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Economic Implications of Cocoa Production on farmers' Welfare in South West Region of Cameroon

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Abstract

This study affirms Adam Smith's assertion in his welfare theory that individuals are led by an 'invisible hand' to promote an end which was no part of their intention. To Smith, individuals in an attempt to take care of their welfare end up promoting the growth and development of the entire nation. Therefore, development at best can be achieved by concentrating on welfare improvement of the citizens rather than concentrating on development in order to improve welfare as has been adopted by most scholars. This study investigates the effect of cocoa production on the welfare of its farmers in the South West Region of Cameroon**.** A multi-stage sampling technique was adopted in the distribution of the 430 questionnaires. With the use of Principal Component Analysis (PCA) and the path regression, the study revealed that fertilizers usage and chemical spray on the farm has a positive significant effect on cocoa production, whereas access to credit and perceived climate variability has a negative direct significant effect. Cocoa production has a positive significant effect on household income. The outcome of household income on welfare was seen by its influence on home consumption, child education and basic needs provision. The above results permit this study to recommend among others the following: The introduction of improved cocoa species which are more adaptive under the current and highly unpredictable climate scenario. Creation of village banks that would provide loans to farmers in the form of inputs rather than money; farmer education to avoid financial mismanagement; need for diversification in order to avoid the risk and uncertainty involve in cocoa production and the "village-first" development strategy that will lure the young and energetic generation in to the cocoa sector.

Keywords: Cocoa production; Path regression; Welfare; South West region

1. Introduction

Agriculture has proven to be the major sustainer of most World economies especially African economies. This sector contribute to development as an economic activity, as a livelihood, and as a

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provider of environmental services, making it a unique instrument for poverty reduction, welfare improvement and development, (Dethier and Effenberger, 2012; World Development Report, WDR, 2008). Three billion of the developing world's 5.5 billion people, nearly half of humanity, live in rural and depend directly or indirectly on agriculture for their livelihood.

The economy of Cameroon is predominantly agrarian and agriculture remains one of the main driving forces for the country's economic growth and development. This sector employs over 70 percent of the country's workforce, contributes about 32 percent of its GDP and 30 percent of its export revenue (MINADER, 2012; Asare and David, 2011 and Molua and Lambi 2007). This agricultural strength comes principally from the export crop sector, which is based on cocoa, coffee, timber, banana, rubber and palm oil, with cocoa as the leading subsector (Tosam et al, 2019). Cameroon has approximately 250,000 cocoa farms with about 60 percent of the country's population depending directly or indirectly on cocoa for their livelihood (Klarer, 2014; FAO, 2005). The country earns about 250 billion CFA francs (308.6 million pounds) a year from cocoa, accounting for about half its primary-sector exports, National Cocoa and Coffee Board, (NCCB, 2013). In 2009 cocoa accounted for 15% of Cameroon's total annual exports, and 2.2% of the country's GNP (Armathé et al., 2013). Thus the welfare of millions of families including 600,000 farmers in Cameroon, depends on the cocoa industry.

Apart from its contribution to the nation's economy through the revenue it generates, cocoa is a plant-based food that contains carbohydrates, fats, proteins, natural minerals and some vitamins. Thus this crop unlike other plant foods contains a group of compounds which exhibit several health benefits (Taubert et al, 2007). Cocoa therefore does not only contribute to welfare indirectly through the income that comes from it sales but also directly as food through the health benefits it provides. Unfortunately the consumption of cocoa in Cameroon like in many Sub Saharan African countries is approximately 0.6 %. Therefore the contribution of cocoa to farmers' welfare in Cameroon and the South West Region in particular is merely indirect through the income they earn from its production. Most of the cocoa producers have never tasted chocolate, though their lives revolve around its key ingredient (Cocoa Barometer, 2015). The cultivation of this rich plant based food which has proven to be one of the major contributors to export earnings and GNP of the economy of Cameroon is predominantly in two basins in the country (The South West and the Center basins).

The South West Region is the leading cocoa producing basin in Cameroon. This region produced over 58% of the country's total production in 2012 (FAO, 2014; MINADER, 2012). The main source of the livelihood of most inhabitants in the South West Region is cocoa production. Given that over 65% of the farming population in the south West Region are involved in cocoa production it will be erroneous to talk about their welfare without making allusion to their main source of income "cocoa production". Production in the South West Region of Cameroon moved from 46000 tons in 2001 to 98,450 tons in 2007 and to 188,329 tons in 2014, contributing 42%, 46.3% and 59.8% to the National output of Cocoa in 2001, 2007 and 2014 respectively (National Institute of Statistics, 'NIS', 2018). This imply that cocoa production in the South West Region as well as the regional share of total national production of cocoa has risen significantly in recent years; re-echoing the role played by the South West region (SWR) in Cocoa production in Cameroon. However, the farmers who cultivate and pick the cocoa beans in this Region; the most important actors in the cocoa value chain, seem to be languishing in poverty.

The evolution of poverty in the Region shows that the rate of poverty moved from 33.8% in 2001 to 27.5% in 2007 and to 18.2% in 2014, (NIS, 2016). This declining trend of poverty is in line with the increasing trend of cocoa production in the region. On the contrary, despite this rise in output and fall in poverty rates in the region, most cocoa farmers in many cocoa-growing communities are still suffering from low incomes, high levels of poverty and poor nutrition (Klarer, 2014). This contradicts Chayanov (1920) and Barnum and Squire (1979) Farm Household Models, which states that an increase in output all other things being constant will increase 'full household income' and consequently welfare.

The growing of cocoa requires much investment in terms of time; this restricts the cocoa farmers from diversifying their economic activities and thus leaves them in a very delicate financial situation (National Cocoa and Coffee Board 'NCCB', 2014). This therefore endangers the cocoa sector which feed, cloth and takes cares of the livelihood needs of thousands of families in the South West Region of Cameroon.

Aware of this demise in the cocoa sector and the plight of the cocoa farmer, the government of Cameroon has in the past and even recently undertaken enormous reforms, in an attempt to revamp the cocoa sector and improve the welfare situation of the cocoa farmers. These reforms includes, but are not limited to the following; liberalization of the cocoa sector in 1989, which was aimed at, increasing the efficiency of commodity marketing and raise prices received by farmers among others; A modernization policy reform in 2000, fuelled by price fluctuations and negative balance of trade, that was designed with the goal of raising cocoa production from 137,000 tons to 320,000 tons by 2015. The strategy was first aimed at attracting a "younger, more financially viable and more educated" generation of farmers into the sector, secondly in facilitating new farmer's access to vast extensions of land from 4 hectares and above, and finally in producing and distributing cocoa hybrid species to farmers accompanied by training. The disbursement of 2.1 billion FCFA in 2004; this was to be used in providing more technical, financial and institutional support to farmers (NIS, 2016; NCCB, 2014).

A re-launch program began in 2006 under the name '*Professionnalisation Agricole et Renforcement Institutionnel'* (PARI) and was aimed at creating awareness and attracting local investors into the sector. It was led by the Ministry of Agriculture and Rural Development (MINADER) and the Sustainable Tree Crop Program (STCP) driven by the International Institute of Tropical Agriculture (IITA). Its activities included; diffusing better cultural practices including agro forestry, improving infrastructures, organizing farmers into cooperatives to ease marketing, and facilitating their access to farm inputs, information and credit (Ndoping, 2011; Kamdem et al., 2010).

The Development fund for the Cocoa and Coffee (FODECC) was created on March 2006 by the decree No 2006/085 of 9th March 2006. Her principal mission is to support this sector through funding of projects aimed at protecting, increasing and guarantying both the qualitative and quantitative cocoa production. In this same 2006 the state-run Cameroon Cocoa Development Authority (SODECAO) decided to acquire land in the south west region for distribution to farmers to open new cocoa farms (MINADER, 2012). Plans have also been developed to improve rural infrastructure and empower farmers to negotiate better prices with buyers. The government announced a 5 years cocoa project in 2009 stating that it would invest $10 million on 20 million seedlings in the first year alone. The Inter-professional Cocoa and Coffee Council (CCIC) launched its "New Generation" scheme in 2012 to lure young people to cocoa farming and create new plantations by funding agricultural schools and giving logistical and financial help to the new farmers (MINADER, 2012). The NCCB regulator also pledged to invest 1.7 billion CFA francs to rehabilitate 2,500 cocoa dryers in the main growing areas to reduce the presence of smoke in beans and reinforce controls in an effort to meet tougher European Union (EU) quality standards (NCCB, 2015).

The above reforms were not without fruits: liberalization has helped farmers to be enjoying higher cocoa prices. Evidence is the fact that prices moved from 430 FCFA in 1988 to 1,695 FCFA in 2011 (NIS, 2018); Road network density (paved and unpaved roads) moved from 3.8% in 1987 to 7.2% of the surface area in the South West Region (SWR) in 2001 (Klarer, 2014 and Njume-Ebong, 2004). About 20% of the cocoa farming population in the SWR has successfully gone through training and certification at Farmer field Schools (FFS) (Kimengsi et al., 2016). Over 114 ovens and over 1,000 canvas sheets (tarpaulins) were distributed freely to cocoa farmers in Cameroon's Central and South West Regions for quality improvement among others. However, not all the fruits have been realized by these reforms and even among those realized the levels are still below expectations.

Thus despite these efforts by the government and it associated results much has not change in the cocoa sector in the South West Region as many cocoa farmers continue to live in destitute poverty. This is evident by the fact that annual average revenue per person in the cocoa producing zones of the South West Region as revealed by Folefack, (2010) stands at 228,263 FCFA (386USD) implying that an individual lives on 625.4 FCFA per day, which is less than the 738 FCFA limit set by Cameroon Household Survey 2007 (ECAM3) for falling into poverty in Cameroon. Again Cocoa Barometer, (2015) and Klarer, (2014) attest to the fact that one out of every four cocoa farmers in these cocoa fields still goes to bed hungry every night.

The above analyses reveal that the real contributing factors to the welfare of cocoa farmers in the South West Region are yet to be known and one will not need a prophet to affirm these field realities as one visit these cocoa producing communities. This therefore undeniably calls for an investigation into the economic implications of cocoa production on the welfare of its producers and that is where this paper finds its grounds.

Many studies/similar works have been carried out on cocoa production and livelihood sustenance in the world, Africa, Cameroon and the South West Region. Some of these studies looked at cocoa production and its growth challenges (Tchokote et al., 2015; Achu , 2009; Wokia-azi, et al, 2008; Vigneri, 2007; Amin, 2001). Others were carried out to examine the influence of climate on cocoa production, (Kimengsi et al, 2013; Oyekale, and Oladele, 2012)**.** Others looked at cocoa as an export crop and its effect on livelihood (Hasnah, et al., 2011; Ladé, 2007; Uba, 1998; Baye, 1998); and cocoa as a small holder activity (Mubeteneh, 2015; Bemieh, 2013); farmer's unions and cocoa production (Kimengsi et al, 2016; Njila, 2012); determinants of cocoa production (Effah et al., 2017; Forgha and Tosam, 2013 and Fadipe et al., 2012); technical efficiency, cocoa output and livelihood improvement (Mukete et al 2016; 2018; Naftali et al. 2014; Richman, 2010); value chain in cocoa production and it livelihood implications (Belen, 2013; Gereffi and Fernandez-Stark, 2011; Traoré, 2009; Kazianga et al., 2002); livelihood diversification and welfare (Daud, 2018; Oyinbo and Olaleye 2016; Abimbola and Oluwakemi, 2013; Aneani, et al, 2011); the effect of poverty on household welfare (akerele and Adewuyi, 2011; Ekow, 2011; Naschold, 2008); the effect of famer innovation on household welfare (Tambo and Wünscher, 2014), cocoa production, agriculture and welfare as well as welfare determinants among others (Lekobane and Seleka, 2017; Bellemare, et al., 2016; Lawal et al., 2015; Ademiluyi, 2014; Quartey, 2012).

These studies adopted various methodologies in the analysis of data ranging from Ordered Probit regression, endogenous switching regression, integrated impact assessment, two-stage least square (2 SLS), FGT poverty model and Tobit regression, Ordinary Least Squares (OLS), Generalized Method of Moments (GMM), profitability and efficiency indexes, multinomial logit among others. The present paper has used the Principal Component Analysis (PCA) and path regression in its data analysis which has been adopted by none of the above studies.

Some of the above scholars have used various variables as proxies for welfare. Some have used household assets as a proxy for welfare (Ekow, 2011; Naschold, 2008); some have used expenditure (Lekobane and Seleka, 2017; Lawal et al. 2015); others household income (Tambo and Wunscher, 2014; Oyinbo and Olaleye, 2016; Daud et al., 2018) and some household consumption (Bellemare et al. 2016; Akerele and Adewuyi, 2011). Those who adopted the use of income as a proxy for welfare used per capita household income to capture welfare. This study did not use per capita household income like other studies but adopted the use of household income and observe the effect of household income on home consumption, child education as well as basic needs provision among the cocoa farming households in the south West Region of Cameroon making the study unique.

2. Methods, Techniques, Studied Material and Area Description

The study adopted a cross-sectional research design which included both survey and ethnographic methods (Ranjit 1996). This cross-sectional study design shows much relevance in this study since it seeks to analyze the economic implications of cocoa production on the welfare of cocoa farmers using a cross section of the farming population of the South West region of Cameroon. It will therefore gives an overall picture of how cocoa farming affects the welfare of the cocoa farmers through its effect on shelter provision, food, clothing, education and health among others that has been captured by household income. The study made use of primary sources of data as well as a mixed method research design in primary data collection. Structured questionnaire and ethnographic techniques were used in the data collection process. The ethnographic study methods used include interviews and observations (with pictures on the ground).

The choice of this design is due to the fact that it is relatively quick and easy to conduct (no long periods of follow-up). Data on all variables is collected at the same time. With this design it is possible to

measure occurrence for all factors under investigation, and multiple outcomes and exposures can easily be premeditated. It is good for descriptive analyses and for generating hypotheses. Attention was be paid to all categories of cocoa farmers, be they small or large scale farmers as well as farmers who own their personal farms and those who are engaged in share cropping. Therefore this work conducted a household level survey in which cocoa farming households were targeted.

A multistage random sampling technique was employed to select the communities as well as sampled households in the study area. Lists of all the cocoa producing villages/communities were obtained from the divisional and regional delegations of agriculture in the South West Region. A clear distribution of the questionnaires is presented in Table 1 below. Questionnaires were administered mainly to households' heads, but other household members were allowed to provide relevant information which could not be sufficiently supplied by the households' heads or could give information in the absence of the households' head.

Table 1: Distribution of Questionnaires as a Percentage of the Total Sampled Population

Division	Estimated Cocoa farming population	% of Cocoa farming pop. in each Division	No. of Questionnaires distributed	Total No. of Questionnaires recovered	Questionnaire recovery rate
MEME	174,151	37.6%	162	143	88%
FAKO	113,877	24.6%	105	91	86%
MANYU	102,285	22.1%	95	80	84%
LEBIALEM	20,916	4.5%	19	16	84%
KUPE-MANEGUBA	36,038	7.8%	34	30	88%
NDIAN	16,215	3.5%	15	14	95%
TOTAL	**463,482**	**100**	**430**	**374**	**87%**

Source: NIS, (2016); MINADER, (2018) and Researcher's computation, 2018

Model Specification

In order establish the relationship between the cocoa production and the farmers' welfare, this study has adopted a related class of models based on Chayanov's ideas that has become known as the New Household Economics (NHE) models, first introduced by Becker (1965). The New Household Economics models assume that the household acts as a unified unit of production and consumption which aims to maximise utility (welfare) subject to its production function and total time constraint. The NHE framework has been widely adopted in many studies and has provided a foundation for the study of household behaviour (Singh et al, 1986; Squire, and Strauss 1985; Rosenzweig and Schultz 1983; Rosenzweig and Strauss 1982, 1984). As already indicated above this study has adopted the NHE model; and has come up with a conceptual model that examines how the cocoa farmer shares his/her time in the production of cocoa and carrying out other activities and the effect of this on his household income (welfare). Thus the concept of this model adequately captures the objective of this paper.

It has been assumed in this study that the only source of livelihood for the famers is cocoa production thus they have only one source of income. However, in reality, it is obvious that all the farmers in the South West Region cannot depend on cocoa production alone for a living. Therefore any other activity which the farmer carries out beside cocoa production from which he/she earns income that can affect the welfare of the farmer has been captured in this study by the variable diversification so as to better evaluate the effect of cocoa production on the welfare of the farmer. Cocoa production and welfare have been captured by our conceptual model below;

The conceptual model showing the relationship between cocoa production (*CCP*), other activities (livelihood diversification) (*LHD*) and households' income (*HHI*) is presented below.

$$HHI = f(CCP, LHD) \quad (1)$$

Where *CCP* = cocoa production, *LHD* = livelihood diversification and *HHI* = household income

The equation above shows a functional relationship between the variables cocoa production (*CCP*), other activities, (*LHD*) and household income (*HHI*). Transforming the above functional relationship into an econometric model gives us equation 2 below:

$$HHI_i = \alpha_0 + \alpha_1 CCP_i + \alpha_2 LHD_i + \varepsilon_i \quad (2)$$

Where; α_0 is the constant term (intercept) and α_1 and α_2 are the parameters to be estimated using partial least square estimation techniques of structural equation modeling. Where the subscript i indicates that the observations across individual parameters at a particular time. α_1 and α_2 are expected to have a positive and negative signs respectively. Equation (2) permits us to examine the effects of cocoa production on household welfare using household income as a proxy for welfare.

Area of Study

This study is carried out in Cameroon, particularly in the South West Region of the country. The South West Region is made up of six divisions namely; Fako, Kupe Muanenguba, Lebialem, Meme, Ndian, and Manyu. This Region has a surface area of 25,410 km^2. It is bounded to the north by the North West region, south by the Atlantic Ocean, to the west by Nigeria and in the East by the Litoral region. The South West Region is situated just above the equator and along the Cameroon line of volcanoes; it is covered with humid forests and is ecologically favourable for agriculture of various types especially cocoa production (Chambon and Mokoko, 2013; Njila, 2012). Cocoa is produced in all the six divisions of the South West Region though not of the same magnitude, thus this study cover all the cocoa producing areas of the six divisions of the South West Region. See the map of Cameroon showing the South West Region and the map of the South West Region showing all the cocoa producing areas in figure 1 below.

A B

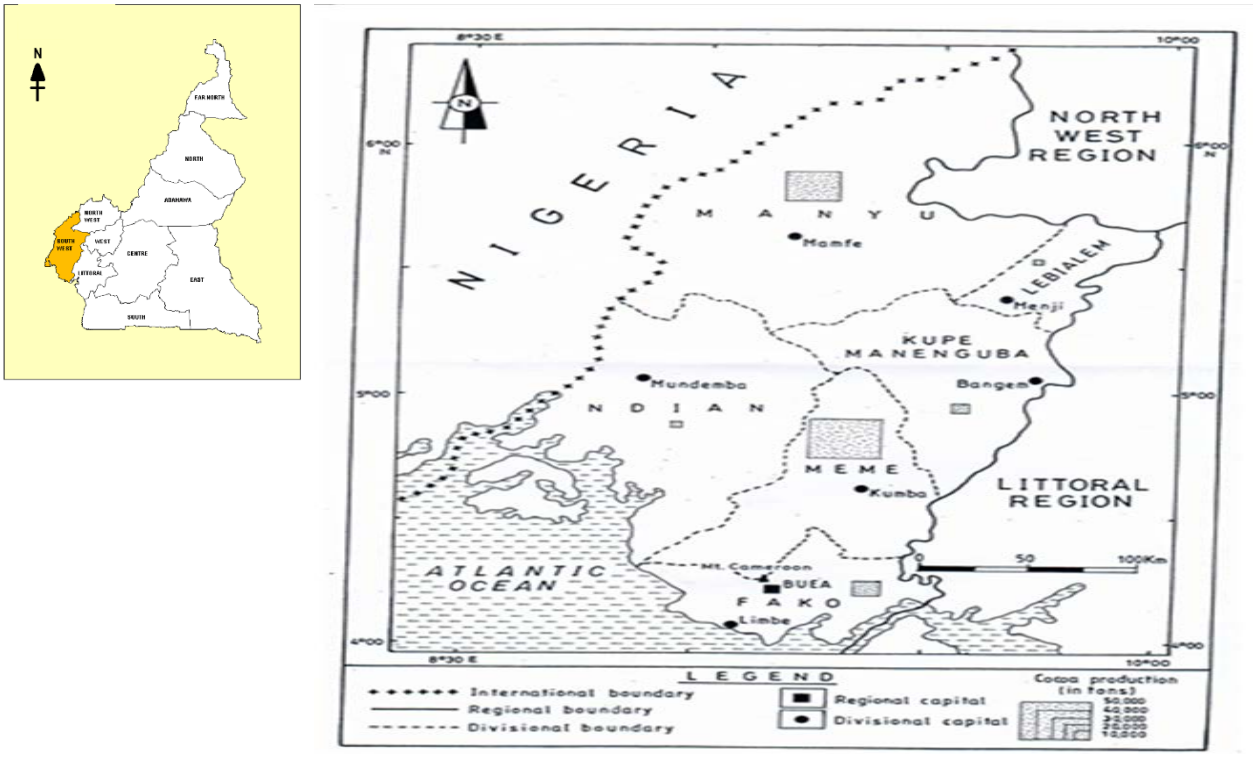

Figure 1*:* (A) Map of Cameroon Showing the SWR; (B) Map of SWR Showing the Cocoa Producing Areas
Source: Adapted from the Department of Survey South West Region

The reason for the choice of this region is because it is one of the two cocoa production basins in Cameroon and again the region is heavily endowed with a lot of potentials for cocoa production. Cocoa is produced in 7 of the 10 Regions of Cameroon but the South West Region alone produces over 58% of the cocoa produced in Cameroon thus the region stand as the country's main pillar in terms of cocoa production (FAO, 2014; MINADER, 2012). This high production is largely due to its rich soils and humid climate. The region has the highest output per hectare in Cameroon averaging more than 425 kg per ha. Cocoa production was first introduced in Cameroon, in the South West Region as early as 1886 – 1887 by the German colonial masters who managed its production and exportation as raw materials for their home industries; therefore this region has a long history of cocoa production (NCCB, 2014; Iyabano, 2012).

3. Presentation of Results

Both descriptive and inferential statistics were used in analysing the data. The first part of the analysis deals with the socio economic characteristics of cocoa farmers in the South West Region (that is descriptive statistics). This was to enable us to ascertain who these cocoa farmers are by bringing out their characteristics which to an extent has an effect on their welfare. From these descriptive statistics, it is evident that; the age of the household head, marital status, level of education, dependency ratio, farm size, farm age, accessibility of the farm, farmer training, land laws (land ownership) and gender of the household head are all socioeconomic characteristics of cocoa farmers in the South west Region of Cameroon.

Inferential statistics

In order to adequately ascertain the economic implication of cocoa production on the farmers' welfare it was necessary to subject the question items on the questionnaire to a number of pre -test analyses. This was done to ensure that the items reflect the concepts being measured. In other words, pre-test are necessary to ensure reliability and validity of the concepts being measured. The first test was the Kaiser-Meyer-Olkin and Bartlett's test for the factorability of the items of households' income measure through dimensional reduction (see table 2)

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.676
Bartlett's Test of Sphericity	Approx. Chi-Square	545.103
	Df	15
	Sig.	0.000

Source: Researcher Computations, 2018

The result in table (2) shows moderate evidence of factorability of the items using principal component analysis. Both Bartlett's test for sphericity and the Kaiser-Meyer-Olkin (KMO) are significant. The significant of these tests permit the researcher to identify the few significant underling items that cluster into a homogenous set. We proceed to present the result of the communalities obtained through principal component extraction method. Communalities explained the proportion of the variance explained by each item. It is recommended to be greater than or equal to 0.5 (Thalut, 2017). The result of the communalities extracted has been presented in table (3) below.

The communality of the six question items on table 3 that was finally adopted in the study shows strong evidence of explained variability. We can now present the result of the total variance explained on table 4. The result in table 4 shows that the six question items has been reduced to regression factor scores with a total percentage cumulative variance of 65.455 with the initial eigenvalues of 2.472 and 1.455 for component one and two respectively. To examine the disposition of the items with respect to the two components, we present the result of result of the rotated component matrix on table 5.

Table 3: Result of Communalities Extracted

		Initial	Extraction
Q46	Your total annual household expenditure	1.000	0.798
Q47	The income from cocoa production has been able to satisfactorily take care of your basic household needs	1.000	0.769
Q48	With income from cocoa I can effectively take care of my children's education	1.000	0.552
Q49	The income from cocoa has enabled me to build my house.	1.000	0.699
Q50	With income from cocoa I am able to feed and clothe household and family well.	1.000	0.535
Q51	I am involved in cocoa production just because I don't have any other means to earn a living.	1.000	0.574

Extraction Method: Principal Component Analysis.

Source: Researcher Computations, 2018

Table 4: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.472	41.204	41.204	2.472	41.204	41.204	2.363	39.385	39.385
2	1.455	24.252	65.455	1.455	24.252	65.455	1.564	26.071	65.455
3	0.694	11.568	77.023						
4	0.577	9.619	86.643						
5	0.439	7.311	93.953						
6	0.363	6.047	100.000						

Extraction Method: Principal Component Analysis.

Source: Researcher Computations, 2018

Table 5: Rotated Component Matrix

	Component	
	1	2
The income from cocoa has enabled me to build my house.	0.832	
I am involved in cocoa production just because I don't have any other means to earn a living.	0.758	
With income from cocoa I can effectively take care of my children's education	0.741	
With income from cocoa I am able to feed and clothe household and family well.	0.725	
Total household expenditure		0.894
The income from cocoa production has been able to satisfactorily take care of your basic household needs		0.864

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations

Source: Computed by the researcher using SPSS version 21, 2018

Table 6: Latent Variable Correlations

	CCP	HHI	LHD
CCP	1		
HHI	0.609	1	
LHD	0.514	0.377	1

Source: Computed by the researcher using SPSS version 21, 2018

Figure 3 shows the result of the bootstrapping t statistic values for Cocoa production model. The loading factors for both the reflexive and formative model were all significant at 0.05 significant levels. In order to assess the adequacy of the model, the result of the predictive relevance and effect size have been presented in the figure 4 below.

The CV Red is the redundancy estimates which represent the predictive relevance in this model. From the finding in figure 4, there is a strong evidence of predictive relevance. While the CV Com represents the measure of the effect size, effect size values of 0.020, 0.150, and 0.350 indicate the predictor variable has a low, medium, or large effect in the structural model (Thalut, 2017). The finding indicates that Cocoa production have a moderate effect size on household income of farmers while livelihood diversification have a weak effect size in the prediction of households income. The path regression result in table 7 indicates that cocoa production has a positive significant effect on household income.

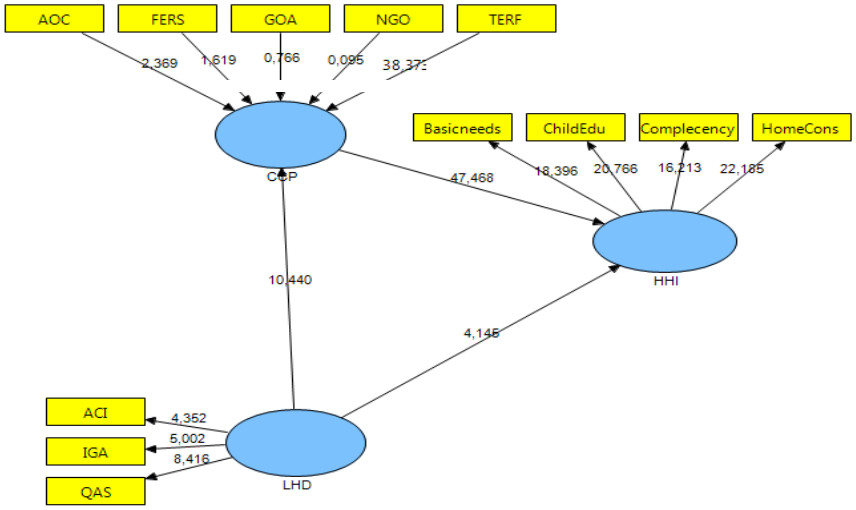

Figure 3: Bootstrapping Result of Cocoa Production
Source: Researcher Computations, 2018

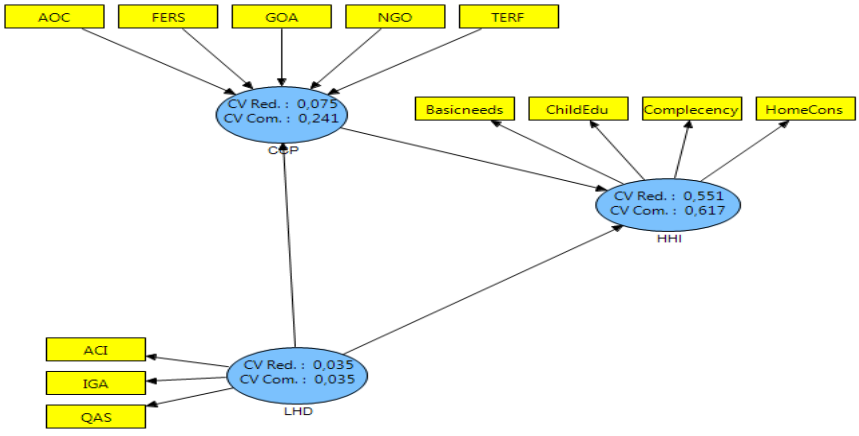

Figure 4: Blindfolding (Jack - Knifing) Output showing Q and f -Squares estimates for the predictive Relevance and effect size of Cocoa Production Model
Source: Researcher Computations, 2018

4. Discussion of Results

Descriptive statistics

The study shows that; 56.4% of the respondents agreed that age of the household head was between 36-55 years, showing the aging nature of the farming population in the South West Region. 84.5% of the respondents were males, thus cocoa production in this region is predominantly a male affair. 69.8% of the farmers were married while 60.2% were either with first school leaving certificate or without any certificate at all, showing a very high illiteracy rate within the cocoa farming population in the South West Region of Cameroon. 56.4% attest to the fact that they have never been trained in either the Farmer Field School (FFS) or in a Farmer Business School (FBS) this imply that they never had any formal training in cocoa producing techniques while 60.4 % of the respondents agree that their cocoa farms are above the age of 31, thus showing the aging nature of the cocoa farms in the Region which affects their yields, see an aging cocoa farm in figure 6 below. 74.6 agreed that they own cocoa farms but 92.0 % of this respondents revealed that they own farms without land title certificates. This implies that nearly every farming household have access to land but do not legally own land because land ownership in Cameroon and the SWR in particular is guaranteed with a land title certificate, this negatively affects their ability to obtain loans because of no evidence of collaterals. 67.1% of the entire cocoa producing areas in the region are inaccessible (see the difficulties the farmers go through in the course of transporting their cocoa because of inaccessibility, in figures 5a, b, c and d). 46.8% of the farmers had between 2-5 dependents, thus showing a high dependency ratio, while 53.7% of the respondents own between 2 to 5 hectares meaning most of the cocoa farmers here are smallholders. All these revelations prove that; the age of the household head, marital status, level of education, dependency ratio, farm size, farm age, accessibility of the farm, farmer training, land laws (land ownership) and gender of the household head are all socioeconomic characteristics of cocoa farmers in the South west Region of Cameroon. From interviews on the field, economic theory and other empirical findings it has been confirm that these socioeconomic characteristics affect cocoa production, income and the welfare of the farmers in the SWR of Cameroon.

Cocoa transported by motor-bike to farm gate in Meme Division

Source: Researcher's field survey (2018)

Vehicles (Hilux 4WD) transporting cocoa to farm gate in Lebialem Division

Source: Researcher's Field survey (2018)

Figure 5a, b, c and d below showing the difficulties the cocoa farmer faces in attempt to transport his cocoa to the farm gate due accessibility problems

Figure 6: showing a cocoa farm of over 45 years old in Manyu Division
Source: Researcher's field survey, 2018

Inferential statistics

The model presented in order to determine whether there exist any statistical significant relationship the between the observed variables (independent) and the construct (dependent variable) was analysed with use of path regression analysis. This permitted us to determine the magnitude, direction and significance of the relationship. This study assumed that the farmer depend on cocoa production for his livelihood. Therefore factors affecting cocoa production will indirectly affect welfare. From our analysis some factors have been identified as factors determining cocoa production see figures 2, 3 and 4. The results shows that the regression weight for access to credits (*AOC*), perceived measure of climatic variability, temperature and rainfall (*TERF*) and the use of fertilizer and chemical spray (*FERS*) in the prediction of cocoa production are significantly different from zero at the 0.001 level (two-tailed). Technically this can be interpreted to mean that access to credit (*AOC*) and perceived temperature and rainfall (*TERF*) has a negative direct significant effect on cocoa production whereas the use of fertilizers and chemical spray (FERS) of the farm has a positive significant effect on cocoa production while farmer involvement in non-governmental organization (*NGO*) and government assistance (*GOA*) both have negative insignificant effects on cocoa production. This perhaps may be because government assistance (*GOA*) might have not reached a threshold that can be felt by the farmers. Some of the effects of climate variability (temperature and rainfall (*TERF*)) can be seen on figure 7 below.

Access to credit (*AOC*) has a negative direct significant effect on cocoa production. This is indeed contradictory to both theory and practice. Intuitively, increase access to credit is supposed to increase cocoa production. This could be due to the fact that loans to farmers that are supposed to be for productive purposes (that is for the purchase of fertilizers, chemicals, sprayers and other inputs) are diverted to consumption and carrying other activities (moral hazard) making it difficult for these loans to be paid back. Since their farms are the main source of collaterals, many farmers therefore end up losing their farms which impacts negatively on their output and of course welfare. This result is in consisted with that of Kuntala and Samanta (2006), who revealed that access to credit in rural India did not have any significant impact on physical assets accumulation and production because poor borrowers ended up in a viscous cycle of debts; as the poor use the money from the bank for consumption and were forced to borrow from money lenders in order to service bank loans. This is confirmed by Kondo et al (1992) who said borrowing without economic rationality and critical economic considerations or gains results into many poor people becoming more vulnerable and unable to services the credit, hence confiscation of their "assets" and or many end up in prison.

The nature of the relationship between cocoa production and household income has been captured by the Latent Variable Correlations in table 6. According to this table there is a strong positive relationship between household income (*HHI*) and Cocoa production (*CCP*) as observed by the correlation structure matrix (r = 0.609). There is a strong relationship between livelihood diversification and Cocoa production (r= 0.514). There is a moderate relationship between livelihood diversification and household income (r= 0.377). This strong relationship between household income and Cocoa production (*CCP*) is in line with the recommended cut-off criteria suggested by Brace et al., (2006).

Figure 7: The effect of climate (temperature and rainfall) on cocoa production.
A farm that has been affected by Black Pod Disease in Boa Bakundu (Notice the affected crops with dark colour
Source: Researcher's field survey, 2018

The loading factors for the reflexive and formative model were all significant at 0.05 significant levels. The model cocoa production has a higher Q^2 statistics of greater than zero implying that it has a significant predictive relevance, this is confirmed by the CV com redundancy estimates which indicates that Cocoa production have a moderate effect size on household income of farmers. It has been revealed that there is a strong relationship between cocoa production and welfare as captured by household income but the magnitude, direction and significance of this relationship has not been revealed. To get this we turn to the path regression results on table 7. The result from table 7 reveal that cocoa production has a positive significant effect on household income. The effect of household income on welfare is seen through its effect on home consumption, child education, complacency and basic needs provision. That is, household income is capable of taking care of household consumption, child education and providing basic needs for the family.

Table 7: Path Coefficients (Mean, STDEV, T-Values)

HYPOTHESIZED LINK	Coefficient	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics
CCP -> HHI	1.045664	0.021392	0.021392	48.749007
LHD -> CCP	0.533677	0.046230	0.046230	11.133152

Source: Researcher Computations, 2018

This result is consistent with appriori expectation. It is also in line the work of Bellemare, et al. (2016) who found that quinoa production was associated with a faster rate of growth of household welfare and Lawal et al. (2015) who revealed that increased cocoa production enhanced cocoa farming households' welfare. However the result is contrary to the study of Quartey, (2012) who attested that the current form of cocoa production in Ghana reduces economic welfare. The result is in agreement with the "new household economics (NHE) model" a class of Chayanov farm household model by Becker (1965). This model assumes that the household acts as a unified unit of production and consumption which aims to maximise utility (welfare) subject to its production function and total time constraint. According to this theory, increased production will improve income and hence welfare. Again it is in line with The

Expected Utility and Decision Theory which stipulates that individuals are consider to make decisions consistent with their expected personal objectives so as to maximize their personal 'welfare' or 'happiness' thus the decision for the production of cocoa is consistent with welfare improvement in the South West Region of Cameroon.

5. Conclusion and Recommendations

Cocoa production has both direct and indirect effects on welfare. It affects welfare directly through the nutritive and health benefits cocoa products exhibit, and indirectly through the income that is earned from its production. However its contribution to the welfare of its producers in the South West Region of Cameroon remains indirect. This is because about 99% of cocoa producers have never tasted the products from this precious plant which the discoverer named "food of the gods" nor do most of them even know the finish products of cocoa. This study has revealed that cocoa production has a positive significant effect on the welfare of its farmers in the South West Region of Cameroon. From this analysis therefore we conclude that income from cocoa production is capable of taking the cocoa farmers in the South West Region out of the poverty situation they find themselves in today because it contributes significantly to household welfare. However some of the socioeconomic characteristics of the cocoa farmers have perpetually kept them in poverty; among which are (i) illiteracy rates; This has led to financial mismanagement amongst the cocoa farmers. Illiteracy has caused some farmers to live with the notion that any amount of money earned is to be spent. Consequently they hold money only for one reason (transactionary motive). This illusion has lure them into reckless spending. Hence it is possible for a cocoa farmer to earn 1.5 million F CFA in October and in January (two months after) he is taking loans (farm inputs and money) from the license buying agents, a habit which kept many in a vicious cycle of poverty. (ii) Farm accessibility; in fact 67.1% of the entire cocoa producing areas in the region are inaccessible thus increasing the famers' expenditure in transporting their cocoa to the farm gate causing some to end up with little or nothing at the end of production season. Despite these ills, one thing that seems glaring is that cocoa production remains one the highest income generating activity among other agricultural activities as affirmed by the United Nation Conference on Trade and Development UNCTD, (2004) and can contributes significantly to the growth of other sectors in the South West Region as well as the growth of the entire nation. Therefore concentration on welfare improvement will bring about the much needed growth and development faster than concentration on development for welfare improvement.

However unlike the salaried workers, the cocoa farmer in the South West Region of Cameroon is not covered by any social security net. For him there is no pension, no housing subsidies, no children's education allowance, no paid vacations and hardly any satisfactory healthcare. He enjoys little or no expressways, no lighted streets, no postal and telecommunication services and the rest of those basic amenities heavily financed from his labour's harvest. Not only is the cocoa farmer hardest hit by such crises but he must continue to produce more to replenish state coffers, keep some of the country's miss-managers on the payroll and pay for foreign debts contracted for projects most of which has instead eluded the cocoa sector rather than build it. In fact, the zeal and spirit of sacrifice of the cocoa farmer to continue producing despite the challenges he faces in the sector is eminent. This silent drama of the cocoa farmer in the South West Region and Cameroon in general deserves the timely attention of the government. If this attention can be turn to the cocoa farmer, in our opinion the cocoa farmer could work for Cameroon the same development miracles performed by farmers elsewhere in the world.

On the bases of these therefore the study recommends; the formation of micro-financial units otherwise known as village banks that will make loans available to farmers in form of inputs, as their cocoa farms can serve as collateral security and they can better monitor the borrower to see that the loan is used for the purpose for which it was contracted. The government, should embark on research so as to introduce improve cocoa species which can adapt to the caprices of climate and still maintain high yields.

The provision of basic infrastructure especially roads in the rural areas in particular is a necessary pre-condition for rural poverty alleviation. The government should also create farm to market roads to reduce

the cost of transportation and decrease current production losses to match the increase in farm input prices. Community participation on road maintenance is recommended. There is need for the construction of local storage fascilities by the farmers. This will enable them store their produce during the rainy season (production season) when the roads are very bad or completely impassable and the cost of transportation too high. The stored cocoa could be released during the dry season when the conditions of the roads are better. Again cocoa is usually limited in supply during this period; as such they could reap much from the high prices thus making more income and improving their welfare.

Education plays indispensable role in improving the welfare of the cocoa producing households as it facilitates households' access to credit and more importantly regulate the spending habit of the farmers among others. Financial management programs should be introduced to the farmers. This will assist the farmer to know how to better manage their finances. It has be uncovered in this study that the major predicament of these farmers is financial mismanagement. Policy makers should give priority to programmes that will encourage poor households to be educated through mass literacy programmes, free adult education among others. Farmers should equally be encouraged to go for training in Farmer Field School (FFS) and Farmer Business School (FBS). So that they can be equip with better techniques of production and should do cocoa farming as a business.

It is recommended that agro-industrialization and the provision of social amenities be instituted in the cocoa growing communities. To an extent it will reverse the current pattern of village-urban migration of the youths in search for employment and city attractions. This will improved quality of city life as it will relieve it of stressful demographic pressures and crime waves, thereby demonstrating the validity of the thesis that a "village-first" development strategy benefits urban centres as well, in contrast to the "city-first" strategy practiced in Cameroon.

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