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Socioeconomic Survey of Okra Production, Marketing and Health Status in Fako Division of South West Region, Cameroon

Author's Details:

Doris Besem Arrey[1]*(besemdoris1369@gmail.com), Oben Tom Tabi[2], Etanke Sylvie Essomo[3], Afanga Yannick Afanga[1] Eneke Esoeyang Tambe Bechem[1]

[(1)]Department of Plant Science, Faculty of Science, University of Buea, Cameroon [(2)]Department of Agriculture and Veterinary Medicine, University of Buea, Cameroon [(3)]Department of Agriculture, Faculty of Agronomy and Agricultural Science, University of Dschang. Cameroon

Contact: Doris Besem Arrey, phone: +237677356040; email: besemdoris1369@gmail.com

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Abstract

Okra (Abelmoschus esculentus (L) Moench) is one of the most utilized species of the family Malvaceae and an economically important fruit vegetable crop. Okra is cultivated for its 'pods' which are cooked and eaten raw. It plays a vital role in human diet and health and as a source of income to the local farmers. The objective of this study was to assess the production marketing and health status of okra in the study area. Surveys were carried out to gather information on farmers, traders and consumers of okra. Field survey was done to identify cropping systems and disease situation of the plant. Descriptive analysis was carryout on data collected. It was observed that production and trading is done by mostly females, with ages above 28 years. Most of the respondent had attained formal education. Farming system was mostly mixed farming on farm sizes ranging from 25m^2 to 980m^2. Two cultivars were grown; 'county and 'white' okra. Challenges encountered by farmers were; diseases, lack of seeds, lack of farmland and poor farm to market road. Trading was by cash and carry and cash after selling. Cultivars sold 'Country buea', 'country bamenda' and 'white' okra. Market Channels included farm gate, local market or taken to available customer at eating houses. A higher percentage of consumers (63.3%) preferred the 'country' okra. Disease symptoms observed varied from leaf spot to mosaic disease.Disease incidence and severity were low.Control measures are required for large scale production.

***Keywords**: Okra, production, marketing, diseases, challenges*

1. Introduction

Okra (Abelmoschus esculentus (L) Moench) is one of the most widely known and utilized species of the family Malvaceae and an economically important fruit vegetable crop grown in tropical and sub-tropical parts of the world (Tesfa and Yosef, 2016). Vegetables are among the stable food component whose production has continued to increase in most countries of the world. (Udoh and Akpan 2007). Okra is quite palatable and liked by the poor and rich in the world. Okra is grown as a garden crop at the backs of many homes and also as a commercial crop in many parts of the world. It brings remunerative income to the growers (Rehmatullah *et al.* 2018). Okra - production of Cameroon increased from 33,320 tonnes in 2001 to 83,412 tonnes in 2020 growing at an average annual rate of 5.25% (Knoema Data Hub Catalog, 2020).

Okra is mainly cultivated for its 'pods' which are cooked and eaten in this study area. Young fruits can be eaten raw and serves as soup thickener. The importance of okra lies in the draw or mucilaginous properties of the fruits, which makes for easy consumption of bulk staple foods (Kumar *et al.*,2013). The crop has a high production rate when cultivated using poultry manure (Omotoso and Johnson, 2015). Okra as a vegetable, help in protecting our body against different ailments including cancers, diabetes and heart

diseases as they contain many essential vitamins, minerals, amino acid and other substances considered nutritious to the body and also provide substances required by the body to survive. It plays a vital role in human diet and health. Increasing the production and consumption of these nutrient rich underutilized indigenous okra seeds will help in food fortification, dietary diversification and alleviation of problems associated with malnutrition (Habtamu et al., 2018; Schipper, 2000). Okra pod can serve as a good source of protein. Therefore, promoting the consumption of Okra pods could provide cheap sources of nutrients that can improve the nutritional status and reducing malnutrition especially among resource-constrained households (Gemede *et al*., 2015). Okra serves as a source of income to its producers, labourers and marketers (Alimi, 2004). Okra is grown both in far off fields and in home gardens. Okra is susceptible to several diseases, both in the field and in storage. Some varieties are highly susceptible to root decaying/root rot organisms while some are associated with both field and storage deterioration of the fruits. Okra is found on almost every Cameroonian market.

Most studies on okra have been cantered on planting density and improving variety and nutrient supplements.Despite its multiple uses and its nutrient proven, the socio-economic importance and Fako in particular nothing has not been looked upon. This study therefore aimed at investigating the marketing, and disease status of okra, in view of filling the knowledge gap.

2. Materials and methods

2.1 Study sites

This study was carried out in selected villages in Fako division. Fako division is situated in the South West Region of Cameroon in Central Africa. The area is situated in the Mount Cameroon region. Due to the volcanic origin of the mount Cameroon, the division is rich in nutrients and provides high fertility for both natural vegetation and farmland. The area has a humid tropical climate modified by the topography from sea level to the top of the mountain. The annual rainfall ranges from 2500 to 3500 mm. The climate is predominantly tropical, with a dry season from November to February and a rainy season from March to October. The study was conducted between March and August in 2020. The main occupation of the population is farming.

2.2 Socio-economic survey

The targeted groups for this survey were farmer, trader and consumers of okra. This survey was conducted to determine different cultivars grown and sold in the markets of the study area. The study included the following selected villages; Ekona, Muyuka, Muea, Bolifamba, Muselele, and Mutengene. These village are main food markets in the division.

2.2.1 Sampling procedure: Three groups of persons were sampled; these include okra farmers, okra traders and consumers. Semi-structured interviews were used to for all groups along the supply chain to gather socioeconomic characteristics for the farmers. Demographic information from respondents included; age, educational level, marital status, source of seed, area cultivated and challenges. Additional information from traders and consumers were years of experience involved in okra business for okra and preferences for different cultivars for consumers. The survey was designed to identify the way in which okra trade is carried out, to give an indication of how trade is related to the welfare status of the respondents. Prior informed consent was sought from respondents and that the respondents can only participate willingly, retaining the right to withdraw from the study at any point if they so choose. A total of 60 questionnaires were administered to each of the following groups, giving a total of 180 interviews for the study.

2.2.2 Survey of okra fields

For the okra farms, five fields were randomly selected in each of the selected villages, given a total of 30 fields. A field was considered if the farm size was greater than $25m^2$. The purpose of this survey was to record the cultivars grown, management strategies, cropping systems and disease situation. Plant sampling to evaluate disease situation was done in a 2 x 2m quadrats spaced 4m apart along the field diagonal. In each quadrat, the total number of plants and the number of plants with each disease symptoms type were counted and recorded and described. This method is based on the fact that disease incites morphological changes in

the plant. Photographs of symptom types were taken and disease symptoms observed were described. The incidence of diseases was calculated using the formular.

I = total number of diseased plants / total number of plants x 100----------Equation (1)

Severity was rated based on a four- point scale modified after Arrey *et al.*, 2019 as shown on Table 1

Table 1: Disease severity scoring system for disease symptoms of okra in Fako division

Severity class	Description
0	Healthy
1	Symptoms not extremely distinct and little yellowed area on any symptomatic leaf
2	Mild symptoms on one or more leaves
3	More, severe symptomatic leaves per plant.
4	Very severe symptoms, obvious and significant amount of infection

2.3 Market survey

Markets in the villages were surveyed in order to obtain information on the varieties of okra sold, the stakeholders involved and the marketing. Information was obtained by random selection of participants and observation.

2.4 Data Collection: Primary data were obtained through the structured questionnaires and personal interview. Data collected include background information of the respondents, farming method and cultivars grown, constraints to farmers, marketing channels, processing methods, utilization. Incidence and severity date were observed, described and scored. The data collected was analyzed using descriptive statistics like frequency, percentages and tables.

3.Results

3.1. Demographic characteristics of Respondents

3.1.1 Demographic results of farmers

Respondents varied in sex, age, educational level, area cultivated, and years of experience in okra cultivation. Generally, there was a difference in the overall gender representation (Males = 14, Females= 46). A majority of the farmers (78.3%) were above 28 years. No farmer was recorded below the age of 18 years. Most of the farmers had attained formal education, with secondary education recording the highest frequency (Table 2).

Table 2: Demographic characteristics of okra Farmers

Factor	Frequency	**Percentage**
Sex		
Male	14	**23.3**
Female	46	**76.7**
Age		
18-27	06	**10**
28-39	21	**35**
40-51	26	**43.3**
52-63	05	**8.3**
>63	02	**3.3**
Educational level		
Informal	04	**6.7**
Primary	21	**35**
Secondary	27	**45**
Tertiary	08	**13.3**
Farming experience		
0-2 years	06	**10**
3 – 4 years	12	**20**
5 – 6years	30	**50**
>6years	12	**20**

Farmers seed source: Seeds were mostly obtained either from local germplasm, seed stores, local markets or from friends (Figure 1).

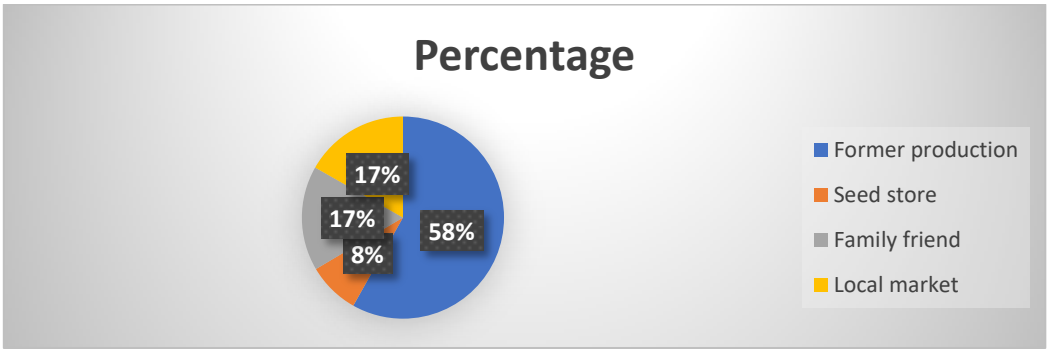

Figure 1. seed source for farmers

Two cultivars were grown in this study areas which included 'country buea' okra and 'white' okra. 'Country buea' okra was the most favoured cultivar among majority of the farmers because it is resistant to pest and diseases and have an indeterminate growth pattern with many branches and producing many pods. Varied challenges were faced by the farmers causing a reduction on their expected production and yield; with that of diseases recording the highest and preservation means the least (Figure 2).

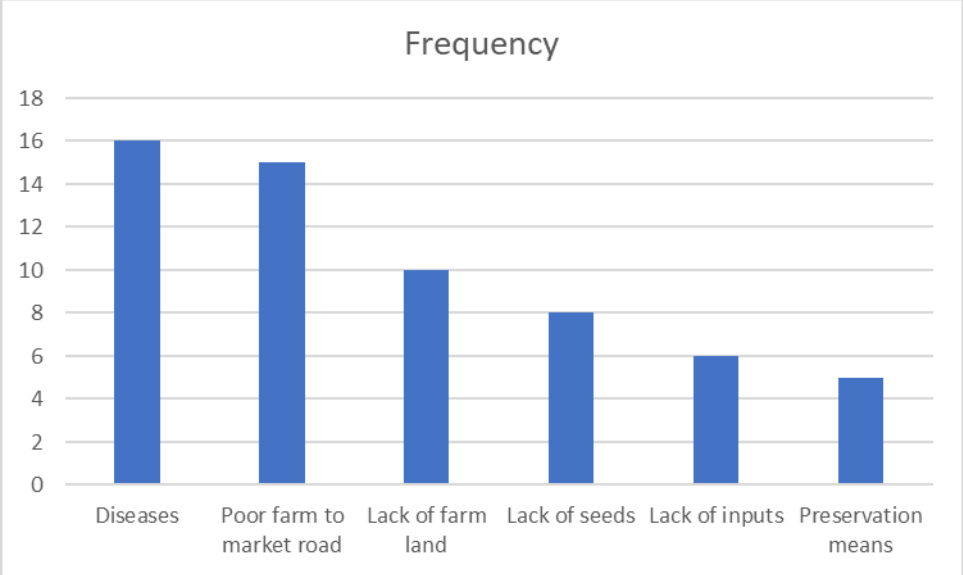

Figure 2: Challenges faced by farmers

3.1.2 Demographic information of Traders

All characteristic considered as demographic information varied amongst respondents. More of females are indulged in okra production than the males. Respondent were within the age range of 18 to 63 years and most of them were within the range of 28 to 51 years (53.3%). Most of them had attained secondary education (66.6%). Trading has been going on for more than one year and trading mean was by cash and cash after selling (Table 3).

Table 3: Demographic characteristics of traders

Sex	Frequency	Percentage
Male	08	13.3
Female	52	86.7
Age		
18-27	13	21.7
28-39	15	25
40-51	17	28.3
52-63	11	18.3

>63	4	6.7
Educational level		
Informal	3	5
Primary	10	16.7
Secondary	40	66.7
Tertiary	7	11.7
Trading experience		
0-2 years	30	50
3 – 4 years	13	21.7
5 – 6years	10	16.7
>6years	07	11.7
Trading means		
Cash and carry	18	30
Cash after selling	42	70

3.1.3 Socioeconomic characteristics of consumers

Consumers of okra varied between males and females, ages, educational level, and consumers (Table 4). Okra is eaten by people of all ages and educational levels.

Table 4: Demographic Characteristics of consumers

Sex	Frequency	Percentage
Male	22	36.7
Female	38	63.3
Age		
18-27	05	8.3
28-39	25	41.7
40-51	14	23.3
52-63	10	16.7
>63	6	10
Educational level		
Informal	08	13.3
Primary	12	20
Secondary	22	36.7
Tertiary	18	30

Majority of the consumers prefer cooking okra before eating. The country okra. The okra fruits were either sliced, grated or sliced and pounded before cooking (Table 5).

Table 5. Consumers preference, processing and consumption mode

Consumers' preference	Frequency	Percentage
White' okra	16	26.7
'Country' okra	44	73.3
Methods of consuming		
Raw	12	20
Cooked	48	80
Methods of processing before cooking		
Slicing	21	35
Grating	18	30
Slicing and pounding	21	35

Okra cooking is done in varied combinations, with mixing with 'egussi' being the most common practice (Table 5)

Table 5: Different combinations of cooking okra

Methods of cooking combination	Frequency	percentages
Eat raw as fruit	08	13.3
Plain soup okra	11	18.3
Okra mixed with 'egussi'	22	36.7
Okra mixed with groundnut	14	23.3
Okra/okbonorh/'egussi'	5	8.3

3.2. Survey of okra fields

3.2.1Cultivars Grown in the Field:

The cultivar names of okra given by the farmers during the survey included: 'Country' okra, and 'white okra'. Most of the field had 'country' okra (63.3%) while white okra was found only on eleven fields (36.7%).

3.2.2 Farm sizes and Cropping systems.

The field sizes ranged from $25m^2$ to $98m^2$. Most of the fields were within the range of $25m^2$ to $50m^2$ (96.7%) while two fields were had sizes above $50m^2$. Most of the fields were mixed cropped (68.3.7%), with food stuff like cassava, other vegetables, corn, sweet potatoes and cocoyam. Very few fields were mono-cropped. White okra was found mostly on mono-cropped fields while country okra was mostly found in mixed - cropping fields. These fields were generally well manged. These cultivars were either planted on arranged beds, broadcasted or planted using zero tillage. Little or no fertilizers were applied on the fields.

3.2.3 Disease situation

Though the fields were well managed, varied disease symptoms were observed in surveyed. Leaf spot, leaf roll, general chlorosis and mosaic were very common. These symptoms were common in all the fields and on all the cultivars. All the disease symptom types were observed in all the villages in the study area. The disease symptoms range from leaf spot to mosaic diseases. The mosaic disease was predominantly on the 'country' okra (Figure 3).

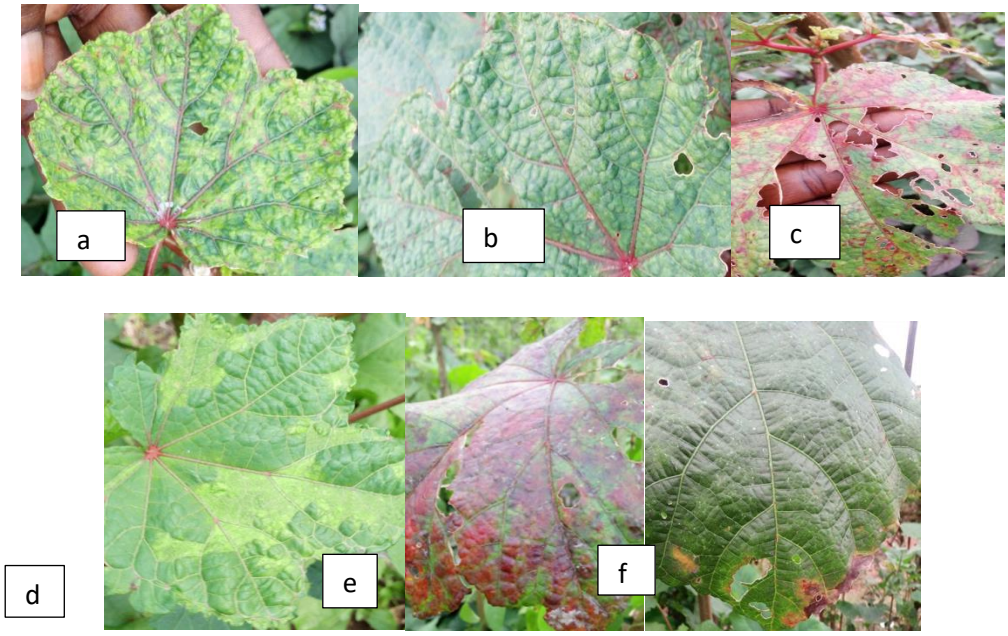

Figure 3: Field disease symptoms on okra leaves: (a) chlorosis (b) Crinkling of leaf (c) Necrotic leaf spot disease, (d) Blistering disease, (e) Necrosis (f) Early blight disease

3.2.4 Incidence and severity of disease

The disease incidence was generally low for the two cultivars observed in the field. It ranged from 17.61 on white okra to 21.26% on the country okra. The disease severity increases from 0.43% on white okra to 2.6% in country okra.

3.3 Market survey results

Analysis on the market survey showed that there was a difference in the prices and preference of the okra cultivars present. Though two cultivars of okra were cultivated in the study area, three were sold in the markets. These includes; 'Country buea', 'country bamenda' and 'white' okra. Country Bamenda is supplied to the markets by farmers from Bamenda which is out of the study area. Channels of marketing in

the study area include farm gate, local market or taken to readily available customer at eating houses. Majority (18) of the farmers sold their produce directly to local market, some sold theirs at farmgate, while very few supplied theirs directly to eating houses (Table 6). The marketing strategy was either cash and carry trading (10%) or carry, sell then pay (90%). The farmers preferred cash and carry system of trading. Both traders and consumers preference depended on their intended outcome after cooking. A higher percentage of consumers (63.3%) preferred the 'country' okra.

Table 6: Distribution of respondents according to marketing channels of okra

Market channel	Frequency	Percentage
Farm-gates	19	31.7
Local market	28	46.7
Direct supply to eating houses	13	21.7

The prices vary with the cultivar and the number of fruits. A small group of five okra fruits of the country cultivar is sold at 200FCFA and twice the quantity is sold at 100FCFA for white okra. Farmers who indulge on okra cultivation, could have an average sale of approximately 250.000 FCFA per annum. The prices are lower in markets in production sites as compared to the okra market in urban centres. A basin of 'country' Okra is sold at a cost 6.000 FCFA while the cost of a 25kg bag of it varies from 12000 FCFA to 25000 FCFA depending on the season. Farmers with larger fields, between 500 to 980m^2 harvested as much as 06 baskets for a single harvest. Harvesting is either done by family members or hired workers and it was done twice a week.

4. Discussion

Farmers are developing a serious interest in okra production due to its potential as an economic crop, its ability to grow with or without nutrient input and its ability to produce high yield within short period of time. Okra cultivation is not labour intensive that why it was mostly done by female. Women increasingly engage in crop production activities, while men are called upon for tasks that require greater physical strength might be the reasons why females dominated in the study. Attributes responsible for farmers choice of cultivar to plant includes; pest and disease resistance, colour of fruits and palatability. Despite the high production rate, there are several factors such as diseases which can hinder the realization of this production. The diseases symptoms observed is not surprising. Diseases have always been a major cause of reduced quality and quantity of plants worldwide (Arrey *et al*., 2016). Various biological agents including bacteria, fungi and viruses cause diseases of okra. Important diseases of okra have been identified worldwide. Diseases often lead to large yield losses. The incidence of these disease symptoms can be due to the seed source which was mostly from the local germplasms used year- after- year. Studies by (Hussain *et al*., 2012) showed that okra is severely attacked by root-knot nematodes. Alegbejo (2015) has also reported on virus diseases on okra. The most conspicuous viral symptoms are the yellow colouration of the leaves, vein banding, light green and dark green patches on the leaves, crinkling of leaves, curling of the leaves and severely stunting of some young plants (Iderawum and Yusuff), some of which were observed during this study. Diseases have proved to be of major problem in okra production and most be taken into consideration when planning for massive production. All the okra cultivars were susceptible to diseases, as all of them show symptoms but their susceptibility to diseases differ with cultivars. White okra was susceptible to diseases, an indication why it was not commonly found in the field. The incidence of disease was lower in 'country okra than white okra. Studies carryout by Ngbede *et al*., (2014) showed that diseases was one of the constraints encountered by okra farmers in the study. This result is similar to that obtained in this study.

Consumers preference of 'country' was due to the fact the mucilage is high and the soup gets thicken after using few pods while those who preferred the whites (20%) attest that the okra maintains its greenery even after cooking presenting a shiny look of their soup. Their rejection for the 'countrys' was the fact that they become dark upon cooking presenting a dark look of the soup which usually is the reason most of their family members do not like eating okra soup. Some few respondents (16.7%) ate all the varieties raw for health reasons.

It was also observed that the gaps that affect the supply chain system of okra includes improper handling of agricultural produce, the involvement of wholesalers at farm gate market that mislead the farmers; resulting in the lower price of their produce, increase in post-harvest losses due to inappropriate availability of storage containers, poor farm to market roads, inaccessibility of markets and the lack of knowledge regarding government schemes and policies regarding seed supply. okra production is also affected by the fact that farmers mostly make use of local seed varieties from their local germplasm year after year.

The trade in okra in the Fako Division is mostly between farmers, whole sellers, retailers and consumers and the prices vary depending on the cultivar and the season. Relatively few farmers sell their product at retail prices to consumers in farmgate markets. Most of the produce from farmers are sold to wholesalers. In this case the farmers receive less than 50% of what is expected as price of the produce. This situation is a serious problem for growers. Production of okra being a perishable crop is affected by its marketing (Kemble *et al*., 1995) and this restricts the ability of producers to store them in order to cope with price fluctuations. Most retailers preferred buying directly from the farms rather than in the markets from wholesalers. This is because at the level of the farm-gates, the farmers turn to drop their prices taking into consideration the transportation aspect. Okra earns a reduced price in rural centres as compared to values obtained in the urban markets. However, trading of the fresh fruits has a large local economic impact, and the income is used for other basic necessities for the okra-trading families. Thus, the okra farmers like any other entrepreneur may have a profit motive (Osalusi *et al*., 2019). Since they don't often have capital to trade on cash and carry, they are bound to ensure all disadvantages in the marketing process. This calls for concern to the government.

5. CONCLUSION

The Study was carried out to asses okra production, marketing and disease situation in villages in Fako division of Cameroon using descriptive statistics to as analytical package. It was discovered that majority of the okra farmers are in their active age, literate, are into small- scale production with majority of the farmers cropping a land area of less than 0.5ha. Mixed farming is the prevailing farming system, an indication of subsistent level of production. Marketing of the okra is carried out at the farm gate, the local markets or served directly to eating houses. 'country' okra is more preferred to 'white' okra. Major constraints faced by farmers in the area are diseases, bad roads, lack of good seeds, small size fields and capital for inputs which if properly addressed can go a long way to enhanced productivity. It is therefore recommended that the government should subsidise in okra production, and marketing, put emphasis on inputs availability, diseases prevention and control, seeds availability and good farm to market roads.

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