Approaches for Enhancing Cowpea Production to Promote Food Security and Sustainable Development in Enugu State, Nigeria

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Abstract

The study examined the approaches for enhancing cowpea production to promote food security and sustainable development in Enugu State, Nigeria. The study answered two research questions in line with the specific purpose of the study. The study adopted a descriptive survey research design. The population for the study was 220 consisting of 190 registered cowpea farmers and 30 agricultural extension agents in Enugu State. The entire population was studied due to the manageable size. The instrument for data collection was 16–item structured questionnaire face validated by three experts from the Department of Agricultural Education, University of Nigeria, Nsukka. Cronbach Alpha reliability method was used to determine the internal consistency of the instrument and an overall reliability coefficient of 0.81 was obtained. The data collected was analyzed using mean and standard deviation. The findings revealed that insect pest attack, diseases such as fungal, viral and bacterial and poor soil fertility were some of the challenges faced by farmers in the production of cowpea; while the approaches for enhancing cowpea production were identified to include the use of early maturing, pest and diseases resistant varieties of cowpea, adopt appropriate planting system, and effective agricultural extension service to disseminate and teach cowpea farmers appropriate practices in cowpea production. It was recommended among others that extension services should disseminate the information to cowpea farmers on good agricultural practices to minimize the incidence of pests and diseases of cowpea in the State.

Keywords: Farmers, Cowpea, Food-Security, Sustainable Development

Introduction

The cowpea, *Vigna unguiculata* (L.) is an annual herbaceous legume of the Fabaceae family grown predominantly in Africa. It is an important staple crop that provides an affordable source of protein (Muranaka, 2016). The cowpea is variously called black-eye pea, black-eye bean, crowder pea and southern pea among others. Cowpea *Vigna unguiculata* (L.) originated in the African continent with large economic and social importance in the developing world. Cowpea is a food of major importance for millions of people, especially in less developed countries of the tropics, being the major source of protein and carbohydrate for a large part of the world population. Cowpea is not only rich in nutrients but also nutraceuticals such as dietary fibre, antioxidants, polyunsaturated fatty acids (PUFA) and polyphenols (Silva, Santos, Junior, Silva, Santos & Siviero, 2018). Among the cultivated crop plants, the cowpea is one of the most variable species in terms of its plant growth, morphology, maturity and grain types (Singh, 2014). The cowpea has a long taproot and adaptation mechanisms such as turning the leaves upwards to prevent them from becoming too hot and closing the stomata that help give it drought tolerance. As a legume crop, the cowpea fixes atmospheric nitrogen through symbiotic interactions with soil rhizobia (Sarr, Fujimoto &Yamakawa, 2015).

Cowpeas are cultivated predominantly in Africa and are grown for food, fodder and green manure. Cowpea production has expanded in the world over the past decades. In 2017, over 87% of the crop was produced in Africa. In South America, Brazil showed a recent increase in cowpea cultivation, placing the country in third place in terms of global area and production. According to Food and Agriculture Organization [FAO] (2019), the ten top producers of dry cowpeas in terms of productivity in 2017 were Nigeria (3 410 thousand tonnes (kt)), Niger (1 959 kt),

Brazil (749 kt), Burkina Faso (604 kt), the United Republic of Tanzania (201 kt), Cameroon (198 kt), Myanmar (179 kt), Kenya (146 kt), Mali (145 kt) and Sudan (130 kt). With the continual increase in the global population, there is the need to increase productivity to meet the food need and enhance the income of producers.

Productivity is a measure of the efficiency of production. Productivity is a ratio of production output to what is required to produce it (inputs). The measure of productivity is defined as a total output per one unit of total input and the concept of productivity refers to total factor productivity, which is a productivity measure involving all factors of production (Robbins,2019). Productivity and resource allocation is an important aspect of increased food production. Silva et al (2018) observed that cowpea performed better using appropriate genotypes, a simple adjustment in the planting system, and provision of improved varieties among others. Nkom et al, (2021) noted that several biotic and abiotic factors such as insect pests, diseases (fungal, viral and bacterial), poor soil fertility, metal toxicity, and drought contribute to the reduction of cowpea yield potential in sub-Saharan Africa. Silva et al (2018) observed that increased productivity and economic viability of cowpea is possible in all growing regions, using appropriate genotypes and improvements in production systems, reducing dependence on external inputs. Ewansiha and Tofa (2016) noted that to increase cowpea productivity, there is a need to develop and/or promote the use of adapted high-yielding varieties, and to disseminate good agricultural practices to minimize the incidence of pests. The authors further observed that increased cowpea production through the adequate use of inputs like fertilizers will support Nigeria's effort to reduce its large imports of cowpea grain from neighboring countries. This will help to promote food security.

Promoting food security, according to Silva et al (2018), is a complex mission with political, economic, environmental, social and cultural dimensions. For food security to be achieved, the population should have unrestricted access to a healthy and nutritious diet, which depends on adequate economic resources and food available in the country, region and communities in which people are located. The national availability of food for human consumption is a function of the balance between food grown in the country, import and export of food, reduction of waste and destruction of food. Adequate food security will lead to sustainable development.

Sustainable development, in the view of Aullan (2017), is the use and exploitation of today´s resources in such a manner that they will be available for use by further generations. It is the development efforts that meet the need of the present while providing an opportunity for future generations to meet equal or greater benefits. Sustainable development through the production of cowpea is very much needed in Enugu State. In Enugu State, cowpea farmers continue to produce below the market demand as cowpea is imported from the other States of Nigeria. Many people find it difficult to buy cowpea; the available ones are usually too expensive and way above the reach of the common man. Consequently, hunger and malnutrition have become commonplace. Malnutrition results from insufficient nutrients for an active and healthy life. Daniel (2018) noted that excessive consumption of energy food leads to negative health consequences such as being overweight and micronutrient deficiencies. Jayathilake et al, (2018) observed that high protein and carbohydrate contents with relatively low-fat content and complementary amino acid pattern to that of cereal grains make cowpea an important nutritional food in the human diet. Farmers lack the necessary knowledge needed to cope with cowpea production. Farmers in the State have been cultivating cowpea with continuous low yield all year round. Many people find it difficult to buy cowpea as the available ones are usually too expensive for the common man to buy. Cowpea grown in the State are mostly attacked by pest and diseases and majority of cowpea farmers normally use low yielding local varieties which affect the yield of the crop. According to Nkomo (2021), insect pests, diseases, poor soil fertility, metal toxicity, and drought contribute to the reduction of cowpea yield. The author noted that most farmers do not have access to high yielding, disease resistant varieties thus predisposing them high risk and uncertainties. Lack of access to modern irrigation facilities and production techniques condemn the farmers to relying solely on rain fed agriculture which is highly unstable and unpredictable. It was based on these scenarios that this study determined the approaches for enhancing the production of cowpea for promoting food security and sustainable development in Enugu State. Specifically, the study sought to determine:

- challenges faced by farmers in cowpea production in Enugu State and
- approaches to enhance cowpea production in Enugu State.

Research Questions
The following research questions were raised and answered for the study:
1. What are the challenges faced by farmers in the production of cowpea in Enugu State?

2. What are the approaches that could enhance the production of cowpea in Enugu State?

Methodology

The descriptive survey research design was adopted for the study. The design was used to determine the approaches for enhancing the production of cowpea to promote food security and sustainable development in Enugu State. According to Olaitan, Ali, Eyo and Sowande (2000), survey research design is the plan, structure and strategy that the investigator wants to adopt in order to obtain solution to research problems using questionnaire in collecting analyzing and interpreting the data. Survey research design was suitable for the study because it made use of questionnaire for data collection from a group of respondents. The study was conducted in Enugu State, South – East Nigeria. Enugu State consists of six agricultural zones which include Nsukka, Agbani, Agwu, Udi, Enugu and Enugu Ezike zone. The population for the study was 220 consisting of 190 registered cowpea farmers and 30 agricultural extension agents in Enugu State (Enugu State Agricultural Development Programme, Human Resource Center, 2021). The entire population of 220 was studied due to the manageable size of the population. Therefore, there was no sampling. The instrument for data collection was a structured questionnaire developed from the literature by the researcher titled Cowpea Production Challenges and Enhancement Approaches Questionnare (CPCEAQ) The nineteen items structured questionnaire had a four-point scale with response options as strongly agree (SA), Agree (A), disagree (D), and strongly disagree (SD) with corresponding values of 4, 3, 2 and 1 respectively. The instrument was face-validated by three experts from the Department of Agricultural Education, University of Nigeria, Nsukka. The comments and corrections made by experts were integrated and used to modify the final draft of the instrument.

The validated instrument was trial tested on 15 respondents who are cowpea farmers in Anambra State that possess similar characteristics to the study area. This was done to determine the reliability of the instrument using the Cronbach Alpha method. The result of the coefficient was 0.81. Since the instrument was not dichotomously scored and the reliability coefficient was above the acceptable level according to Kline (1999), the instrument was deemed exceptionally reliable and used for the study. Data were collected by the researchers and three research assistants who were instructed on how to distribute and collect the instrument. 220 copies of the instrument were distributed and successfully retrieved giving a 100% rate of return. Data collected were analyzed using mean and standard deviation. The real limit of numbers was used in making decisions on the research questions. Thus 0.5 – 1.49 was taken as strongly disagree, 1.50 – 2.49 was taken as disagree, 2.50 – 3.49 was taken as agree while 3.50 – 4.00 was taken as strongly agree.

Results and findings

Research Questions 1: What are the challenges faced by farmers in the production of cowpea in Enugu State?

Data for answering research question one is presented in Table 1

Table 1: Mean Ratings and Standard Deviations on the Challenges Faced by Farmers in Production of Cowpea (N=220)

S/No Item Statements	$\bar{X}$	S	Remark
1. Insect pest attack	2.91	0.78	Agree
2. Diseases such as fungal, viral and bacteria	3.14	0.86	Agree
3. Poor soil fertility	2.76	0.81	Agree
4. Metal Toxicity	2.61	0.74	Agree
5. Drought	2.74	0.79	Agree
6. Lack of improved varieties that can withstand stresses	2.87	0.75	Agree
7. Lack of adequate production practices	2.56	0.81	Agree
8. Inputs needed for higher productivity and profitability	2.58	0.88	Agree

N= number of respondents, $\bar{X}$ = mean of respondents, S = Standard deviation of respondents.

Data presented in Table 1 revealed that all the 8 items had their mean valued ranged from 2.56-3.14, which were within the real limit of 2.50 – 3.49 indicating that the respondents agree that all the items as challenges faced by farmers in the production of cowpea. The standard deviation of the 8 items ranged from 0.74-0.88 indicating that all the responses were close to the mean and one another.

Research Question 2: What are the approaches that could enhance the production of cowpea in Enugu State?

Data for answering research question two is presented in Table 2

Table 2: Mean Ratings and Standard Deviation of the Responses of Farmers on the Approaches that could Enhance Production of Cowpea (N=220)

S/N	Item Statements	$\bar{X}$	S	Remarks
1	Provision of improved varieties	3.74	0.44	Strongly Agree
2	Availability of production practices to farmers through training	3.58	0.52	Agree
3	Evaluation with farmers	3.43	0.59	Strongly agree
4	Suitable crop environment	3.47	0.61	Agree
5	A simple adjustment in production systems such as planting time, spacing and plant density	3.61	0.49	Strongly Agree
6	Using appropriate genotypes	2.57	0.65	Agree
7	Use of early maturing cowpea that can withstand pest and diseases	3.62	0.71	Agree
8	Use of multiple cowpea cultivars	2.97	0.58	Strongly Agree

N= number of respondents, $\bar{X}$ = mean of respondents, S = Standard deviation of respondents.

Data presented in Table 2 revealed that items number 1, 2, 5, and 7 had mean ratings of 3.74, 3.58, 3.61, and 3.62 respectively which were within the real number limit of 3.50 – 4.00 indicating strongly agree; while items number 3, 4, 6, and 8 had mean values of 3.43, 3.47, 2.57, and 2.97 respectively which were within the real number limits of 2.50 – 3.49 indicating agree. The standard deviation of the 8 items ranged from 0.44-0.71 indicating that all the responses were close to the mean and one another.

Discussion

The results obtained from Table 1 showed that insect pest attack, diseases such as fungal, viral and bacterial, and poor soil fertility are some of the challenges faced by farmers in the production of cowpea. These findings support those of Nkomo et al (2021) who found that biotic and abiotic factors such as insect pests and diseases (fungal, viral and bacterial), poor soil fertility, metal toxicity, and drought contribute to the reduction of cowpea yield potential in sub-Saharan Africa. The findings were in line with Iwuagwu, Ogbonnaya, and Onyike (2017) who noted that cowpea is usually subjected to drought stress in both seedling and terminal growth stages; and this causes substantial reduction in grain yield as well as biomass production. The findings were also in line with Hall (2004) who noted that regions where rainfall is variable and irregular dry spells, a single type of cowpea cultivar is not ideal, as it does not meet the needs of farmers.

Results from Table 2 revealed that the use of early maturing cowpea varieties that can withstand pests and diseases, using appropriate genotypes, an adjustment in planting system, and use of improved varieties are some of the approaches that could enhance the production of cowpea. The findings are in line with those of Silva et al (2018) who observed that cowpea performed better when an appropriate genotype is used, an appropriate planting system, and the use of improved varieties among others. The findings also support those who observed that to Ewansiha and Tofa (2016) increase cowpea productivity; there is a need to develop and/or promote adapted high-yielding varieties, and to disseminate good agricultural practices to minimize the incidence of pests. The findings were in agreement with Silva et al (2018) who indicated that cowpea performed better using appropriate genotypes, simple adjustment in planting system, provision of improved varieties among others.

Conclusions

The importance of cowpea production cannot be overemphasized due to its great contribution to human health and the national economy. In the current scenario of a constantly increasing population, the need to provide nutritious and functional, safe, and healthy food for the people poses a major challenge for producers, who in the face of climate change are enjoined to conserve natural resources. With excellent nutritional properties and several agronomic, environmental and economic advantages, cowpea can contribute to food security, maintain environmental and nutritional health. Considering the global demand for cowpea, the excellent nutritional and nutraceutical properties, the availability of production technology and the wide possibility of choice of genotypes for production, cowpea is undoubtedly strategic legume species for food security and health if the challenges facing its production are overcome.

Recommendations

Based on the findings of the study, the following recommendations were made.

- Agricultural extension agents should educate farmers on best approaches in cowpea production in terms of the most appropriate varieties and systems of cultivation.
- The Ministry of Agriculture should provide funds to Research Institute in the State to research to develop and adopt high-yielding varieties of cowpea.

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