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# Sweet Orange Production and Farmers Livelihood effects in Manyu Division, Cameroon

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## Abstract

The aimed of this study was to investigate the effects of sweet orange production on the livelihood among farmers in Manyu Division, Cameroon. The study employed primary data collection through self-administered questionnaires to sweet orange farmers and a total of 200 samples were selected. The study used descriptive statistics and Ordinary Least Square to estimate the result. The results from the linear regression analysis revealed that the drivers of sweet orange production are; age of respondent, farm experience, size of farm, age of farm, cost of farm inputs, quantity of output and income from sales. The result from percentage ranking shows that the major constrains of sweet orange farmers are: credit facilities, lack of agrochemicals, absent of extension services, high cost of farm inputs, high cost of labour, pests and diseases and bush fire. The study recommended that agricultural credits should be extended to sweet orange farmers by the decision makers.

**Key words:** Profitability Analysis; Sweet Orange Production; Livelihood and Mamfe

## 1. Introduction

Fruit production forms a substantial percentage, of about twenty-five percent of the major food crops cultivated in the tropics and therefore, it is a means of livelihood or a source of income for a considerable section of the population (Abba, 2014). Fruits have been significantly singled out in human nutrition for the supply of minerals, vitamins, some hormone pre-cursors in addition to protein and energy (Kausadikar et al., 2019). In spite of their importance in the diet, per capita consumption of fruits in Cameroon is only 100 g compared with 400 g of daily consumption per head as recommended by the Food and Agricultural Organisation. Numerous quantities of fruits, such as citrus species, pineapples, paw-paw, guava, coconut, mangoes, avocado pears, plantain and bananas are produced in Cameroon and staggering figures are given as the estimated annual production level.

The sweet orange (*Citrus sinensis*) is a member of the citrus family (Rutaceae), along with other

fruits such as mandarins, lemons, grapefruits and limes. Sweet oranges account for the greatest value fruits followed by grapefruits, lemons, mandarins and limes. In the pre-historic era, sweet orange was cultivated in several locations including areas now occupied by the modern China, India, Bhutan, Burma, and Malaysia (Musasa et al., 2013). Sweet oranges are one of the most widely grown fruit trees in the tropical and sub-tropical regions of the world. The fruits are eaten fresh and used for making canned orange juice. Large quantities of sweet oranges are used to produce single strength juice, frozen concentrate, rind oil, pectin used in the production of jams and jelly pulp residue which is fed to livestock. The sweet orange juice is also extracted and used for flavours for food items (Pearce, 2011).

Diversification of livelihoods in terms of incomes, assets and activities at household level is the norm in most parts of rural Sub-Saharan Africa (SSA). Cameroon is well known for its climatic, geographic and ecological diversity, which

enables farmers to grow a very large number of crops. The most frequently cultivated are organic products. The Agricultural sector in Cameroon plays a crucial role in reducing poverty, employment and achieving economic growth. Agriculture is the dominant economic activity in Cameroon. For several decades now, agriculture has been a very important sector that has increasingly significantly contributed to the national economy. In this context it must be taken measures that contribute to increasing of agricultural holdings profitability Niehof (2004). The need to developed a profitable business derives for the fact that the use of inputs which are obtained with a particular effort should be balanced by the effects obtained from the execution of the activity, that is getting a surplus of effects (results) compared with the efforts (expenses) involved. The farm profitability reflects the measuring of effects materialized in revenues with the efforts involved materialized in expenditure. Therefore, it is necessary to generate more diversified food with greater shares of fruit production. But production of fruits is still far behind the countries present requirement. It is widely recognised that this can contribute to achieving the development goals of reducing poverty, improving food security, and economic growth. The most important effect is the profit, specially the net profit, which remains at the disposal of associates/shareholders. The potential of the Agricultural sector in securing incomes, employment and food supply and thus to reduce poverty among the Cameroonian population has greatly increased.

Despite efforts made by the Ministry of Agriculture and Rural Development (MINADER) and the Institute of Agricultural Research for Development (IRAD) to increase fruits production, annual output is still low to satisfy demand. There is still persistent food insecurity and poverty among the rural communities since its population is still suffering from poverty and malnutrition. Most of the citrus plantations have been abandoned and concentrated on cocoa production with fluctuation of prices per kilogram in the world market, and uncertainty (MINADER, 2015). Unfortunately, in Cameroon sweet orange production has not given attention like other case

crops such as cocoa, coffee cotton and banana. This is why production is low, thus supply cannot match with the demand. Several factors including natural and non-natural have already been identified to be behind the low production (Kausadikar et al., 2019). Factors such as the lower yields and profitability, price variability, low level of technology transfer, use of local seeds, high cost of fertilizer, and lack of modern agricultural implements are among the key challenges holding back productivity in the country (FAO, 2016). To address this demand gap, sweet orange is imported from other sweet orange producing countries including Nigeria and South African.

Cameroon has high potentials for increasing sweet orange production ranging from the increased population, availability of suitable ecosystems for sweet orange production, adequate land, increased internal and external markets demand, expansion of other sectors including the food processors, and tourist industry. Several efforts have been repeatedly initiated and implemented by the government and farmers, aiming at revamping the fruit tree sector including introduction of adaptable seeds, introduction of some programs to support citrus subsectors, introduction of financial support through small credits, and limit imported sweet oranges to stimulate local sweet orange production. The major purpose of the government interventions is to enhance sweet orange productivity and their benefit to farmers through the increased income and food security. However, regardless of all these efforts the subsector is still facing the biggest challenges posed by aging plantations, seedlings, farming technology, credit facilities<sup>1</sup>.

The potential for sweet orange to create more employment opportunities, create wealth as well as improve the livelihoods of farmers and fruit business in the country<sup>2</sup>. Therefore, this study was designed to determine the drivers of sweet orange production, profitability accrued by sweet orange farmers; to identify the key constraints perceived by farmers that affect their farm income and their livelihood. Focus is given to

<sup>1</sup> <https://agritrop.cirad.fr/465096/>

<sup>2</sup> <https://www.lavoixdupaysan.net/cameroun-oranges-varietes-locales-disponibles-entre-septembre-fevrier-2>

sweet orange production because of the growing demand sweet orange especially, with an increasing household's income in the cities. The magnitude of the economic benefits is so far not known, whether it has adequate incentive, and the number of farmers who have adopted the approach is also not known. Some studies have been done on sweet orange marketing in Nigeria; Fakayode (2010). The author examines the efficiency of sweet orange marketing and constraints confronting sweet orange marketing. Kausadikar et al. (2019) analysed the market chain of mandarin in Nepal, in which the researcher analyses the cost of production and problems faced by mandarin producers. Studies have not been done on the profitability analysis of sweet orange production in Cameroon.

However, the profitability of adoption of agro ecological intensification technique is also not known. Economic theory assumes profit maximization, hence the assumption that a profitable technique is likely to be highly adopted. There is a gap in knowledge of factors affecting the continued adoption of these technologies particularly in Manyu Division. The researcher intends to critically analyse the drivers of sweet orange production, its profitability and find out its livelihood effect on farmers in Mamfe municipality. Despite the economic potential of sweet oranges and its ability to generate income and create employment for the rural population and youths in the Mamfe municipality, its profitability is not known. Nevertheless, the impact of profit varies from one farmer to another and local community to another which is a common feature in the municipality. Therefore, in pursuance of the central problem in this research, two objectives have been raised: (1) to identify and discuss the drivers of the production of sweet oranges among farmers in Mamfe municipality, Cameroon and (2) to investigate the impact of sweet orange production on the wellbeing of farmers in the Mamfe municipality, Cameroon.

## **2. Literature Review**

The driving force of economics of agricultural production at the micro level is to help farm-

ers to meet their objectives through efficient farm allocation of resources over a specified period of time. Hence this study assumes that producers attempt to maximize some objective function subject to a set of constraints determined by institutional set up and socio-economic characteristics. In this case, maximising returns from production factors as described from the production theory. Literature suggests that farmers may be motivated to produce on the basis of the utility derived from production; and for profit reasons (Kausadikar et al., 2019). Following this, the current study conceptualizes returns status as an outcome of farm and household characteristics, volume of production, price received per enterprise and cost associated with the production of the commodity. It illustrates that different farm and physical characteristics among farmer's influence profits by having effect on the volume of production, price received per unit of enterprise and the cost structure and group membership directly or indirectly influence volume of production, price of enterprise and eventually the gross margins they accrue.

Musasa et al. (2015) have shown that socio-demographic factors and geographical location influence production practices of farmers. Different factors influence sweet orange gross margins. This is because individuals in a community often vary in terms of age, education, gender, wealth and access to credit. As such, farmer attributes like age, gender, education, income, family size, group membership, primary economic activity, resource endowments, have been shown to influence farmer decisions. Furthermore, such variables may influence the costs of production, volume of production which also influences the revenues and one's ability to comprehend technologies. For instance, farm and farmer characteristics such as access to credits distance to input and output market and size of the farm.

Presently, citrus is assuming an increasingly important commercial role, especially for low income households living near urban centres (Musasa et al., 2013). This type of fruits cultivation presumably supports livelihoods primarily through food provision, income generation and employment as they are preferred cash crops. Re-

cent population figures indicate that about two-third of Cameroonian population live in rural areas. The means by which this vast population earns their living, which constitute their livelihood strategies, is drawing a wide range of concern and speculation among development experts and scholars. Loubser (1995) construed livelihood strategy as the totality of means by which people secure a living, have or acquire in one way or another, the requirement for survival and the satisfaction of needs as defined by the people themselves in all aspects of their lives. Livelihood pattern in rural households cuts across agricultural and non-agricultural activities. It has been established that majority of households especially in developing countries live in rural areas and rely on agriculture for their livelihood (FAO, 2016).

According to Musasa et al. (2015) about two-third of rural households earn their livelihood from subsistence agriculture, either as small-scale farmers or as low-paid farm workers while the remaining one-third engage in petty services. Understandably, agriculture for now and in the near future will remain the bedrock of the rural household economies because of their access to land (a major input in agricultural enterprises) through various forms of traditional land holdings the potential of agriculture to readily meet their basic needs for food and to some extent cash. It is obvious that agriculture provides increased on-farm and off-farm employment opportunities capable of raising incomes of the rural households and their purchasing power. In this vein, FAO (2016) noted that increased growth of the agriculture sector offers direct benefits to rural households such as income and food contributes to broader food security objectives and helps to establish forward linkages with high value-added industries as well as linkages between rural and urban centres. Furthermore, agricultural activities which embrace crop and livestock farming have strong linkages with non-agricultural livelihood activities which are common among rural households. Non-agricultural activities which include hire-labour, fabrication of tools, repair services, handicrafts, tailoring, trading, masonry, carpentry, welding, blacksmithing and arts apart from serving as stop-gaps, have helped to service ru-

ral agricultural enterprises while providing the needed income to meet household needs simultaneously.

The capacity to diversify or combine the above livelihood strategies varies markedly among individual members of a particular household and across households in a given community. However, the benefits derivable from combining agricultural and non-agricultural livelihood strategies by a household cannot be over-emphasized. Working in different livelihoods has helped to spread risks and manage uncertainty especially when such activities engaged in do not rely on the same resources. To many other households, diverse livelihood strategies serve as a measure to cope with insufficiency arising from shortfalls and failures in a major livelihood means. Sometimes and often, when a favoured activity requires working capital but the individual and household have no access to ready credit, they may likely undertake other livelihoods to generate income to support a preferred livelihood. To maximize the above benefits, successive governments in Cameroon in the last three decades have vigorously pursued different programmes on rural and agricultural development, which development experts consider as a precursor to sustainable rural livelihoods.

Despite the efforts, some studies including that of the Ministry of Agriculture and Rural Development (MINADER, 2015) still suggest that people living in rural Cameroon communities are faced with high levels of resource limitation, material uncertainty and survival risk. Consequently, the country has continued to experience a vicious migration pattern of its nationals unprecedented in modern nation states, brain drain, kidnap/hostage taking, child labour, crises and other social problems. This is an indication that there are underlying forces against livelihood pursuits in rural areas that demand critical analysis. Some studies have identified economic, cultural, personal factors as affecting decision for a certain livelihood and/or a combination of livelihood strategies among rural dwellers (MINADER, 2015).

Apart from the aforementioned factors, it is obvious that the social dimensions have not been



given attention considering the fact that livelihood decisions in any society are essentially governed by certain social values. Social factor refers to a set of beliefs, moral values, tendencies that control interpersonal relationships between individuals, groups, institutions and agencies in society. Issues associated with social relations are deeply ingrained in the social behaviours of the people which govern decisions and guide their livelihood pursuits. Over the years in most parts of the Cameroonian nation, negative social values have hampered the various rural development efforts for sustainable livelihoods. This becomes more critical in view of the nation's long term efforts in fighting social vices to pave way for meaningful rural development. Against this background, the study identified the livelihood strategies of rural households and analysed the social factors affecting livelihood strategies of rural households in South West Cameroon, highlighting its implication for agricultural transformation agenda.

### **3. Methodology**

This study was undertaken in Mamfe municipality which is in the Equatorial Rain Forest of Cameroon. The Mamfe Municipality was created in 1917 along other municipalities in the South West region by Presidential decree as an administrative unit<sup>3</sup>. Mamfe municipality is found in Manyu Division of the South West Region of Cameroon situated some 250 km from the South West regional capital, Buea. It is located in the northern part of the South West. It is about 74 km away from the Cameroon-Nigeria Border. The municipality shares common boundaries in the north with Akwaya council, in the East and South with Eyumojock council and in the East with Tinto council. It extends from latitude 5° 45' 4.75» north of the equator and longitude 9° 18' 49.32» East of the Greenwich Meridian. It covers a total surface area of approximately 3,442 km<sup>2</sup> benefiting from three Forest Management Units (FMU 11001, 11003 and 11005).

The Mamfe municipality falls within the Equatorial Climate Zone. It has the Equatori-

al Rain Forest Climate, which is characterized by two distinct seasons; the rainy and the dry seasons. The dry season runs from October/November to March and is characterized by elevated temperatures (30–32°C). The rainy season begins from March/April and ends in September/October with an annual average rainfall ranging between 3500–4000 mm, and peak periods in the months of July and August (MINADER, 2015). The area is richly watered by the Badi and Manyu rivers and their tributaries. The Badi and Manyu rivers are prominent rivers that join to make up the “Cross River” that flows into Nigeria. Some streams do exist in the area like the Monyen and Baku streams. A waterfall exists in Bachou Ntai. Swamps exist in Bachou Ntai, Lala quarters (Mamfe town), towards Egbekaw village and another towards the Catholic Mission in Mamfe town. The soils are sedimentary sandstones which form old basement complex, decomposes into old sandy soils. Three main types of soil exist in this municipality: the sandy soil, humus or top soil and the red clay soil.

Generally, the Equatorial Rain Forest occupies the area and it also falls within the Tropical evergreen forest type of Cameroon. It is also part of the Guineo-Congolian Floristic Region with altitude ranging from 90–500 m above sea level. We have the primary and secondary vegetation types in the area. The variation in the above-mentioned characteristics causes the existence of two unique types of vegetation in the municipality. The vegetation types are the Lowland rain forest and the Mid-Altitude Forest. Forest Resources include Timber, Non-Timber Forest Products (NTFPs), and wildlife. No data on the quantity of timber in the area exist but it is estimated that over 80% of the area is covered by forest. Meanwhile a good quantity of NTFPs and wildlife do exist in the forest. Mineral deposits exist in some areas of the municipality, most of which are not exploited. The municipality is endowed with a lot of quarries which is highly exploited; unfortunately, about 50% of the exploiters are illegal. If stricter measures are put in place to follow up the exploitation of this mineral, it will bring in much income to the council.

<sup>3</sup> <http://www.cvuc-uccc.com/national/index.php/en/about-uccc/the-secretariat?id=414>

### **Data presentation**

The primary data collected constituted the population of sweet orange farmers, drawn from the population of farmers in the Mamfe Municipality of Manyu Division in the South West region. The population of this study was drawn from the eleven villages of the Mamfe municipality. These villages are; Small Mamfe, Egbekaw, Eshobi, Okoyong, Eyangntui, Besonabang, Etemetek, Eyangchang, Nchang, Bachuo Ntai and Nfaitock II. The total number of population of the Mamfe Central sub division as reviewed by the 2015 census figure is 36500. The population of this study constituted two hundred sweet orange farmers, drawn from the Mamfe municipality. For this study, the researcher adopted the convenient sampling technique in selecting the respondents. From a total of 36500 populations, according to the 2015 National Population Census figure, the researcher adopted a sample size of 200 farmers from eleven villages in the Mamfe municipality. This is less than 5% of the entire population of the Mamfe municipality. This choice is informed by Musasa et al. (2013) submission as cited in FAO (2016) that “if the population is a few hundreds, a 40% or more sample will do; if many hundreds, a 20% sample will do; if a few thousands, a 10% sample will do and if several thousands, a 5% or less sample will do”. The population of this study will be less than 5% sample is considered appropriate.

Data was collected using structured questionnaire and oral interview randomly selected among sweet orange farmers guided by the effects on the livelihood of farmers. It was used to elicit pertinent information from the subjects. The questionnaire is structured in three sections: socio-economic characteristics, drivers of sweet orange production and impact of sweet orange production to farmer’s wellbeing. The study used simple random sampling to draw the population of the study. Simple Random Sampling gave equal chances of opportunity to the entire universe in the population and reduces the rate of errors. The data collected were analysed using descriptive statistics and OLS. The Ordinary Least Square analysis was used to analyse the factors of production of sweet oranges. The study adopted

quantitative and qualitative research approach so that, the theoretical orientation is informed by the concepts and ideas that link research to literature and the gathering of empirical evidence through questionnaires. This methodology was adopted for this study because; it allows the researcher to gather relevant information that helped to build up analysis and proposed recommendations. The adoption of the foregoing analytical method becomes necessary since the study relied principally on primary sources of data.

## **4. Results**

### **4.1. Farmers Socio-economic characteristics**

The study observed that 94 percent of the respondents were male while 6 percent were female as shown in Table 1. The predominance of male farmers in the study area can be attributed to the labour intensive nature of sweet orange farming which can be very tedious, hectic and time consuming especially for females who have to combine farming activities with their domestic chores. This result is in the same direction with the findings of Musasa et al. (2013) and Kassem et al. (2020) reporting that sweet orange farming is a male-dominated enterprise. According to their study, 71.2 percent of sweet orange farmers in Rusitu Valley and 83.33 percent of sweet orange farmers in Kwara State respectively are were males. Kassem et al. (2020) reported similar findings in a study conducted in Katsina State, Nigeria that farming is tedious and energy demanding. Another reason for male dominance can be attributed to the general belief in the study area that a woman should not inherit a farm land except for very few cases. The gender analysis indicates that sweet orange farming is mainly a masculine vocation in the study area.

The age of the farmers ranged between 21–81 years. About 11 percent of the respondents were between the ages of 18–28 years, 25.5 percent were between the ages of 29–39 years and 33 percent were between the ages of 40–50 years. 30.5 percent of sweet orange farmers were 51 years. The mean age of the farmers was 48.2 years implying that the respondents were agile and active

in sweet orange production. This result corroborates the findings of Ekhande et al. (2020) and Kassem et al. (2020) that sweet orange farmers in Aurangabad district and Manded district with the mean ages of 49.7 and 47 respectively. Most communities in Cameroon are populated with aged men and women who are left behind as a product of rural-urban drift in search of white collar jobs.

The result also showed that most of the respondents (84.5%) were married, 4 percent were single, while the others (11.5%) separated, widow or divorced and compares favourably with the findings of Karina et al., (2011) who reported that majority or 66 percent of sweet orange farmers in Jammu region of J and K State were married. Marital status determines the household size since

married respondents tend to have a larger household size per family and produce more output because of the availability of family labour. As regard the household size, 26 percent of the respondents had 1–3 people, 42.5 percent of the respondents had 2–7 people per household, and 31.5 percent had 8 people and above per household. The household size ranges from a single person to 8 people with an average of 4 people per household indicating that sweet orange farmers in the study area have a relatively low household size. This implies that additional labour should be hired to work on the farm especially where the farm size is large. This assertion agrees with those of Kassem et al. (2020) that a relatively large household size enhances the availability of labour. Kassem et al. (2020) also reported that adoption index might be positively or negatively related to the household size depending on the nature of the age structure and the amount of labour contributed by the members of the household.

Regarding education, all the respondents had undergone through formal education. 20 percent of the respondents had primary education, 32.5 percent had secondary education, 25.5 percent had high school education, 17.5 percent had tertiary education and 4.5 percent had vocational training. Usually, farmers with small family sizes spent less than those with high numbers of family members. Ekhande et al. (2020) reported similar findings when they observed that more than 60 percent of sweet orange farmers in Aurangabad district had only up to high school. This finding shows that an average farmer in the study area is fairly educated and therefore can take a better decision as regards the acceptance of innovation. Moreover, such a farmer can apply better agronomic practices that will help to increase sweet orange production. This result agrees with the finding of Kassem et al. (2020) who indicated that education enhanced the capacity of individuals to understand, manage and work with ideas.

#### **4.2 Drivers of sweet oranges production among farmers in Mamfe municipality**

The linear regression result reveals that the estimated F-statistics was 124.474 and it was statistically significant at 1% level of significance as

**Table 1.** Farmers Socio-economic Characteristics

| <b>Description</b>  | <b>Percent</b> |
|---|----------------|
| <b><i>Distribution according to gender of respondents</i></b>         |                |
| Male  | 94.0           |
| Female  | 6.0            |
| <b><i>Distribution according to age or of respondents</i></b>         |                |
| < 28 years  | 11             |
| 28–39 years   | 25.5           |
| 40–59 years   | 33             |
| > 59  | 30.5           |
| <b><i>Distribution according to marital status of respondents</i></b> |                |
| Single  | 4              |
| Married   | 84.5           |
| Others  | 11.5           |
| <b><i>Distribution according to household size of respondents</i></b> |                |
| < 4 persons   | 26             |
| 4–7 persons   | 42.5           |
| > 7   | 31.5           |
| <b><i>Distribution according to Level of education</i></b>            |                |
| Primary   | 20             |
| Secondary   | 32.5           |
| High School   | 25.5           |
| Tertiary  | 17.5           |
| Vocational training   | 4.5            |

Source: Author.

the probability of F-statistic. This implies that the model was statistically significant, thus the joint effect of all explanatory variables on the drivers of sweet orange production was above zero. The Adjusted R squared of 0.932 implies that 93.2 percent of the variation in the drivers of sweet orange production is explained by the explanatory variables estimated in the model. The results of the linear regression are summarized in Table 2, there are several significant relationships between drivers' variables and sweet orange production. The age of respondent is significantly and positively influencing sweet orange production at 5% threshold, meaning that the age influences their motivation in sweet orange production. The age of has a coefficient of 7.3 percent influence on the driver of sweet orange production. The mean age of orange farmer is 48.2 years. This result corroborates the findings of Ekhande et al. (2020) that sweet orange farmers in Aurangabad district and Manded district with the mean ages of 49.7 years. Practically the probability sweet orange production increases up to 50 years and decreases beyond. This is due to the fact that old-

er farmers are more engaged in perennial crops than young farmers.

The result of the study confirms the prior hypothesis that farm experience had a positive effect on the drivers of sweet orange production. The number of years of the farmers' experience in sweet orange production positively (4.401) affected the production of sweet orange production at 1% of significant. One percent increase in years of farm experience of the farmer in sweet orange production increases the drivers of sweet orange production by 43.7 percent in Table 2. The result agrees with Okam et al. (2016) who reported a positive relationship between the farming experience and farm production. With regard to Table 2, it was notices that, the size of sweet orange orchard has a positive (5.046) influence on the sweet orange production. This is shown by it statistical significant level of 1%. More so, the coefficient of 22 percent shows that a change in the farm size will increase farmer's drivers in sweet orange production. These results subscribe to the findings of Etebu and Nwauzoma (2008), who stated that farmers in Bo District in Sierra

**Table 2.** Drivers of sweet orange production among farmers

| Model  | Estimation Method: Ordinary Least Square |                |                |      |
|--|--|----------------|----------------|------|
|  | Unstandardized Coefficients              |                | T - Statistics | Sig. |
|  | Coefficient                              | Standard Error |                |      |
| Age of respondents                           | .073**                                   | .029           | 2.524          | .012 |
| Level of education                           | -.052 <sup>NS</sup>                      | .042           | -1.251         | .212 |
| Farm experience in sweet orange production   | .437***                                  | .99            | 4.401          | .000 |
| Size of sweet orange orchard                 | .220***                                  | .044           | 5.046          | .000 |
| Age of sweet orange orchard                  | .124***                                  | .047           | 2.630          | .009 |
| Cost of farm inputs                          | .393***                                  | .102           | 3.836          | .000 |
| Quantity of output                           | .106**                                   | .045           | 2.371          | .019 |
| Annual income from the sales of sweet orange | 1.041***                                 | .117           | 8.920          | .000 |
| Annual profit                                | .002 <sup>NS</sup>                       | .116           | .013           | .989 |
| (Constant)                                   | -.957                                    | .177           | -5.399         | .000 |
| R-squared                                    | 0.932                                    |                |                |      |
| F-Statistics                                 | 124.474 [10; 000]                        |                |                |      |
| <b>Number of observations</b>                | <b>200</b>                               |                |                |      |

N/B: \*, \*\*, \*\*\* Significance at 10%, 5% and 1% respectively.

Source: Author's compilation, from field survey.



Leone earn less than farmers who earn high annual farm incomes would likely adopt improve technologies than those who earn less income per year. The production of sweet oranges requires large piece of since the distance from one plant to the other varies from 4–7 m depending on the type of sweet orange variety. Mamfe municipality has abundant land for sweet orange farming.

Age of sweet orange orchard had a positive and significant effect on the profit margin of common bean production (2.63) at 1% level of significance in Table 2. This is due to the fact that sweet trees start producing fruits at the third year. The number of sweet orange increases progressively and reaches maximum production at the fifteen year when the plant is mature. The coefficient of 12.4 percent signifies that a change in the age of sweet orange orchard will increase sweet orange drivers by 12 percent. The age of a sweet orange orchard determines the production of the farmer and thus the drivers of sweet orange production.

The result of the study indicates that the cost of farm inputs had a positive significance on the drivers of sweet orange production. One percent increase in the cost of farm inputs causes an increase in the drivers of sweet orange production by 39.3 percent at 1% level of significance in Table 2. This might be due to the reason that the cost of farm inputs had a direction relationship with farm size and thus the production of sweet orange farming. Cost of farm inputs constitute the major expenditure in sweet orange production and thus a greater influence as a driver of sweet orange production in the study area.

Quantity of output had a positive and significant effect on the drivers of sweet orange production at 5% level of significance in Table 2. The effect is in line with prior expectation. The quantity of out determines the income and profitability of the farmer. The high output per yield attracts farmers to invest in sweet orange production. A percentage increase in the quantity of output increases the drivers of sweet orange production by 10.6 percent. Farmers increase their farm land where the outputs per hectare are high. This also stimulates farmer to create a sweet orange orchard and thus increases the production of sweet oranges.

The study reveals that income from the sales of sweet orange per year had a positive influence on the drivers of sweet orange production. As indicated in Table 2, one percent increases in the income from the sales of sweet orange per year causes an increase of the drivers of sweet orange production by 104.1 percent at 1% level of significance ( $p < 0.01$ ). The result is slightly similar with Etebu and Nwauzoma (2014) who found that income from non-agricultural enterprises is higher for farmers in conventional in respect of farm sizes. This could be because of the fact income from the sales is the main determinant of farmer's activity and thus profitability. It increases the creation of new orchards, investment in sweet orange farming and it contributed to the drivers of sweet orange production. Furthermore, income from the sales of sweet orange has a positive influence to the drivers of sweet orange production due to increase demand of sweet orange in Cameroon.

#### ***4.3. The impact of sweet orange production on the wellbeing of famers***

The linear regression result shows that the estimated F-statistics was 101.931 and it was statistically significant at 1% level of significance as the probability of F statistic. This implies that the model was statistically significant, thus the joint effect of explanatory variables on farmers' wellbeing was above zero. The Adjusted R squared of 0.828 implies that 82.8% of the variation in the wellbeing of sweet orange farmers is explained by the explanatory variables estimated in the model.

Gender of respondents had a positive (4.865) significant effect on farmer's wellbeing at 1% level of significance (see Table 3). The effect is in line with prior expectation. Male farmers had higher gross profit margin in sweet production than the female farmers. Male farmer's increases profit margin from sweet orange production by 78.5 percent in relative to female farmers. The gender of sweet orange farmers has a positive impact on the livelihood of farmers. This could be due to the lack of gender consideration during the dissemination of improved agricultural technologies and the provision of training on agricultur-

**Table 3.** The impact of sweet orange production on famers' wellbeing

| Variable                              | Estimation Method: Ordinary Least Square |                |             |      |
|---------------------------------------|--|----------------|-------------|------|
|                                       | Unstandardized Coefficients              |                | T-Statistic | Sig. |
|                                       | Coefficient                              | Standard Error |             |      |
| Gender of respondents                 | .785***                                  | .161           | 4.865       | .000 |
| Age of respondents                    | .009 <sup>NS</sup>                       | .106           | .089        | .930 |
| Level of education                    | -.065 <sup>NS</sup>                      | .024           | -2.720      | .007 |
| Marital status                        | -.068 <sup>NS</sup>                      | .020           | -3.391      | .001 |
| Household size                        | -.051 <sup>NS</sup>                      | .065           | -.785       | .433 |
| Experience in sweet orange production | .059**                                   | .030           | 1.991       | .048 |
| Quantity of output                    | .680***                                  | .031           | 21.843      | .000 |
| Size of orchard                       | .021 <sup>NS</sup>                       | .024           | .866        | .388 |
| Age of sweet orange orchard           | .208***                                  | .041           | 5.065       | .000 |
| Profit                                | 1.060***                                 | .046           | 23.138      | .000 |
| (Constant)                            | .785                                     | .161           | 4.865       | .000 |
| R-squared                             | .828                                     |                |             |      |
| F-Statistics                          | 101.931 [10;<br>000]                     |                |             |      |
| Number of observations                | 200                                      |                |             |      |

N/B: \*, \*\*, \*\*\* Significance at 10%, 5% and 1%  
Source: Author's computation.

al production. The result agrees with Ndungu et al. (2013) who reported that male farmers quickly adopted new technologies as compared to female farmers.

The study reveals that experience in sweet orange production had a positive influence on the wellbeing of farmers. This is because experience farmer has high probability to high output quantity and thus high profits. As indicated in Table 3, one percent increases in farmer's experience causes an increase in farmer's wellbeing by 5.9 percent at 5% level of significance ( $p < 0.05$ ). This could be because of the fact experienced sweet orange farmers can easily production challenges than an inexperienced farmer. The result agrees with Okam et al. (2016) who reported a positive relationship between the farming experience and farmer's wellbeing.

The quantity of output is significantly and positively influencing the wellbeing of farmers at 1% threshold. Quantity of output has a coefficient of 68 percent is significantly correlating and influencing farmer's wellbeing. This is as a re-

sult that farm income and profit are determined by the quantity of output. The quantity of output has a positive impact on farmer's wellbeing. Thus a change in the quantity of output influences farmer's wellbeing by 68 percent. This is due to the quantity of output in the study area. The age of sweet orange orchard with a coefficient of 20.8 percent is significantly influencing the wellbeing of famers at 1% level of significant. The production of a sweet orange plant has a direct influence on the age of the orchard. Sweet orange plants start bearing fruits timidly from the third and production increases to the fifteenth year. After that, production starts dropping from the sixteenth year towards. Thus the age of sweet orange orchard has a positive (5.065) influence on the wellbeing of sweet orange farmers.

The profit of sweet orange farmers had the expected positive (23.138) influence on the wellbeing of sweet orange farmers at 1% level of significant, as shown on the result Table 3. Profit had a coefficient of 106 percent. This signifies that a change in a unit change in profit will influence

the wellbeing of farmers at 106 percent. Incomes from sweet orange production constitute the major source their revenue and thus the livelihoods of farmers in the study area. Profit is the main object of agribusiness farmers and enterprises. This result is similar to that of Bumbescu (2015), who notes that profit significantly influences the wellbeing of farmer viewed that the profit of an entrepreneur or firm has a positive influence on the wellbeing of farmers.

**4.4. The constraints encountered by sweet orange farmers**

The major constraints to the effective production of sweet orange in the study area were ranked according to their severity as presented in Table 4. The most prevalent constraints in the study area are the lack of credit facilities, lack of agrochemicals, absent of extension services, high cost of farm inputs, pests and diseases, bush fire high cost of labour. This conformed to some of the findings of Bumbescu (2015) they observed that inadequate planting materials, unhealthy (diseased) planting materials and poor farming practices, little access to credits, high transport costs, poor routes from the farms to the main highways and lack of adequate market information were the constraints to small-scale pineapple growing in Jammu region of J and K State. In addition, Saddoud et al. (2012) observed the shortage of high quality planting materials (valuable genotypes and free of pathogens), high perishability of fruits, low sale price, lack of access

to credit and plant diseases as the most prevalent constraints to sweet orange production in Tunisia.

Lack of credit facility (71%) is the major constraint in sweet orange production in the study area. Access to agricultural credit has been positively linked to agricultural productivity in several studies (Bumbescu, 2015). Yet this vital input has eluded farmers in Cameroon. Banks and microfinance institutions with large loan funds are generally difficult to reach since issues of collateral and high interest rates screen out most rural farmers. Meetings, friends and family members dominate the sources of farm credit among the farmers in the study area. Lack of agrochemicals (38%) ranks the second in the most serious constraints faced by farmers in the study area. Agrochemicals used to treat sweet orange trees are scarce in the study area. Some of the agrochemicals available are not effective for to kill pests and diseases. Absent of extension services (31%) is ranked as the next most severe constraint. All the sweet orange farmers have never received extension workers or training on sweet orange farming. MINADER does not support sweet orange famers in the study area. About 28% of the farmers complained about the problem of high cost of farm inputs. The prices of farm inputs such as agrochemicals and fertilizers are very high. This why most farmers do not use fertilizers in their sweet orange orchards and only go for agrochemicals when there are infected buy pests and diseases.

**Table 4.** Rank of constraints encountered by farmers

| <b>Challenges</b>            | <b>Frequency</b> | <b>Percentage</b> | <b>Ranking</b> |
|------------------------------|------------------|-------------------|----------------|
| Credit facilities            | 71               | 35.5              | 1              |
| Lack of agrochemicals        | 38               | 19                | 2              |
| Absent of extension services | 31               | 15.5              | 3              |
| High cost of farm inputs     | 28               | 14                | 4              |
| High cost of labour          | 22               | 11                | 5              |
| Pests and diseases           | 7                | 3.5               | 6              |
| Bush fire                    | 3                | 1.5               | 7              |
| Total                        | 200              | 100               |                |

Source: Author from field survey.

Marketing of horticultural crops, such as pineapples is quite complex and risky due to the perishable nature of the fruit, post-harvest food losses, seasonality of production and bulkiness. About 22% of farmers complained about the problem of pests and diseases which causes farmers to majority of their sweet orange fruits when attack. This is dangerous to an orchard because if not well treated it can spread to all the trees in an orchard. Farmers who have suffered from it, does not know the appropriate agrochemicals to use. About 7% of farmers complained about the bush fire which was ranked one before last. This problem is common in the dry season. Fire from a nearby farm can easily cross to an orchard and causes lot of damage to the orchard. In the study area, most farmers use fire to burn their farm lands after clearing. The last of the constraints and high cost of labour (3%) is considered the least among all the constraints faced by the sweet orange farmers in the study area. This can be linked to the family size of the farmers in the study area which constitutes a large percentage of family labour in sweet orange production in the study area. Most of the labourers come from Nigeria, Akwaya and Bamenda who work as in farms in the study area on “shared cropping” system.

## 5. Conclusion

The main objective of this study was to evaluate the effects of sweet orange production on livelihood among farmers in the Mamfe municipality, Cameroon. In order to attain the objective, the study adopted the linear regression analysis in conformity with early researchers (Kausadikar et al. (2019). The study observed that age of respondent, farm experience, size of farm, age of farm, cost of farm inputs, quantity of output and income from sales are relatively important in explaining the drivers of sweet orange production among farmers in Mamfe municipality. The study equally observed that sweet orange production has a strong impact on farmers on the livelihood of farmers in the Mamfe municipality is accepted. Finally, the result showed otherwise that “credit facilities, lack of agrochemicals, absent of exten-

sion services, high cost of farm inputs, high cost of labour, pests and diseases and bush fire are the major constraints faced by sweet orange farmers in the Mamfe municipality of Cameroon.

Since the business is significantly influencing farmers’ livelihood, the government and third party institutions are recommended to promote such an activity in Mamfe as it is providing jobs and profitable to livelihood activities for Cameroonians. This will equally boost the foreign exchange earning capacity of this agricultural sub-sector of the economy thus helping in accelerating growth of the agricultural sector of the economy. For sweet orange production to assume its prime position as the greatest citrus fruit for foreign exchange earner, the drivers of productivity of the crop in the largest sweet orange growing areas of Cameroon identified in this study must form the axis of policy implementation to reinvigorate the positive drivers and reduce the negative effects of some variables retarding the productivity of this important crop. Hence efforts must be geared towards mechanizing the activities involved in sweet orange production in the area so as to reduce drudgery arising from increasing labour intensity observed in the farms surveyed.

## References

- Abba, H.** (2014). Juicy orange business in Benue. Retrieved May 23, 2021, from <https://www.benuenews.com.ng/2017/01/juicy-orange-business-in-benue.html>.
- Awodoyin, R. O., Olubode, O. S., Ogbu, J. U., Balogun, R. B., Nwawuisi, J. U., & Orji, K. O.** (2015). Indigenous fruit trees of tropical Africa: status, opportunity for development and biodiversity management. *Agricultural Sciences*, 6(01), 31.
- Bumbescu, S.** (2015). Analysis models of profitability in agriculture. Bulletin of Taras Shevchenko National University of Kyiv. *Economics*, 9 (174) 37-42.
- Debbabi, O. S., Bouhlal, R., Abdelaali, N., Mnasri, S., & Mars, M.** (2013). Pomological study of sweet orange (*Citrus sinensis* L. Osbeck) cultivars from Tunisia. *International Journal of Fruit Science*, 13(3), 274-284.
- Ekhande, Y. S., Raykar, S. S., Holkar, S. C. & Suradkar, D. D.** (2020). Entrepreneurial Behaviour of Sweet Orange Growers. *International Journal of Current Microbiology and Applied Sciences*, pp. 11: 44-49.



- Etebu, E. & Nwauzoma, A. B.** (2014). A review on sweet orange (*Citrus sinensis* Osbeck): health, diseases, and management. *American Journal of Research Communication*, 2(2): 33-70.
- Fakayode, S. B., Omotesho, O. A., Babatunde, R. O., & Momoh, A. A.** (2010). The sweet orange market in Nigeria, how viable? *Research Journal of Agriculture and Biological Sciences*, 6(4), 395-400.
- Gockowski, J., & Ndoumbe, M.** (2004). The adoption of intensive monocrop horticulture in southern Cameroon. *Agricultural economics*, 30(3), 195-202.
- Kassem, H. S., Alotaibi, B. A., Aldosari, F. O., Herab, A., & Ghozy, R.** (2021). Factors influencing small-holder orange farmers for compliance with GlobalGAP standards. *Saudi Journal of Biological Sciences*, 28(2), 1365-1373.
- Kausadikar, H. H., Nagargoje, S. R., & Deshmukh, K. V.** (2019). Profitability of sweet orange in Marathwada region. *Journal of Pharmacognosy and Phytochemistry*, 8(4), 255-258.
- Loubser, J.** (1995, November). Sustainable livelihoods: a conceptual exploration. In *workshop of civil society, sustainable livelihoods and women in development* (pp. 6-8).
- Musasa, S. T., Mvumi, B. M., Manditsera, F. A., Chinhanga, J., Musiyandaka, S., & Chigwedere, C.** (2013). Postharvest orange losses and small-scale farmers' perceptions on the loss causes in the fruit value chain: a case study of Rusitu Valley, Zimbabwe. *Food Science and Quality Management*, 18(2), 1-8.
- Ndungu, S. K., Macharia, I., & Kahuthia-Gathu, R.** (2012). Analysis of profitability of organic vegetable production system in Kiambu and Kajjado counties of Kenya. In *African crop science conference Proceedings 11* (pp. 605-611).
- Niehof, A.** (2004). The significance of diversification for rural livelihood systems. *Food policy*, 29(4), 321-338.
- Okam, C. Y., Yusuf, O., Abdulrahman, S., & Suleiman, A. D.** (2016). Comparative analysis of profitability of rice production among men and women farmers in Ebonyi State, Nigeria. *Asian journal of agricultural extension, economics and sociology*, 10(1), 1-7.
- Pearce, D.** (2011). South Africa citrus insights in the Middle East. Retrieved May 18, 2021, from <http://www.freshfruitportal.com/2011/04/28>.
- Tawanda, M. S., Robert, M., Bray, M. A., & Marshall, M. S.** (2015). A preliminary study of the orange (*Citrus sinensis*) fruit value-chain in Chimanimani Rural District, Zimbabwe. *African Journal of Agricultural Research*, 10(35), 3507-3516.
- Yeware, P. P., Pawar, B. R., Landge, V. V., & Deshmukh, D. S.** (2010). Costs, returns and profitability of Mrugbahar and Ambebahar sweet orange production. *International Journal of Commerce and Business Management*, 3(1), 79-81.
- FAO (2016). Food and Agriculture Organization of the United Nations (FAO) Statistics. Retrieved July 8, 2021, from, <http://faostat.fao.org> Faostat.
- MINADER. (2015). The State of Biodiversity for Food and Agriculture in the Republic of Cameroon. Retrieved April 23, 2021, from <http://www.fao.org/3/CA3431EN/ca3431en.pdf>.