farming, farm size, yearly income from the sales of plantains and the main reason for cultivating plantains were significant at 5% and 10% confidence interval and had positive effect on the choice of the type of labour used and an Odds ratios greater than or equal to 1. Gender, matrimonial status, household size and ownership of farm proceeds had a negative effect and Odds ratios less than 1. Thus, to be able to solve the problem of labour shortage needed in the various farm activities, it was recommended that farmers can reduce their farm sizes and the younger population who are more energetic be encourage to indulge in farm activities. Villages should be encouraged to further their education so as to better understand and implement Banana Bunchy Top Disease (BBTD) containment measures.***

Keywords--- Gender, labour, plantain, production, commercialization

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1. INTRODUCTION

Agriculture which is considered as the backbone of Cameroon's economy employs about 70 percent of its workforce, while providing 42 percent of its Gross Domestic Product (GDP) and 30 percent of its export revenue (FAO, (2013). Banana (*Musa spp.,* AAA or ABB groups) and plantain (*Musa spp.,* AAB group) are major food crops in the humid and sub-humid parts of Africa and are major sources of energy for millions of people in these regions (John and Marchal, 1995). Nutritionally, *Musa spp.* constitute a rich energy source, with carbohydrates accounting for 22% and 32% of fruit weight for banana and plantain respectively, and rich in vitamins A, B6, C, minerals and dietary fiber (Chandler, 1995; Honfo *et al.,* 2007). The dense caloric content coupled with nutritional quality makes *Musa spp.* one of the most important and regularly consumed staple foods in Cameroon. (Ajayi and Aneke, 2002; Lusty *et al.,* 2006). They contribute significantly to food security and provide more than 25% and 10% of the daily intake of carbohydrates and calories, respectively, for more than 70 million people in Sub-Saharan Africa (IITA, 2000).

In 2001, over 47 million tons/year were produced across the African continent rising to 36 million tons/year accounting for over 1/3 of the global production (Lescot, 2008). Despite the high level of plantain production in Africa and a yearly increasing production trend in the major producing countries, the increase remains insufficient to keep pace with the increasing demand (Temple *et al*., 1996; Temple, 2006).

Cameroon is a major banana and plantain producing, consuming and exporting country in Africa, and is ranked among the first 20 most important ones worldwide (FAO, 2011). In Cameroon, total production of bananas and plantains was estimated at 1,400,000 metric tons in 2009 with dessert banana accounting for 35% whereas plantains and other cooking bananas accounted for 65%, with an average consumption level of 190 kg/person/year (FAO, 2011). According to IMF (2010), 48.5% of the total population lives in rural areas with 50.9% of this rural population falling within the age group 15 to 60. The main occupation of rural populations in Cameroon and most African countries is farming. The farming system practiced is mainly subsistence mixed farming on small farm holdings (family farms). According to FAO (2012), family farming is related to production by producers who, despite their great heterogeneity among countries and within countries, have the following key characteristics such as limited access to land and capital resources as well as predominant use of family labour.

The plantain/ banana (*Musa* spp.) subsector in Cameroon has great potential to sustain food security, create jobs, generate income and contribute to agricultural, rural and economic development (Temple and Tentchou, 2000). However, achieving this potential depends in part on the level of interaction that exists among the many participants involved in the sector (CTA, 2005). The availability of plantain for consumption has become a critical issue in Cameroon and the sub region in particular, since supply does not meet demand. More so, the recent spread of the Banana Bunchy Top Disease (BBTD) in the region which requires specialized techniques and an intensive labour force to combat it is lacking. This has pushed farmers to switch to the cultivation of other food crops such as cassava (*Manihot esculenta*), cocoyams (*Colocasia esculenta*) and groundnuts (*Arachis hypogaea*) thus decreasing the current quantity supplied which is less than the expressed demand. In addition, the poor farm to market roads, low technical assistance and weak innovative systems does not favour increase in quantity produced.

Banana Bunchy Top Disease (BBTD) caused by the *Banana Bunchy Top Virus* (BBTV) is a great threat to food and income security of millions of people (IITA, 2011). The disease renders plants unproductive and stunted. BBTD spreads into new fields along with infected planting material and also through an insect, the banana aphid (*Pentalonianigro nervosa*), which is widespread in all banana and plantain producing areas. Once the disease is present in a region, it is extremely difficult to control or eradicate. No durable sources of resistance have yet been identified. BBTD is a great threat to banana production, productivity and subsequent commercialization.

In the South Region of Cameroon, the plantain (*Musa spp*) production system is mainly the subsistence system with the use of rudimentary tools. The cropping systems can be separated into those based on forest clearing and those based on land already used. Plantain is a major crop, and it is the most grown crop for commercial reasons which initiate the forest clearing cycle. Labour is mainly provided by household members, knowledge on pests and diseases is very limited and, farmers are unaware of infection pathways. Contrary to that, farmers are very aware of the causes of yield loss with an overall realistic assessment of total yield losses, estimated at 50% (Tetang, 2005). The labour force required is thus insufficient to meet the increasing demand for plantains given that production requires a large labour force and the available labour is unevenly distributed amongst the production cycle. Thus, division of this labour force based on gender and the nature of the various production and commercialization activities is necessary. This article therefore seeks to understand the gender roles in production and commercialization of plantain/banana on small farm holdings in the banana bunchy disease affected area. It also aims to; identify the different types of labour available at household level in the production and commercialization of plantains; examine the factors influencing division of labour in the production and commercialization of plantains; identify the opportunities and constrains in division of labour embedded in production and commercialization of plantains.

2. METHODOLOGY

The study was carried out in the equatorial forest of the South Region of Cameroon; an agro-ecological zone located between latitudes 02.33° N and 02.35° N and longitude 11.42 5" E and 11.59E. The study area was chosen due to the fact that it is an area producing large quantities of plantain and banana (*Musa spp*) and due to the prevalence of the BBTD in the area. The climate of the area is the Equatorial climate with a high level of humidity and an annual rainfall averaging between 1500 mm and 2000 mm distributed over 4 main seasons. The soil is very rich in humus, light coloured, sandy and clayey. The humus nature of the soil is as result of a large amount of decomposing organic matter present in it. This is favoured by the climatic conditions of the study area given its location in the dense equatorial forest. Data for the study was obtained from both primary and secondary sources. Primary data which enabled us obtain new and original information during the study was obtained using: household survey (moving from house to house to obtain information), focus group discussions (FGDs), gender sensitive seasonal activity calendar and key informant interviews. Snowball sampling and purposive sampling techniques were used to select the sample size. Snowball sampling was used to select key informants as well as questionnaire respondents. The purposive technique was used to select focus group participants by constructing a corpus i.e. a selection of people who could give valuable information that would help us to understand the phenomenon of gender roles in plantain production and commercialization. Nine focus groups and 141 respondents

were selected through these techniques. Data was analyzed using qualitative and quantitative methods, mainly with the descriptive statistics and the logit model. The logit model is expressed implicitly as follows:

Log (OODS) = f (X₁, X₂, X₃... X₇)

$$Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10}$$

$$Y = Log\ (P) = \ (P/1-P) = \ + \beta_1 X_1 + \ \beta_2 X_2 + \cdots + \beta_{10} X_{10} + \mu \quad \ldots\ldots\ldots 1$$
Where,

Y_i: Type of labour used by the farmer with Y_0 = Family labour and $Y_{1\ =}$ hired labour.

X_1: Gender of the respondent (farmer).

X_2: Matrimonial status.

X_3: Age of respondent.

X_4: Level of education of respondent

X_5: Size of household.

X_6: Farming experience.

X_7: Farm size.

X_8: Income of respondent.

X_9: Ownership of proceeds.

X_{10}: Main reason for cultivating plantains.

α =intercept.

β_i = partial regression coefficient with (i= 1,2,3,…12).

Hence, by integrating the 10 explanatory variables (X1, X2… X10) to equation (1), we now obtain equation (2) expressed as follows:

$$P = 1/[1 + [Exp - (\alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_{10} X_{10})] \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

P of the equation (2) is the predicted probability of an event Y to occur. By generalising it to each observation denoted by i.

3. RESULTS AND DISCUSSION

3.1 Socio-Economic Characteristics of Respondents.
The results from data analysis show that 92.19% of the households in the locality were male headed households. This explains the mark domination of men in decision making on access and control over all household and communal resources. Also a large majority (78.8%) of the respondents were married. The average size of households in the study area was 9 persons. Compared to the national average, this size is greater than the national average of 4.8 (Boukar, 2011). It can be said that the farming system in the area is predominantly labour-intensive, as such households need to be large enough to supply the labour required for farm operations. The educational level of respondents is important as it can influence their perceptions or willingness to adopt new strategies put in place to combat the BBTD in the study area in a bit to increase and sustain their livelihood. Results also show that 6.4 % of the respondents had no formal education primary education while 48.2 % of them had attended secondary education and only 0.7 % of them had attended university education. The ages of the of the respondents ranged from 16 to 75 years, with the mean age being 42.79 years, 35 being the modal age and 42.79 being the median age. The most active population in plantain production and commercialization activities was within age range of 35 to 45 years. The number of years of experience in plantain cultivation and commercialization ranged from 1 to 50 years. 57.3% of men against 48.48% of women had been cultivating and commercializing plantains between 1 to 10 years while 1.3% of men as against 3.0% of women had been cultivating and selling plantains for 41 to 50 years. Further results showed that the majority of respondents had a farm size of 7 hectares. 36% of men against 45.5% of women had a farm size of 7 hectares on which they cultivate plantains in association with other crops. Results also shows that 29.1% of proceeds from the farms belong to men alone in the study area while 24.1% belong to women while 45.4% of the proceeds belong to both men and women jointly. Even though

45.4% of these proceeds are jointly owned, this money cannot be spent by the women without the consent of the men. Also, results shows that, only 1.3% of men cultivate plantains for household consumption mainly while no woman does that. This is in contradiction Temple *et al.,* (2006) who stated that almost 40% of the total production is for home consumption. 36% of men against 28.8% of women cultivate plantains for commercial purposes mainly. 62.7% of men against 71.2% of women cultivate plantains for both household consumption and for commercial reasons. This is in line with Bikoï, (1999) who stated that in the past, plantain was produced mainly for home consumption, but it has become a source of diversification of income for poor farmers in rural areas.

3.2 Awareness of the BBTD in the Study Area
Results shows that 97.9% of the respondent were aware and could describe the symptoms manifested by a BBTD infected plant in their farms. These results imply that the majority of the populations were aware of yield decrease in their farms due to the BBTD. This is in line with IITA (2011), Kumar *et al.,* (2011) who identified the BBTD as the greatest threat to plantain and banana production and thus, to food and income security of millions of persons. Further results shows that only 6.3 % of the entire population were aware of any BBTD control measure, therefore implying that that the remaining 93.7% of the population were completely unaware of any BBTD control making them completely vulnerable to the disease. This situation accounted for the drop in the quantity and quality of plantain produced.

Family labour and hired labour were basically the types of labour found in the study area. The type and intensity of labour used in carrying out the various activities varied significantly based on the activity and the gender. Chi square tests of independence were carried to test if the various farm activities carried out were independent of the gender (sex) of the farmer and also if the type of labour used by the farmer in carrying out these various farm activities were independent of the gender of the farmer. The following hypothesis was tested:

H_0: Farm activity carried out is independent on the gender of the farmer.
H_1: Farm activity carried out is not independent on the gender of the farmer.

Table 1: Results of the Chi square test of independence for activity type and gender

Activity	Chi Square	df	p-value	Decision
1- Clearing	1.366	2	0.505	H_o
2-Felling of trees	1.177	2	0.555	H_o
3- Slash and burn	19.293	3	0.000	H_a
4- Digging of holes	2.624	4	0.623	H_o
5-Transportation of suckers	4.228	4	0.376	H_o
6- Planting of suckers	3.911	3	0.271	H_o
7- Pruning and weeding	4.435	3	0.218	H_o
8- Harvesting	10.549	4	0.032	H_a
9- Transportation of bunches	4.648	3	0.199	H_o
10- Commercialization	8.435	2	0.015	H_a

The results of the chi square test of independence presented in table 1 shows that at 90% confidence interval, clearing, felling of tress, digging of holes, transportation of suckers, planting of suckers, pruning and weeding and transportation of plantain and banana bunches to the village and markets are independent on the gender of the farmer. It was thus concluded that the above mentioned activities do not depend on the gender of the farmer. These results are in concordance with those of Temple *et al.,* 2006 and those of Salami *et al.,* 2010.

3.3 Factors affecting the type of labour used in the production and commercialization of plantains.
Ten factors were identified as the factors affecting the type of labour used in the production and commercialization of plantain. To capture the main determinants of the choice of the type of labour used in the production and commercialization of plantains, the logit model was used. The Chi-square statistic in the Omnibus tests of model in our study, show a Chi-square value of 26.195 on 10 df, sig = 0.003, hence the null hypothesis was accepted which implies that the model fits well. The Hosmer-Lemeshow test showed that the model adequately fits the data (the test was not

significant at 5% level with sig = 0.350, thus, the null hypothesis could not be rejected). On the basis of the two decisions option (family labour and household labour), the percentage of correct prediction was 84.1%. Moreover, most of the explanatory variables have the expected sign, except for the "gender", "matrimonial status", "household size'' and "ownership of revenue from the farm" variables.

Results of the logistic regression show that, the coefficient of the variable gender were negative at 10% level of significance, implying that, gender has a negative relationship with hired labour. In other words, results of table 2 show that females (women) are more likely to use family labour than hired labour. Age had a positive coefficient (significant at 5%), implying that, age of farmer influences the type of labour used. Its ODDs ratio of 1.015 implies older farmers are 1.015 time more likely to use hired labour that the younger farmers. This may be due to the fact that the older the farmers become, the less strong they to carry out very tedious activities. Level of education, years of experience, farm size, income and the main reason for the cultivation and commercialization of plantains also had positive coefficients. This implies that these variables have an influence on the choice of the type of labour to be used. However, the coefficients of household size and ownership of revenue gotten from the farm were negative. This implies that these variables are negatively related to hired labour. An increase in these variables by a unit will increase the probability of using family labour by 1.002 and 0.534 respectively.

Table 2: Results of logistic regression of the factors affecting the type of labour used in the production and commercialization of plantains.

variable	B	S.E.	Wald	df	Sig	Exp B	1/Exp B
Gender (FL=0, HL=1)	-1.210	0.455	7.08	1	0.008***	0.298	3.356
Matrimonial status (FL=0, HL=1)	-0.138	0.139	0.992	1	0.019**	0.871	1.148
Age (FL=0, HL=1)	0.24	0.021	0.518	1	0.072*	1.015	-
Level of education (FL=0, HL=1)	0.002	0.255	0.890	1	0.045*	1.272	-
Household size (FL=0, HL=1)	-0.022	0.049	0.001	1	0.075*	1.002	0.998
Years of experience in farming (FL=0, HL=1)	000	0.024	0.855	1	0.155	0.978	-
Farm size (FL=0, HL=1)	000	000	2.760	1	0.070*	1.000	-
Ownership of resources from the farm (FL=0, HL=1)	-O.628	0.287	4.770	1	0.029*	0.534	1.873
Income (FL=0, HL=1)	000	000	1.160	1	0.082*	1.000	-
Main reason for cultivating plantain (FL=0, HL=1)	0.105	0.222	0.224	1	0.160	1.110	-
Constant	0.640	1.41	0.206	1	0.650	1.896	-

***: Significant at 1%; **: Significant at 5%; *: Significant at 10%;

Number of observations n=141; -2 Log likelihood=93.793; Nagelkerke R²=0.244;

Percentage of correct prediction=84.1%;

Omnibus Test of Model Coefficients: χ^2 =26.195 df= 10 sig= 0.003;

Hosmer and Lemeshow Test: χ^2 = 8.905 df= 8 Sig= 0.350.

FL: family labour , HL: Hired labour

Ln(ODDS)= 0.64 – 1.210X₁ - 0.138X₂ 0.24X₃ + 0.OO2X₄ -0.022X₅ -0.628 X₉ + 0.105X₁₀ ……………………3

The equation model is given as equation 3 above.

4. CONCLUSION

Based on the results, it can be concluded that, the South Region is no doubt an area with great agricultural potentials which could play a very important role in poverty reduction and sustainable development. The high level of fertility of

the soil and its rich equatorial climate, which is highly favourable to plantain production coupled to its frontier location making it accessible to a ready and growing market has highly transformed the attitude of its inhabitants with regards to plantain cultivation which was mainly done for home consumption but which is now progressively been done for commercial purposes. 36% as against 28.8% of women cultivate plantain mainly for commercial purposes thus making it their min activity.

The BBTD which was has been recognised as the greatest threat to plantain production is well known by the farmers but unfortunately 97.0% of men and 93.94% of women are unaware of any BBTD control measure. This situation is an alarming lost since farmers are helpless face to this and are recording yearly yield loss of up 30% and more as time goes by pushing them to progressively abandon plantain cultivation and divert to other food crops such as cassava, cocoyams, yams, maize and groundnuts.

As concerns the factors affecting the choice of labour used in plantain production and commercialization, the following factors, level of education, household size, farm size, and yearly income were all significant at 5% and 10%, all had a positive effect on the choice of the labour type. The latter factors showed that, an increase in these factors will increase the probability of using hired labour instead of family labour. The following recommendations were made to stakeholders; To

- Revisit existing gender policies related to access and control over household and communal resources and the follow up of the application of those in place in order to ensure gender equity. Put in place a transparent land rights and land registration system in Cameroon.
- Adopt laws that promote a land tenure system which protects the land rights of all actors particularly small scale producers and rural inhabitants with a view of achieving food security and food sovereignty.
- Promote and uphold friendly dialogue and negotiations, through open communications between conflicting parties (facilitated by neutral or independent parties), for a peaceful, cheap and sustainable resolution as concerns gender access and control over household and communal resources.

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