

ASSESSMENT OF SORGHUM STORAGE METHODS IN MADAGALI AND GANYE AREAS OF ADAMAWA STATE, NIGERIA

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-----ABSTRACT-----

The research was conducted to assess the methods of sorghum storage in Madagali and Ganye local Government areas of Adamawa state, Nigeria. A total of one hundred (100) respondents were selected using purposive and random sampling techniques. Descriptive statistics, such frequency distribution and percentages were used to analyze the data. The results of the characteristics distribution of the respondents are presented in Table 1. Concerning the decision of the farmers to store sorghum, majority of the respondents (96%) indicated that they do store sorghum grains after harvest, while few of them (4%) maintained that they do not practice any form of storage. A reasonable number of the respondents (62%) stored the grains as threshed grains while 38% stored it unthreshed. Few numbers of the respondents (2%) indicated that they usually stored their produce for the period of more than five years. 59% of the respondents pointed out that they use to store the grains without using any herbs. When asked about the type of storage facilities used, 51% of the respondents indicate that they prefer storing the grains in bags, while 21% and 19% uses granary and rhombus respectively. 68% of the respondents show that they use mud and grasses in constructing the storage structure and 21% revealed that they make use of cements and zincs. Most of the rural farmers in the study areas (51%) agreed that they can only build storage structure that can contain 1-10 bags (0.08-0.8 tons) of the threshed grains, while 4% of the respondents said that their storage structure can contain more than 100 bags (8 tons). According to the farmers, the storage structure can last between 1 to 5 years. The result of this study shows that sorghum grains are mostly stored traditionally using the available local construction materials. Nevertheless, some farmers preferred the use of poly bags than granary and rhombus. An important issue here is how to support these poor rural farmers to improve on methods of storing sorghum grains in order to minimize postharvest losses to the minimal level.

Keywords: Sorghum, Assessment, Storage, Granary, Rhombus, Grains

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I. INTRODUCTION

Sorghum is the common and scientific name for numerous cultivated annual grass of the genus sorghum; family gramineae. (Americana Encyclopedia vol. 25). According to Doggiatt, (1970) sorghum originated from Sierraleon, distributed to the upper Niger river. Phillips, (1977) pointed out that *S. guineense*, the common sorghum type provides food for man and feed for animals. It is an important source of carbohydrates and it is eaten as “tuwo” in Nigeria and other part of West Africa. The by-products such as stalks are used as building materials, fencing and also making beds. Sorghum is the fifth major cereal in terms of production and acreage. It is a staple food crop for millions of the poorest and most food unsecured people in the semi-arid tropics of Africa, Asia and Central America (http://www.org/our_research). Farmers and traditional grain processors have been evolving numbers of traditional practices through trials and error methods, to avoid huge loss that are occurring in stored pulse grains due to insects and pests infestation. Women folk have accumulated knowledge of household practices over generations by observation to a giving culture of society and vary between countries, religions, villages and even communities. Indigenous practices emanate from the cultural contact of the people concerned and evolve in close contact with specific environmental conditions and are based on traditional society intimate knowledge of their environment. These reasons imply that indigenous knowledge is ecofriendly and safe both to man and his environment. It is estimated that 60-70% of sorghum grains produced in a country is stored at home level in indigenous structure ranging from bamboo baskets to mud structures, gunny bags and modern bins (Karthikeyan et al., 2009).

Hay (1975) also observed that granaries were the most common traditional method of storage, especially in the northern States of Nigeria. Such storage systems were useful for large scale of unthreshed grain, the wall and roof of the granaries should be devoid of cracks and crevices through which insects may hide. According to Iyu (1991), poor or inadequate storage facilities and method are well known in traditional practices which most of the time result in heavy post-harvest losses in Nigeria. For example, It is generally known that out of about ten million tones of cereal grains produced annually, between 1.5-2 tones is lost due to poor storage.

Jean (1985) reported that three quarter of African farmers keeps their products at village level. The traditional storage system is thought to be effective or give satisfaction in which they continue improving so as to preserve grains from damage. Ezueh M.J. (1983) stated that substantial losses on store products were due to damage by insects and other organisms during the post harvest handling process. An average annual loss of 20% is generally cited in developing countries.

Sorghum remains or is one of the important cultivated crops in the study areas. Many rural and urban farmers depend on it for their means of livelihood sustenance. Nevertheless the crop is characteristics with some problems of post harvest losses. Therefore, it is imperative to assess how farmers store the product in order to maintain food security in the study area.

II MATERIALS AND METHODS

The study area:

The study was carried out in Madagali (Longitude 13⁰ E and latitude 10⁰ N) and Ganye local government area (Longitude 12⁰ N and latitude 9⁰ E), Adamawa State, Nigeria. Madagali have total land area of about 88km² with a population of 92,105 people and Ganye 2291.42km² with population of 169,748 (NPC 1991) respectively. The mean annual temperature and mean annual rainfall of Madagali area are 36⁰C and 750mm respectively and Ganye 20-27⁰C and 1000-1600mm respectively.

People of the two study areas are predominantly farmers and sorghum remain one of the most important cultivated food crop in the areas. Apart from marketing, farmers use sorghum for making food call "Daf" (tuwo) in Madagali and "Tum" in Ganye, and sometimes it is used for making soft drink known as "kunun zaki" and local bear call "Pito" or "Burkutu".

Method of data collection and analysis

The assessment was based on field visit, oral interview and questionnaire. Data were collected from all communities involved. A total of one hundred (100) respondents interviewed (50 from each local government) were selected using purposive and random sampling techniques. Information gathered includes gender, age, occupation and educational level. Others are the methods of sorghum grain storage after harvest, the form stored, duration of storage, use of herbs in storing the produce, types of storage facilities, items use to build the store, the capacity of the storage structure and the duration time of the storage structure. The completed questionnaires were retrieved, coded and subjected to descriptive statistical analysis such as tables, frequency distribution and percentages.

III RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

72% of the respondents are male who represents the active part of the population engaged in sorghum production activities, while 28% are female (Table 1). 37% of the respondents aged 60 years and above are the most group involved in sorghum production, followed by 31-50 (25%) and 51-60 (25%) years old, and the remaining 13% were the young farmers with 18-30 years. This revealed that most of the sorghum farmers in the study areas are the oldest people. 69% of the respondents are full time farmers, 19% business, while the remaining 12% engaged in other similar occupation (Table 1). In the aspect of educational level 12% of the respondents do not possess any formal education, 16% attend adult education, 17% primary school, 37% had O - level education and 18% maintained that they had "A" level education (Table 1). This indicate that sorghum production activities is dominated by "0" level graduates. According to Adekunle, (2009) the level of education of farmers will directly affects their ability to adopt to change and to accept new ideas. Amaza and Tashikalma, (2003) also maintained that the literacy level of farmers is important as it determines the rate of adoption of improved technology for increased productivity.

Sorghum grain storage

Table 2 revealed that 96% of the respondents stored their sorghum grains after harvest, and 4% consume it immediately after harvest. This shows that majority of the farmers in the study areas do stored the grains after harvest. 38% of the respondents use to store them unthreshed while 62% store their own as a threshed grain. With respect to the duration of storage, 25% of the respondents use to store the produce for 6

months, 54% store it for the period of one year, while 19% store it for the period of 2-5 years and the remaining 2% can store the grain for the period of more than 5 years. When asked whether the farmers use herbs in storing the grain? 41% of the respondents said they do applied some herbs in order protect it from insect attack and damage and 59% said they don't use herbs in storing the produce. This results also revealed that most of the farmers in the study areas threshed their sorghum grains before storage, and the duration of storability for a period of 1 year without using any herbs.

Types of storage facility used:

Table 3 Shows that a reasonable number of respondents (51%) uses bags for storing the sorghum grain, 21% store it in granary, 19% in rhumbu, 6% in round huts and 3% store the grain in other similar storage facilities. When asked concerning the items used for constructing the storage structure, majority of the respondents (68%) said that they use grasses and mud, 21% use cement and zinc while the remaining 11% use other similar items for the construction of the storage structure. In the aspect of storing capacity of the structures, 51% of the respondents have storage structure that can contain 1-10 bags of threshed grain, 27% 11-30 bags, 15% 31-50 bags and 7% 51-100 bags respectively. Good number of the respondents said their store can last for between 1-5 years, while 8% of the farmers agreed that their store can stay for the period of 10 years. It was also observed that most of the farmers in the study areas do not use to store their sorghum grains in traditional storage structure, 51% maintained that they make use of bags as a storage facility. On the other hand, those who preferred granary and rhumbu make use of grasses and mud as construction materials and others make use of cement and zinc. Small numbers of the farmers in the study areas do construct bigger stores that can last for a long time.

Conclusion

Like any other part of the tropical savannah region, the cultivation of Sorghum in these areas is an integral part of farmer's way of life and remains one of the major food crop consumed. Majority of the farmers are full time farmers, but, despite the existence of modern technology they still use traditional storage method in storing their produce. The research found it clear that majority of the sorghum farmers in the areas are the elderly people who do not easily accept changes and as such they cannot produce much and they cannot construct big and lasting storage structures. To this end it is important that government should assist the rural farmers by building a central store in each district so that the less privilege farmers should make use of it to store their sorghum grains.

Table 1: Characteristic distribution of the respondents

Gender	Frequency	Percentage (%)
Male	72	72.0
Female	28	28.0
Total	100	100.0
Age		
18-30	13	13.0
31-50	25	25.0
51-60	25	25.0
60 and above	37	37.0
Total	100	100.0
Occupation		
Farmer	69	69.0
Business	19	19.0
Others	12	12.0
Total	100	100.0
Educational level		
NO formal education	12	12.0
Adult education	16	16.0
Primary school education	17	17.0
Post primary school education	37	37.0
Others	18	18.0
Total	100	100.0

(source: Field survey 2014)

Table 2: Distribution of respondents based on sorghum grain storage

Storage of sorghum grains after harvest.

	Frequency	Percentage(%)
Yes	96	96.0
No	4	4.0
Total	100	100.0
Form of storage		
Threshed	62	62.0
Unthreshed	38	38.0
Total	100	100.0
Duration of storage:		
6 months	25	25.0
1 year	54	54.0
2-5 years	19	19.0
Above 5 years	2	2.0
Total	100	100.0
Use of herbs in storing the produce:		
Yes	41	41.0
No	59	59.0
Total	100	100.0

(Source: Field survey 2014)

Table 3: Distribution of respondents based on types of storage facilities

Types of storage facilities:	Frequency	Percentage(%)
Bags	51	51.0
Granary	21	21.0
Rhumbu	19	19.0
Round hut	6	6.0
Others	3	3.0
Total	100	100.0
Items used for building the storage structure:		
Mud and grasses	69	69.0
Cement and zinc	21	21.0
Others	11	11.0
Total	100	100.0
Capacity of the storage structure:		
1-10 bags	51	51.0
11-30 bags	27	27.0
31-50 bags	15	15.0
51-100 bags	3	3.0
100 bags and above	4	4.0
Total	100	100.0
How long the storage structure last:		
1-5 years	67	67.0
6-10 bags	25	25.0
Above 10 years	8	8.0
Total	100	100.0

(source: Field survey 2014)

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