

Assessment of Factors Limiting Production of Citrus among Smallholder Farmers in Benue State, Nigeria

Attah A. J.

Department of Agricultural Extension and Rural Sociology, University of Abuja, Nigeria

Mbah E. N.*

Department of Agricultural Extension and Communication, Federal University of Agriculture, Makurdi, Nigeria

Okeke M. N.

Department of Agricultural Economics and Extension, Chukwuemeka Odumegwu Ojukwu University Anambra State, Nigeria

Abstract

The study assessed factors limiting production of citrus among smallholder farmers in Benue state, Nigeria. Primary data were collected from 120 respondents using structured questionnaire. Data were analyzed using frequency, percentage, mean score and factor analysis. Results revealed that 80% males and 20% females were involved in citrus production in the study area, 95% were married with 74.17% having citrus farm size of 1-3 hectares. Site selection (93.3%), variety and rootstock selection (91.7%), irrigation (91.7%), disease control (91.7%), pest management (88.3%), fertilizer application (86.7%), wind breaks (83.3%), grafting/budding (81.7%) were major citrus management practices used by the respondents. Respondents' activities in citrus production were constrained by infrastructural, fund-related and institutional factors. The study concluded that more males than females were involved in citrus production. It is recommended that research and extension agencies should target appropriate technologies that will improve productivity of citrus and increase income of smallholder farmers for economic empowerment.

Keywords: Factors; Production; Citrus; Small-holder; Farmers; Nigeria.



CC BY: [Creative Commons Attribution License 4.0](https://creativecommons.org/licenses/by/4.0/)

1. Introduction

Citrus is one of the most important fruit crops grown all over the world. Citrus fruits are rich in Vitamin C (ascorbic acid) and folic acid, as well as a good source of fiber [1]. They are fat free, sodium free and cholesterol free. In addition, they contain potassium, calcium, foliate, thiamin, niacin, vitamin B6 (pyridoxine), phosphorus, magnesium and copper. In Nigeria, about 930,000 tons of citrus fruits are produced annually from an estimated hectareage of 3 million hectares of land. Citrus is grown in the rainforest and guinea savannah, most of these farmlands is in the remote part of the country with poor roads. About 30-50% of these citrus fruit get spoilt on the way before getting to the final consumers in the urban centres [2].

The commonly grown citrus species belong to the family Rutaceae. Important citrus species grown in Nigeria are sweet orange, grape fruit, lime, lemon and tangerine. Although there has been an improvement in citrus fruit production in Nigeria over time, challenges still being faced in the areas of production, harvesting, post harvesting, processing, marketing and storage are preventing full exploitation of the best of citrus production [1].

Citrus is one of the most important fruit crops widely cultivated in Nigeria especially in North Central with Benue state in particular. Although the area of land under production for the crop is increasing, it is quite low and at a slow pace because the farmers face number of constraints on use of resources and production [3].

Citrus contributes greatly to agricultural development in the country's economy and faces a lot of challenges in its development and maximization of potential by smallholder farmers. Some of the factors limiting production are lack of capital, pests, diseases, soil fertility problems, scarcity of large quantities of high yielding varieties, scarcity of early maturing true-to-type planting materials, high cost of labour for farm operations, lack of information on the use of agro-chemicals, insufficient market information on the export trade involving fruits, difficulty in obtaining land for producing crops that are permanent in nature as well as lack of training for farmers [4].

Bhat, *et al.* [3] observed that most citrus farmers are constrained by finance and credit facilities. Citrus is a perennial crop requiring constant management for continuous productivity and inadequate finance may hamper its production. Losses arising from pests and diseases infestation on farmers' plots remain a major challenge to agricultural productivity and food security [5]. This gave rise to the following research questions. What are the socio economic characteristics of the respondents? What are the management practices of citrus production? And what are the constraints to production of citrus in the study area?

The specific objectives of the study were to:

- i. describe the socio economic characteristics of the respondents;
- ii. ascertain management practices of citrus production; and
- iii. identify constraints to production of citrus.

2. Methodology

The research was carried out in Benue state, Nigeria. Benue State is delineated into three agricultural zones, namely; Northern zone (A), Eastern zone (B) and Central zone (C). The state comprises (23) local government areas with Makurdi as the state capital. It is located between longitude 7° 47' and 10° 0' East and latitude 6° 25' and 8° 8' North. It shares boundaries with five other states namely; Nasarawa state to the north, Taraba state to the east, Cross-River state to the south, Enugu state to the south-west and Kogi state to the west. The state also shares a common boundary with the Republic of Cameroon on the south-east. Benue state occupies a landmass of 34,059 square kilometres. It has an estimated population of 4,253,641 [6].

The state is inhabited predominantly by the Tiv, Idoma and Igede people. The major occupation of the people in the state is farming which engages more than 70% of the working population. This has made Benue the major source of food production in the nation. Major crops grown are rice, groundnut, cowpea, cassava, sweet potato, maize and sorghum. Tree crops grown include citrus, mango, oil palm, cashew and guava. Livestock raised include sheep, goat, pig, rabbit, poultry and cattle.

The population of the study consisted of all citrus farmers in Benue State, Nigeria. There are three zones in Benue State, namely; Zone A, Zone B and Zone C. Zone A was selected out of the three Zones as a result of having large production of citrus. In the first stage, Ushongo and Vandekeiya LGAs were purposively selected in Zone A because of their contribution to citrus production in the state. In the second stage, five (5) council wards were purposively selected from each LGA. In each of the council wards selected, simple random sampling was used to select (12) respondents, making a total of 120 respondents.

Primary data were collected through the use of a well-structured questionnaire. Descriptive and inferential statistics such as frequency, percentage, mean score and factor analysis were used for data analysis.

3. Results and Discussion

3.1. Socio-economic Characteristics of the Respondents sex

Majority (80.0%) of the respondents were males (Table 1). This implies that males were more involved in citrus production in the study area. This could be due to socio-cultural milieu which gives males access to production resources such as land which is a major requirement for citrus production.

3.2. Age

Table 1 shows that 46.67% of the respondents were aged 51-60 years while 21.67% were within the age range of 41 and 50 years, among others. The mean age was 54 years. This implies that the respondents were middle-aged, in their productive years and energetic for greater involvement in citrus production.

3.3. Marital Status

Majority (95.00%) of the respondents were married while 5.00% were single (Table 1). This implies that the respondents had family members which are attributed to greater responsibilities hence the need for more avenues of obtaining additional income in citrus production. This finding agrees with Onwubuya and Ajani [7] who stated that majority of the farmers in the study area were married which indicates provision of family labour used in the farm.

3.4. Household Size

Entries in Table 1 show that 35.00% of the respondents had household size of 11-15 persons, 25.00% had household size of between 6 and 10 persons, among others. The mean household size was 14 persons. This indicates that the respondents had large household size which could be available for providing labour used in citrus production. This finding agrees with a study conducted by Mbah, *et al.* [8] which reported that having large household size is advantageous because it provides labour used in family farming.

3.5. Level of Education

Results in Table 1 indicate that 61.67% of the respondents had tertiary education, 27.50% had secondary education, among others. This implies that majority of the respondents were literate as they attained one form of education or the other which could enhance the ability to adopt improved technologies in citrus production. This is in line with [9] who noted that education is advantageous to farmers because it will lead to increase in adoption of innovation.

3.6. Citrus Farm Size

A greater percentage (74.17%) of the respondents had farm size of 1-3 hectares, 23.33% had farm size of between 4 and 6 hectares, among others (Table 1). The mean farm size was 2.84 hectares. This implies that citrus production in the study area is practiced at a subsistence level. This could be as a result of type of land tenure system predominant in the study area or due to increase in population. Farm lands in the traditional Tiv culture are not communally owned and this leads to fragmentation, leaving farmers with small size of farm land. The small landholding could have negative effect on the productivity of citrus in the study area.

3.7. Citrus Farming Experience

About 53% of the respondents have been involved in citrus production for more than 25 years, 24.17% had between 11 and 15 years of experience, among others. The mean farming experience was 19.9 years. This implies that the respondents started citrus production early in life which is important in enhancing sustainable productivity. Additionally, long period of involvement could ensure efficient use of production resources. This finding agrees with [Abdullahi, et al. \[10\]](#) who opined that a good number of farmers have acquired enough experience as a result of farming for a long time.

3.8. Extension visit

A greater percentage (62.50%) of the respondents affirmed having contact with extension agents while 37.50% had no contact in the last one year ([Table 1](#)). This implies that the respondents had regular contact with extension agents which could encourage the development of receptive attitude in adoption of technologies for citrus production. This finding agrees with [Onwubuya and Ajani \[7\]](#) who stated that regular contact with extension agents motivates and exposes the farmers to innovations and gives them information on how to use technologies.

3.9. Number of Extension Contact

Entries in [Table 1](#) show that out of those that had contact with extension agents, 65.33% of them had contact with extension agents once while 37.67% had contact with extension agents twice in the last one year. This was considered very low. The implication is that farmers may not be well informed about citrus production practices and other improved technologies. This finding agrees with [Mbah, et al. \[11\]](#) who reported that poor extension services deprive farmers opportunities of embracing use of improved technologies that will boost their productivity.

3.10. Annual Income

Results in [Table 1](#) indicate that about 48% of the respondents earned between ₦250,001 and ₦500,000 while 6.67% earned above ₦500,000, among others. The mean annual income was ₦347,500.00. It shows that the respondents obtained low income from citrus production. This finding agrees with [Ajani and Igbokwe \[12\]](#) who opined that small-scale farmers do not earn much from their farms.

3.11. Membership of Organization

Majority (89.17%) of the respondents were not members of any organization while 10.83% belonged to organizations ([Table 1](#)). Membership of organizations is expected to favour citrus production because the members are assumed to have more access to information and knowledge on improved citrus production practices, credit facilities and other inputs needed for production. This finding is in line with [Ekong \[13\]](#) who opined that the possible reasons why some people joined organization could be as a result of satisfying their basic needs which sometimes could be achieved collectively.

Table-1. Distribution of Respondents According to their Socio-economic Characteristics (n= 120)

Socio-Economic Characteristics	Frequency	Percentage (%)	Mean Score
Sex			
Female	24	20.00	
Male	96	80.00	
Age (years)			
21 – 30	3	2.50	
31 – 40	10	8.33	
41 – 50	26	21.67	
51-60	56	46.67	
Above 60	25	20.83	53.50
Marital status			
Married	114	95.00	
Single	6	5.00	
Household size (numbers)			
1-5	8	6.67	
6-10	30	25.00	
11-15	42	35.00	
16-20	26	21.67	
Above 20	14	11.67	14
Level of education			
Non-formal education	7	5.83	
Primary education	6	5.00	
Secondary education	33	27.67	
Tertiary education	74	61.67	
Farm size (hectares)			
1-3	28	23.33	
4-6	2	1.67	
Above 6	1	0.83	2.84
Farming experience (years)			
1-5	8	6.67	
6-10	14	11.67	
11-15	29	24.17	
16-20	17	14.17	
Above 20	52	43.33	19.90
Extension contact			
No	45	37.50	
Yes	75	62.50	
Number of extension contact			
1	26	34.67	
2	49	65.33	
Annual income (Naira)			
≤250,000	55	45.83	
250,001-500,000	57	47.50	
Above 500,000	8	6.67	347,500.00
Membership of organization			
Yes	13	10.83	
No	107	89.17	

3.12. Management Practices of Citrus Production

Management practices of citrus production include site selection (93.3%), variety and rootstock selection (91.7%), irrigation (91.7%), disease control (91.7%), pest management (88.3%), fertilizer application (86.7%), wind breaks (83.3%), grafting/budding (81.7%) and canopy management (2.5%) (Table 2). This implies that respondents in the study area adopted several management practices as this will impact on the profitability of citrus production. This finding agrees with Dorji, *et al.* [14] who reported that efforts should be made to select varieties desired by consumers which are suited to regions.

Table-2. Distribution of Respondents According to Management Practices of Citrus Production (n=120)

Management practices	Frequency*	Percentage (%)
Site selection	112	93.3
Variety and rootstock selection	110	91.7
Wind breaks	100	83.3
Canopy management	3	2.50
Irrigation	110	91.7
Fertilizer application	104	86.7
Pest management	106	88.3
Disease control	110	91.7
Grafting/Budding	98	81.7

* Multiple responses

3.13. Constraints to Production of Citrus among Smallholder Farmers

Results of factor analysis of constraints to production of citrus is presented in Table 3. Three constraint factors were extracted based on the responses of the farmers namely; factor 1(infrastructural constraints), factor 2 (fund-related constraints) and factor 3 (institutional constraints).

Variables that loaded under factor 1(infrastructural constraints) were inadequate agronomic and technological knowhow (0.4154), pests and diseases infestation (0.6888), fluctuating weather and climatic conditions (0.6743), inadequate transport facilities (0.6994), lack of infrastructural facilities (0.6130), lack of storage facilities (0.7050) and lack of processing industries (0.8149). This implies that production of citrus by the respondents was impeded by lack of infrastructure. This finding agrees with Mendelson and Williams [15] who indicated that one of the major factors inhibiting citrus production is poor physical infrastructure.

Fund-related constraints include unavailability of labour (0.4911), lack of credit facilities (0.5903), inadequate finance (0.6150), poor start up capital (0.4737) and large number of middle men (0.4053). This implies that citrus production is constrained by inadequate fund. This finding is line with Bhat, *et al.* [3] who reported that most citrus farmers are constrained by finance and credit facilities.

Variables that loaded in factor 3 were absence of an organized data management system (0.5176), inadequate extension contact (0.4079), poor marketing information (0.4407), poor marketing channels (0.4381) and unfavourable government policy (0.7007). This implies that institutional factors affected production of citrus by smallholder farmers. The findings agree with a study carried out by Ajani and Igbokwe [12] which stated that activities of rural women were constrained by labour, institutional, technical and social factors..

Table-3. Factor Analysis of Constraints to Citrus Production among Smallholder Farmers

Constraints	Factor 1	Factor 2	Factor 3
Lack of improved varieties of seedlings for planting	0.3162	0.2539	0.1599
Absence of an organized data management system	-0.0169	0.2264	0.5176*
Inadequate agronomic and technological knowhow	0.4154*	0.1138	0.2848
Unavailability of labour	0.0165	0.4911*	0.3345
Lack of credit facilities	0.2231	0.5903*	0.0265
Inadequate finance	0.0436	0.6150*	0.0612
Pests and diseases infestation	0.6888*	0.1321	-0.0054
Poor start up capital	0.3927	0.4737*	0.1710
Inadequate extension contact	0.0633	0.1916	0.4079*
Fluctuating weather and climatic conditions	0.6743*	0.1617	-0.2547
Lack of organized markets	0.3330	0.3379	0.3744
Large number of middle men	0.0840	0.4053*	0.2858
Inadequate transport facilities	0.6994*	0.1747	0.0063
Poor marketing information	0.1305	0.2585	0.4407*
Lack of infrastructural facilities	0.6130*	0.0825	0.0626
Lack of storage facilities	0.7050*	0.1423	0.0255
Lack of processing industries	0.8149*	-0.0941	0.1393
Poor marketing channels	0.0911	0.2707	0.4381*
Unfavourable government policy	-0.0455	-0.0019	0.7007*

Factor 1: Infrastructural constraints

Factor 2: Fund-related constraints

Factor 3: Institutional constraints

4. Conclusion and Recommendations

The study concluded that males who are in their productive years were mostly involved in citrus production. Annual income generated from sales of citrus was low which could be as a result of small land holdings obtainable in the study area. However, the smallholder farmers were engaged on the use of citrus management practices such as

site selection, variety and rootstock selection, irrigation, disease control, pest management, fertilizer application, wind breaks and grafting/budding. The respondents were highly constrained by infrastructural, fund-related and institutional factors. Based on the findings of the study it is recommended that research and extension agencies should target appropriate technologies that will improve productivity of citrus and increase income of smallholder farmers for economic empowerment. There is need for government at the local level to establish markets where smallholder farmers can easily sell their produce in order to avoid deterioration of citrus after harvest thus increasing income as well as raises standard of living.

References

- [1] Chase, W. G., 2007. "Production of citrus fruits." *Proceeding of International Society of Citriculture*, vol. 13, pp. 1365-1373.
- [2] Taiwo, T. A., 2005. *Production of fruits, vegetables, grains, legumes, root crops in Nigeria, problems and prospects* vol. 1: University Press. p. 9.
- [3] Bhat, A., Jyoti, K., Manish, S., and Rajinder, P., 2015. "Constraints in production and marketing of citrus fruit in Jammu region of J&K State." *Economic Affairs Journal*, vol. 60, pp. 331-337.
- [4] Owoye, T., 2010. "Nigeria, Training farmers will boost agricultural production." Available: www.freshplaza.com/news_detail.
- [5] National Horticultural Research Institute (NIHORT), 2000. "Twenty-five years of research into horticultural crops development in Nigeria, Denton, O.A., Alasiri, K.O. and Adejoro, M. A." p. 140.
- [6] National Population Commission (NPC), 2006. "National Population Census figure, Abuja, Nigeria," *National Bureau of Statistics*,
- [7] Onwubuya, E. A. and Ajani, E. N., 2012. "Strategies for improving production and processing of cocoyam among women farmers in Anambra State, Nigeria." *Agricultural Research and Reviews*, vol. 1, pp. 102-106.
- [8] Mbah, E. N., Ezeano, C. I., and Odiaka, E. C., 2016. "Analysis of rural youths participation in family farming in Benue State, Nigeria, Implications for policy." *Current Research in Agricultural Sciences*, vol. 3, pp. 46-56.
- [9] Obinne, C. P. O., 1991. "Adoption of improved cassava production technologies by small-scale farmers in Bendel state, Nigeria." *Journal of Agriculture, Science and Technology*, vol. 1, pp. 12-15.
- [10] Abdullahi, Y. M., Gidado, A. S., and Jibril, S. A., 2010. "Attitude of rural youths towards family farming in Dass, Bauchi state, Nigeria: Implications for policy." *Journal of Agricultural Extension*, vol. 14, p. 22.
- [11] Mbah, E. N., Ezeano, C. I., and Onwusika, A. I., 2017. "Assessment of challenges faced by rural youths in family farming in Benue State, Nigeria, Issues for consideration." *International Journal of Interdisciplinary Research and Innovations*, vol. 5, pp. 7-15.
- [12] Ajani, E. N. and Igbokwe, E. M., 2014. "Constraints to occupational diversification among rural women in Anambra State, Nigeria." *Journal of Agricultural Extension*, vol. 18, pp. 27- 36.
- [13] Ekong, E. E., 2010. *An Introduction to Rural Sociology*. Uyo, Nigeria: Dove Educational Publishers. p. 251.
- [14] Dorji, K., Lakey, L., Chopel, S., Dorgi, S., and Tamang, B., 2016. "Adoption of improved citrus orchard management practices, A micro study from Drujegang growers, Dagana, Bhutan." *Agric. and Food Security*, vol. 1, pp. 5-8.
- [15] Mendelson, R. and Williams, L., 2004. "Comparing forecast of global impacts of climate change." *Mitigation and Adaptation Strategies Global Change*, vol. 9, pp. 315-333.