

The Effects of Agricultural Inputs and Extension Services on Household Crop Production in Dschang, Menoua Division, West Region of Cameroon

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ABSTRACT

Purpose: Agricultural production in the country is based on smallholder production with most farmers carrying out rain fed agriculture and who, on average, cultivate less than 2 hectares using mainly rudimentary equipment. As such, this study seeks to understand how the increase in agricultural production is achieved through provision and use of inputs (such as pesticides, fertilizers, labour, and machinery, high yielding seeds) and agricultural extension services

Methodology: This study made use of primary (through questionnaires) and secondary instruments (journals, articles and books) of data collection. The data was collected from a sample of 110 respondents from the 5 zones of the subdivision: Foto, Foreke, Fogo-Ndeng, Fossong-Wentcheng and Fotetsa. Data collected was analyzed using Statistical Package for Social Sciences (SPSS) version 20.0 and Microsoft Excel 2010 using descriptive statistics, correlation and Regression analysis as analytical tools.

Findings: this research revealed that age of the farmer, educational level, provision of extension services, input application method and the use of improved seeds contribute positively to the increase in crop yields. Whereas, input application method ($B=0.541$), the use of improved seeds ($B = 0.475$) and the provision of extension services ($B = 0.366$) indicated greatly to farm yields. Also, the high cost of agricultural inputs was reported by 85% of the farmers to influenced farm productivity and yields.

Unique contribution: it is recommended to promote the use of improved seeds, provide extension services and Farm inputs from the state through grants and loans with low interest rates so as to improve on Productivity.

Keywords: Agricultural Inputs, Extension Services, Household, Food Security, Dschang Subdivision.

INTRODUCTION

Increasing agricultural production and productivity is very important to ensure global food security, especially as the world population increases to 7.6 billion (BONCIU, 2017). Agriculture is very important in the economy of most developing countries. It does not only provide a main source of livelihood but contributes to economic growth, to the provision of environmental services important to poor people in urban and rural areas and aids as a main source of livelihood to more than one-third of the world's population (DFID, 1999; Zavatta, 2014).

In Cameroon for instance, Agriculture contributed 76.4% to the national Gross Domestic Product in 2017; and it is a major source of livelihood for Over 70% of its population (Balgah et al., 2019). It remains the backbone of many African economies, accounting for 57 percent of total employment, 17 percent of GDP, and 11 percent of export earnings on the continent (World Bank, 2007).

Few households use their land exclusively for food production or exclusively for profit; the majority use their land for a combination with a wide and changing mix of reasons along the continuum (NDA, 2001). Extension and its research companion offer technology as the answer to wealth creation among materially poor smallholder farmers. Technology is made the centrepiece of poverty alleviation and wealth creation. However, the burgeoning poverty extent among smallholder farmers, despite the dissemination of a plethora of scientifically researched technologies, indicates that the answer to fostering prosperity among smallholder farmers lies beyond mere development and adoption of technologies (Worth, 2006)

Extension has been an active force in agriculture since the 1800s. The primary focus of extension was and has remained technology transfer. In recent years, concept and practice of agricultural extension has expanded to include more participatory approaches that are more inclusive of farmers as active players in the agricultural extension mix and issues of poverty alleviation and food security (Rivera, 2003; Swanson et al., 1997).

In other to increase agricultural production and its quality is through provision and use of inputs (such as pesticides, fertilizers, labour, and machinery, high yielding seeds) and extension services which can go a long way in increasing the incomes of rural subsistence farmers in the area and the country.

Problem Statement

Cameroon, like many developing countries in the Africa, particularly those on the continent of Africa continue to increasingly find it extremely difficult for their escalating populations to be food secure, yet part of the food produced is sold by the population to acquire other household needs. The only approach of increasing the incomes of these entirely rural subsistence farmers, who dominate the agricultural production systems in Cameroon and with limited adoption of modern agricultural practices, is to increase agricultural production and its quality through provision and use of inputs such as pesticides, fertilizers, labour, machinery, high yielding seeds and above all extension services.

Literature reveals a wide range of opinions about the role of farmers in extension. On the one end, farmers are seen as recipients of extension. On the other side, farmers are seen as partners in extension. Petheram (1998) identified farmers as beneficiaries of extension. Duvel (2000) identified farmers as participants in extension. Schuh (2000) implied farmers are learners, arguing that education puts farmers in the position of being able to use their resources more efficiently. Roberts et al. (2002) recognised farmers as 'co-learners' in which role, gaining knowledge was expedited.

The hurdle is to know why despite all above applications (introduction of drought resistant crops), the food security situation remains somehow un- certain and why most crop yields remains low. It is therefore necessary to establish how inputs and extension services have tried to rectify the food production situation in the country precisely in Dschang Subdivision.

Objective of the study

- The main objective of the study is to understand the effects of agricultural inputs and extension services on household crop production.

The specific objectives included:

1. To determine the socioeconomic characteristics of Crop producers in Dschang Subdivision.
2. To evaluate the effect of inputs and extension services on crop production in Dschang Subdivision.
3. Identify barriers to access to inputs and extension services by farmers and propose means to overcome identified barriers.

LITERATURE REVIEW

Socioeconomic characteristics of Crop producers in Dschang Subdivision

In Dschang, the demand for vegetables is high and causing scarcity in the market. The cultivated swamps are increasing in size at the same rate as urban perimeter increases. In fact, the urban perimeter passed from 537 hectares in 1984 to 1,300 hectares in 2006 (INS, 2007). This significant increase in vegetable production is not only to satisfy the demand or consumption, but it has also solved the problem of unemployment and underemployment. Unfortunately, no study on the vegetable system in Dschang is available, whereas the production in swamps covers a considerable area in Dschang town (Fomecha, 2004), and supplies several markets in Cameroon (Ntangmo et al., 2009). Also, urban market gardening is recognized today like as a major stake in terms of provisioning of the cities and employment for many families which generally live under conditions of poverty or extreme poverty (Lynch et al., 2001).

Effect of inputs and extension services on crop production

Agricultural extension have been used to build the capabilities of clients, through improved problem solving, decision making and management (Haq, 2011a, b; Vanclay and Leach 2011). It is a means of transferring specialist knowledge from research or public policy to farm level commonly adopted worldwide. Haq et al (2003) found that contact with extension agent and farmers had positive impact on the income of farmers. It is also depicted that higher income of farmers, young farmers and education of farmers are some key determinants of extension contact. More recently, Haq (2011a, b) examined the effects of extension contacts on the rice yield. The results are very much important because of large samples covering study sites.

Barriers to access to inputs and extension services by farmers and propose means to overcome identified barriers

Conventional wisdom holds that Sub-Saharan African farmers use few modern inputs despite the fact that most poverty-reducing agricultural growth in the region is expected to come largely from expanded use of inputs that embody improved technologies, particularly improved seed, fertilizers and other agro-chemicals, machinery, and irrigation. Yet following several years of high food prices, concerted policy efforts to intensify fertilizer and hybrid seed use, and increased public and private investment in agriculture (Sheahan et al., 2017)

METHODOLOGY

The data was collected from all the zones that make up the Dschang sub-division. Many the respondents were gotten from zones with large surface area while zones with smaller surface area had small sampled respondents. Zones like Foto, Foreke and Fogo-Ndeng had a larger sample while zones like Fossong-Wentcheng and Fotetsa had smaller samples. Each sampled zone was divided into smaller units called quarter/villages from which the questionnaires were administered to the respondents.

The sample size was calculated using the formula

$$n = N / (1 + Ne^2)$$

Where;

n = sample

N = population

e = the margin of acceptable error which is usually 0.05 level of confidence

$$n = 151 / (1 + 151(0.05)^2) = 110 \text{ farmers}$$

DATA ANALYSES/FINDINGS

This analysis included the descriptive analysis of the data to reveal patterns of sustainable practices among practitioners, as an attempt to investigate if practices vary among them. The analyses were done at the 95% confidence interval ($\alpha = 0.05$). A regression analysis will be used to find out which factors contribute to the effect of agricultural inputs/extension services on household crop production. The dependent variable in the study is the Crop production while the independent variables include age, access to credit, educational status, availability of inputs and extension services, household size and sex. The econometric model will adopt the following format:

$$Y (\text{Crop production}) = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_n X_n + \epsilon \dots \dots \dots 1$$

Where

$\beta_1, \beta_2, \beta_3$ and β_n are the respective regression coefficients still to be estimated

X_1, X_2, X_3 and X_n are the respective independent variables and

ϵ is the regression constant

Socioeconomic characteristics of Crop producers

In the domain of the socio economic characteristic of the respondents as seen on table two below. Regarding gender distribution, indicates that 59% of the sample population consists of male respondents while 41% consist of female respondents. This observation shows that men are more engaged in agricultural production in Dschang subdivision than their female counterpart.

With respect to educational attainment, (37%) had only secondary level of education while 34% had Bachelor Degree. However, another 29% had only primary education. This implies that all the respondents were literate and had a good understanding of the theme of research.

This further implies that they can make good use of agricultural information to improve their farm practices and increase farm yields to ensure their livelihood.

More so, with the distribution of the incomes of the respondents, The results show that majority of the respondents described their income to be only moderate as compared to that of other persons within the community (74%). 19% reported their incomes to be low as compared to that of other members of the community. A small proportion (7%) evaluated their income to be high as compared to that of other community members which implies most of the respondents could afford basic farm inputs.

Table 1: Socioeconomic characteristics of Crop producers

Variable	Percentage of Respondents %
1.Sex	
Male	59
Female	41
2.Educational Attainment	
Bachelor Degree	34
Secondary	37
Primary	29
3.Income Distribution	
High	7
Moderate	74
Low	18
Total	100%

Source: field work, 2018

Factors Contributing to Increase Farm Yields

Because of the importance of these inputs in increase crop production, further analysis was conducted to evaluate the contribution of the inputs to agricultural productivity of the farmers. The Binary logistic regression was used for analysis. The dependent variable (crop productivity) took 1 for increased productivity and 0 otherwise. 9 explanatory variables were used in the analysis. The results are presented table 3 below.

Table 2: Determinants for Increased Farm Yields

Variable	B(beta)	S.E.	Wald	df	Sig.	Exp(B)
Age	.028	.028	.976	8	.323	1.028
Educational level	.182	.364	.250	8	.617	1.199
Extension service	.366	1.080	.115	8	.735	1.442
Farm experience	-.007	.025	.086	8	.769	.993
Farm size	.323	.404	.637	8	.425	1.381
Level of extension visits	-.572	.572	.997	8	.318	.565
Input application learning method	.541	.702	.593	8	.441	1.717
Use of improve seeds	.475	.558	.723	8	.395	1.608
Use of fertilizer	-20.360	22769.72	.000	8	.999	.000
Constant	18.739	22769.72	.000	8	.999	41.054

Source: field work, 2018

The results show that the age of the farmer, the educational level, the provision of extension services, the farm size, the input application learning method and the use of improved seeds contribute positively to the increase in crop yields of our sample population. On the other hand, the farm experience, provision of

extension services and the use of fertilizer were not positive. The contribution of education of the farmer in crop production ($B = 0.182$) for instance indicate that any increase in one year of education of the farmer increases the probability of the productivity to increase by 1.199 times. This is possible because as rural households and individuals acquire more and more education and experience especially in farming operations, accumulation of wealth and better planning and tend to have better chances for sustaining their livelihood activities, which translated in to better management and agricultural production. Ngwa and Balgah (2016) in their study in the Lake Nyoos area had similar results where they found educational level of the 1986 Lake Nyoos victims to positively affect their agricultural production and choices of livelihood strategies. Umoren et al (2014) in Nigeria also found education status to have a positive influence on the production and sustainability of agricultural credit schemes. Haq et al (2003) and Heanue et al. (2014) also found positive economic outcomes for more educated farmers using an instrumental approach See also the works of Wilson et al (2015) and Fatherstone et al (2007).

The provision of extension services and the input application learning method also showed positive relationships ($B = 0.366$ and $B = 0.541$ respectively). Therefore, those who have visits from extension services and those who learn how to use various farm inputs from the extension agent and not from their predecessors have a higher probability for their crop yields to increase (1.442 times with extension services and 0.565 times with source of input application methods). Our results are similar to that of Garforth et al (2003) who found out that participatory extension positively affected technology adoption, increased productivity and profitability of beneficiaries.

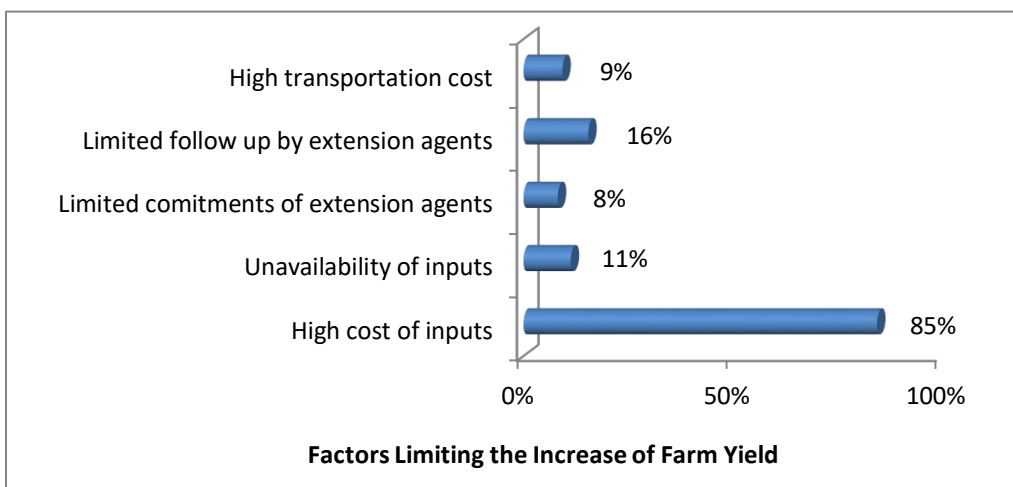
The use of more improved seeds was positive in affecting crop yields of farmers ($B = 0.475$). Based on the result, moving from a farmer who does not uses more improved seed varieties to one that uses improved seed varieties, the probability of the farmer having higher crop yields increases by 1.608 times.

The size of the farm was also positive ($B = 0.323$). Thus, for any unit increase in farm size, there is a 1.283 probability of the yields of the farmer to increase. This is possible as an increase in farm size increases the quantity of seeds that is planted as consequently the yields at the end if properly managed.

Factors Limiting the Increase of Farm Yield

Presented in figure 1 below are the challenges they face that limits their ability to full enjoy the benefits of these farm inputs and extension services.

Figure 1: Factors Limiting the Increase of Farm Yield



Source: field work, 2018

As can be inferred from figure 15, the most important challenge faced by the farmers was the high cost of agricultural inputs as reported by 85% of them. Goldman et, al, 2003 found that the main constraint to use of inputs(fertilizer) cited by farmers is cost. However, farmers in the study area also reported other challenges such as limited follow up by extension agents (16%), scarcity of farm inputs (11%), high cost of transportation for farm products (9%) and limited commitments of some of the extension workers (8%). Therefore, addressing these challenges will improve greatly on the performance and productivity of these farmers as gains from diffusion of these agricultural inputs can be enjoyed broadly including to consumers (Evenson and Gollin, 2003). Thus, contributing to the government of Cameroon's long term development vision (Vision 2035).

CONCLUSION

Our results lead us to conclude that the age of the farmer, the educational level, the provision of extension services, the farm size, the input application learning method and the use of improved seeds contribute positively to the increase in crop yields of our sample population. However, the input application method (0.541), the use of improved seeds ($B = 0.475$) and the provision of extension services ($B = 0.366$) were the first three inputs which contributed highly to farm yields. Also, the high cost of agricultural inputs as reported by 85% of the farmers was their main challenge in reaping the full benefits of farm inputs and extension services.

IMPLICATIONS

It is therefore recommended to promote the use of improved seeds and the provision of extension services in the study area as they showed positive contributions to farm yields. More so, Farm inputs should be subsidized so as to facilitate the acquisition of inputs by farmers which will improve on their productivity.

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