

Post-Harvest Problems of Cowpeas Faced by Farmers in Madagali Local Government Area of Adamawa State - Nigeria

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Abstract

Post-harvest losses in cowpea have been a problem for cowpea farmers in Madagali Local Government Area. These losses are mainly due to insect pest attacks and spillage during post-harvest handling operations. To determine the post-harvest problems of cowpea. Five farming communities were selected, and twenty cowpea farmers from each community represented the entire population, resulting in a total of one hundred farmers. Structured questionnaires were used to collect data from the respondents. The questionnaires were scored using a 4-point Likert scale. The collected data were subjected to descriptive statistics using Microsoft Excel. According to the study, the majority of farmers asserted that steel drums were the best storage technique, with the highest mean score of 3.39, while rhomboidal storage techniques had the lowest mean score of 2.15 in the study area. Pests had the highest mean score of 3.12, which was considered the major problem in cowpea storage, while lack of knowledge about the storage facility had the lowest mean score of 1.94 and was considered a minor storage problem in the study area. However, the use of proper insecticides had the highest mean score of 3.32 and was considered the best method of pest control for cowpea in the study area, while the use of silos with a mean score of 2.16 was considered a less effective method for controlling pests in cowpea in the study area. Most farmers store their cowpea for five to six months to prevent pest damage.

Keywords: Cowpea, Silos, Rhombus, Pests, Harvest, Insecticides, Farmers.

Introduction

Cowpea (*Vigna unguiculata* (L.)), is a vital legume crop commonly grown under low-input production systems and in arid and semi-arid agroecologies around the world (Horn and Shimelis, 2018). Post-harvest loss (PHL) is the reduction in the quantity and quality of crops produced after harvest. Despite its nutritional and economic significance, postharvest losses of cowpea have been reported to exceed 45% worldwide, mainly due to significant damage caused by the cowpea bruchid [*Callosobruchus maculatus* (F) Walp] (Ibrahim et al., 2022). Cowpea is one of the most popular crops and a valuable component in the farming systems of the majority of resource-poor rural households in Sub-Saharan Africa (Molosiwa et al., 2016). Cowpea can grow under harsh environmental conditions where other main crops fail to grow. Cowpea (*Vigna unguiculata* (L.)) foliage is considered an essential source of high-quality livestock feed and can restore soil fertility through nitrogen fixation, making

it useful for crop rotation. It is rich in fiber, protein, iron, and potassium (Baributsa et al., 2012) and widely available in both rural and urban areas.

Cowpea (*Vigna unguiculata* (L.) Walp; $2n = 22$) is a diploid warm-season legume that serves as a significant source of calories and protein for many people, especially in developing countries (Zewdu et al; 2021). According to literature (Adams et al., 2018), cowpea (*Vigna unguiculata* (L.)) is a staple food crop used by humans in low-income arid regions, and it also enhances soil fertility. It has always been called 'poor man's meat' because it contains a great deal of protein. However, it is relatively less expensive than maize, rice, and other cereals (Khalih et al., 2012). Additionally, it is relatively inexpensive compared to other protein sources, such as milk, meat, or eggs (Khalih et al., 2012). Cowpea (*Vigna unguiculata* (L.)) is mainly cultivated in the lowland areas of Madagali, Adamawa State, Nigeria, for its edible seeds, pods, and leaves. Additionally, it provides feed, forage, hay, and silage for livestock, green manure, and cover crops that preserve soil productivity (Alemu et al., 2016). Cowpea is grown throughout Madagali Local Government on a projected 2000 hectares of land planted each year, with a total annual production of about 1000 metric tons (Boukar et al., 2016).

According to FAOSTAT (2016), cowpea was grown on an estimated 12.3 million hectares in Africa in 2014, with the majority of production occurring on 10.6 million hectares in West Africa, particularly in Nigeria, Niger, Burkina Faso, Mali, and Senegal. Although Nigeria is a center of cowpea production, Adamawa State is one of the largest producers of cowpeas in the country. No previous studies on cowpea production and productivity in the local government areas of Adamawa State have been mentioned.

Agricultural growth is increasingly economic and recognized to be central a sustained development in Nigeria. Agricultural production plays a crucial role in ensuring food security, alleviating poverty, and promoting human and national development. Agriculture provides income, food, raw materials, foreign exchange, and employment to the nation, with over 65% of the population living in rural areas (Joseph et al., 2022). Therefore, the growth of the agricultural sector is crucial, particularly for increasing food self-sufficiency in the country.

The main constraints and challenges faced by cowpea farmers in Madagali Local Government Area regarding cowpea production are inadequate attention to crop lifespan preservation. In addition, pests such as insects, nematodes, diseases, and parasitic weeds, as well as low soil fertility, drought, marketing problems, poor management practices, and technology dissemination, pose significant challenges to agricultural growth. (Joana and Gungula, 2010)

Therefore, the present study focuses on ascertaining and providing solutions to post-harvest problems of cowpeas in Madagali Local Government Area.

Statement of the problem

Despite the nutritional and economic significance of cowpeas, postharvest losses remain a concern. been a problem for cowpea farmers in Madagali Local Government Area. These losses are mainly due to insect pest attacks and spillage during post-harvest handling

operations. Poor storage conditions and spillage are also responsible for the observed losses in sorghum. Additionally, mainly due to the significant damage caused by the cowpea bruchid [*Callosobruchus maculatus*]. Postharvest loss includes food loss throughout the supply chain, from crop harvesting to consumption. The losses can broadly be categorized as weight loss due to spoilage, quality loss, nutritional loss, seed viability loss, and commercial loss the growing demand for cowpea by consumers and the lack of proper handling after harvest have resulted in scarcity. Many farmers currently harvest and store their cowpeas due to a lack of proper storage, which leads to pest and disease infestations and significant losses. However, farmers in the study area have been enjoying their harvests due to proper storage, the availability of insecticides, and their familiarity with cowpea farming.

The aim and objectives of the study

- To increase cowpea production in Madagali Local Government Area, Adamawa State.
- To educate the farmers in the study area of proper storage of cowpeas

Research Methodology

Location of the Study Area

The study was carried out in Madagali Local Government Area of Adamawa State, Nigeria. Madagali Local Government is situated in the northern part of Adamawa State, between longitude $13^{\circ}37'42''$ east of the Greenwich Meridian and latitude $10^{\circ}53'31''$ north of the equator. It shares borders with Borno State to the north, the Cameroon Republic to the east, Michika Local Government Area to the south, and Askira/Uba Local Government Area to the west. The majority of the population are farmers who produce different varieties of crops such as sorghum, maize, groundnuts, cowpea, rice, sugarcane, sweet potato, and vegetables, as well as tree crops of various species and types.

Research Design and Sampling Techniques

The study employed a descriptive questionnaire to gather information from a representative sample of the population under study. The study used simple random sampling to select five farming communities in the Madagali Local Government Area in the northern zone of Adamawa State. The selected communities are Gulak, Duhu, Kirchinga, Sabongari Hyembula, and Palam. Twenty cowpea farmers were selected from each community to represent the entire population. A total of one hundred farmers were selected for the study.

Source of Data

Primary data were collected through the administration of a structured questionnaire combined with an interview schedule. This is because the majority of the farmers are unable to fill out the questionnaires themselves. The questionnaires were scored using a 4-point Likert scale as follows:

Strongly Agreed (SA=4),
Agreed (A=3),
Disagreed (D=2), and
Strongly (SD=1)

Result and Discussion

This chapter presents the results from data analysis. The results were presented in tables based on the research questions that guided the study.

Table1: Storage Techniques of Cowpea in Madagali L.G.A.

Items	SA	A	D	SD	Mean	Standard Deviation	Decision
Polyethylene Bag with chemicals	50	30	10	10	3.2	2.82	Accepted
Polyethylene Bag without chemicals	20	15	30	35	2.2	1.97	Rejected
Rhumbus	15	20	30	35	2.15	1.89	Rejected
Steel Drum	56	30	11	3	3.39	2.95	Accepted
Silos	15	20	40	25	2.25	1.94	Rejected
Grand Mean					2.638		

The results in Table 1 above reveal that most of the respondents asserted that the use of steel drums was the most commonly practiced storage method for cowpea in the study area, with a mean score of 3.39 and a standard deviation of 2.95. Storing cowpea in a polyethylene bag with chemicals was the second-best method of storing cowpea, with a mean score of 3.2 and a standard deviation of 2.82. However, based on our benchmark mean of 2.50, rhombuses, silos, and the use of polyethylene bags without chemicals do not meet the benchmark for acceptance as storage techniques and are therefore rejected by cowpea farmers in the study area. Therefore, they are rejected as storage techniques employed by cowpea farmers in the study area.

Table 2: Problems of Cowpea Storage in Madagali LGA

Items	SA	A	D	SD	Mean	Standard Deviation	Decision
Poor storage facilities	30	30	25	15	2.75	2.42	Accepted
Thieves	15	20	23	42	2.08	1.86	Rejected
Pests	43	36	11	10	3.12	2.74	Accepted

Lack of knowledge about storage	12	10	38	40	1.94	1.67	Rejected
Lack of storage facilities	12	23	33	30	2.19	1.89	Rejected
Grand Mean					2.49		

The results from Table 2 showed that most of the respondents affirmed that pests were the major problem facing farmers' storage of cowpea in the study area, with the highest mean score of 3.12 and a standard deviation of 2.74. The study found that insurgents and poor storage facilities were the least problematic issues for cowpea storage in the study area, with mean scores of 2.86 and 2.75, and standard deviations of 2.55 and 2.42, respectively. However, it is important to note that the farmers revealed that a lack of knowledge about storage is not a problem for them, indicating that most farmers in the study area are educated about cowpea storage.

Table 3: Storage Length in Madagali.

Items	SA	A	D	SD	Mean	S- D	Decision
One -Two months	20	34	29	17	2.57	2.24	Accepted
Three -Four Months	23	43	14	20	2.69	2.37	Accepted
Four - Five Months	32	40	18	10	2.94	2.56	Accepted
Six Months and above	18	27	30	25	2.38	2.09	Rejected
Grand Mean					2.645		

According to Table 3, most respondents indicated that the highest storage length of cowpea in the study area was five to six months, with a mean score of 2.94 and a standard deviation of 2.56. Storing cowpea beyond six months has the lowest mean score of 2.38 and a standard deviation of 2.09, which is below the benchmark mean score of 2.50. This is because storing cowpea for a long period of time increases the risk of pest infestation if proper insecticides are not used.

Table 4: Methods of Controlling Pests of Cowpea in Madagali LGA.

Items	SA	A	D	SD	Mean	S-D	Decision
Use of Silos	18	20	22	40	2.16	1.94	Rejected
Use of Steel Drum	19	31	27	23	2.46	2.16	Rejected
Use of Plant Materials	20	15	30	35	2.2	1.97	Rejected
Use of Proper Insecticides	60	20	12	8	3.32	2.93	Accepted

Sun-drying	18	34	30	18	2.52	2.19	Accepted
The use of purdue improved crop storage bags.	46	21	20	13	3.0	2.67	Accepted
Grand Mean					2.61		

Table 4 indicates that most respondents consider proper insecticides to be the best pest control method in the study area, with a mean score of 3.32 and a standard deviation of 2.93. The use of Purdue Improved Crop Storage bags follows with a mean score of 3.0 and a standard deviation of 2.67. Silos are the least commonly used method for cowpea pest control, with a mean score of 2.16 and a standard deviation of 1.94, which is below the benchmark mean score of 2.50.

Conclusion

The study on post-harvest problems of cowpeas faced by farmers in the Madagali Local Government Area of Adamawa State, Nigeria was successfully conducted. According to the study, the majority of farmers in the study area considered steel drums and polyethylene bags with chemicals to be the best storage techniques. However, silos and rhombus are less commonly used storage techniques in the study area. Most farmers store their cowpea for five to six months to prevent pest damage. Storing cowpea beyond this period, along with inadequate storage facilities, results in pest infestation. However, most farmers agreed that using appropriate insecticides is the best method of pest control for cowpea in the study area. Using steel drums, other airtight containers, and appropriate insecticides can prevent pest infestation and extend the shelf life of cowpea. Farmers in the study area have been enjoying their harvests due to proper storage, the availability of insecticides, and their familiarity with cowpea farming.

Recommendation

- Farmers in the study area should use appropriate insecticides.
- Farmers in the study area should use steel drums and other airtight containers.

Conflict of interest by authors

The authors declare that there are no conflicts of interest.

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