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Assessment of the use of cassava as alternative energy feedstuff in livestock feeds in Nigeria

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Abstract

Cassava is an important crop in the tropics. It contains about 92.2 percent carbohydrates and 3.2 percent protein in its dry matter. However, there is a dearth of information on the current trend of cassava and cassava products as alternative energy feedstuff for the livestock industry. This study was conducted in three states of southwest Nigeria on the use of cassava as alternative energy feedstuff in livestock feeds. Simple random technique was used to select a total of 35 feedmillers in Ogun, Oyo and Osun States. Primary data were obtained with the aid of structured questionnaire and analyzed using descriptive statistics. The result revealed that over one-third (38.35%) of the feedmillers had been in business for over 20years and 90% majorly produce feed for poultry birds. Out of the four common energy feedstuffs utilized in livestock feeds, maize was considered by the majority (93.55%) as the most preferred while 16.13% of the respondents used cassava as enegry feedstuff in the formulated rations. Feed millers (35.48%) rarely make use of cassava in their feed production while 38.71% never included cassava in the feeds. About 20% of the respondents use less than 5tons of cassava in their feed formulation per day. High cost, high water content and spoilage were main factors reported to be militating against cassava utilization by the feedmill industry. The study concluded that yield and processing method should be improved upon, if cassava is to compete favourably with maize and be a preferred future feedstuff for livestock.

Keywords: Cassava, Energy source, Feedstuff, Livestock and Feedmill Industry,

Introduction

Nigeria is the largest producer of cassava in the world (FAO, 2010). She produces up to 49million metric tons of this commodity annually and 90% of the annual production in Nigeria is targeted for the domestic food market (i.e. consumed locally). International Institute for Tropical Agriculture (IITA, 2002) identified and highlighted the characteristics of the common forms of cassava products available in Nigeria: cassava flour, compounded feed for poultry birds among many others. Cassava is mainly produced by small scale farmers in rural communities and is primarily produced for food especially in form of gari, fufu with little use in agribusiness sector as industrial raw material. However, the crop can be processed into several other products like chips, flour, pellets, adhesives, alcohol, starch etc which are raw materials in livestock, feed, alcohol/ethanol, textiles, confectionery, wood, food and soft drink industries (Iheke, 2008). Sanni (2015) reported that cassava has contributed to economic growth of Small Holder Farmers (SHF) and community

processors groups with increased income from $7,173,920 in 2013 to $10,073 in 2014.

Cassava in its crude form is widely used in most tropical areas for feeding pigs, cattle, sheep and poultry. Cassava contains about 92.2 percent carbohydrates and 3.2 percent protein in its dry matter, and so it is a high energy feedstuff. IITA (1990) claims that cassava products are important feedstuff for livestock feed formulation. For example, cassava has a capacity of substituting up to 44 percent maize in pig feed without any reduction in the performance of pigs. Okeke (1998) also observed that in compounding feed for pigs, broilers, pullets and layers, cassava meal plays a significant role. Eagleston *et al.* (1992) provided evidence that the whole cassava plant, boiled root, cassava root meal, chips and pellets could be used in compounding livestock feed. The roots could be dried, ground and fed to ruminants and it could be used as substitutes for maize in poultry feed.

Apart from the use of whole cassava tuber, parts of the crop considered as waste can as well be used. For instance, dried peels of cassava roots are fed to sheep and goats, and raw or boiled roots are mixed into a mash with protein concentrates such as maize, sorghum, groundnut, or oil palm kernel meal and mineral salts for livestock feeding.

However, general developmental trend identified with cassava utilisation has not been well grouted in the livestock industry in spite of the country's advantage in cassava production. Nigeria has over 12million livestock farmers population (NBS, 2012) and high population of the livestock species, yet cassava and cassava products have not fully explored in the livestock industry particularly, poultry with over 150million population (Timothy *et al*., 2011). The Nigerian livestock and feed mill industries involve the use of energy feedstuff. This constitutes about 50-60% of daily ration produced for some animal species such as poultry. The use vary between 35 and 50% in other ruminant animals such as sheep, goat and cattle and other monogastric animals like swine and rabbit. It also vary with physiological stage of animal and production target (such as flushing, steaming, fattening etc.) of the farmer. There is a dearth of information on the current trend of cassava and cassava products as energy feedstuff and utilization in livestock value-chain and this necessitated the need for this study.

Objective of the study

The general objective of the study was to assess the use of cassava as alternative energy feed stuff in Southwest, Nigeria.

Specific objectives:

1. Describe the feed milling business operation and their production in the study area
2. Identify the commonly used energy feedstuffs, the frequency of use among the feed millers and quantity utilized per production day.
3. Identify factors affecting the utilization of the identified potential energy feedstuff.
4. Identify the constraints to cassava utilization in livestock feed.

Methodology

The study was conducted in Southwest Nigeria. A random sampling technique was used to select three states: Ogun, Osun and Oyo States. A total of 35 feedmill operators were randomly selected and interviewed across the three states. The selection was not evenly distributed following the uneven distribution of the feedmills across and within the selected states. However, the sampling ensured inclusion of both small and at least large feedmills in each of the states. Structured questionnaire was used in drawing data from the respodents. The data collected were analysed using descriptive statistics.

Results and Discussion

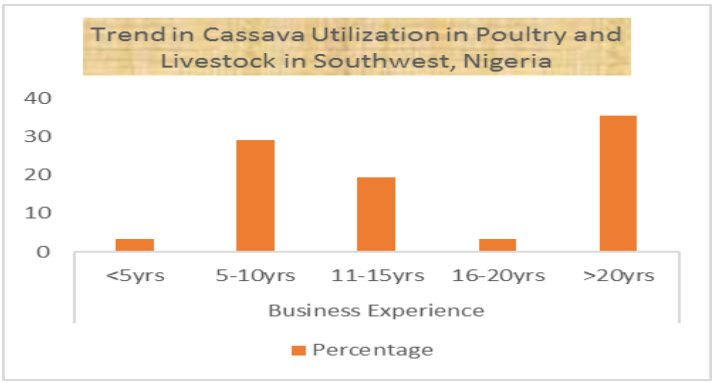
Years of Business Experince and Products

Over one-third (38.35%) of the respondents had feedmill business experience

that spanned over 20years. This was not unexpected as the livestock and poultry industry are ancient enterprise in Nigerian Agricultural business. The Farm Settlement Scheme of the Western Region that was established in late 50s was such that allowed livestock and crop production as the main source of livelihood. Many poultry farms folded up in 2006 following the incidence of Highly Pathogenic Avian Influenza (HPAI) infection. This had a complementary challenges with the feedmill industry which principal customers are the poultry farms (farmers). Due to this relationship and resultant progress, the poultry industry has a direct influence on the feedmill industry thus the additional growth of about 30% between 5-10years ago (Figure 1).

Feed Production Type

Figure 2 shows that 90% of the feedmill operators produced feed for poultry while 38% produced feed for the pig farms. Feeds produced for Rabbit, Sheep and Goat and Cattle were between 17 and 20%. This distribution could be as a result of vast growing attention that poultry production have received over the years in Nigeria. The growth of poultry industry began as a result of its low level of energy (calorie) and high protein, rapid turnover rate and short incubation period (21days), intensive selection of broilers that resulted to shorter duration to attain market weight (6 weeks) and cheap and quality protein egg from layers among others which are the advantages of poultry over other livestock (Mokwunye, 2000; FA0, 2011).



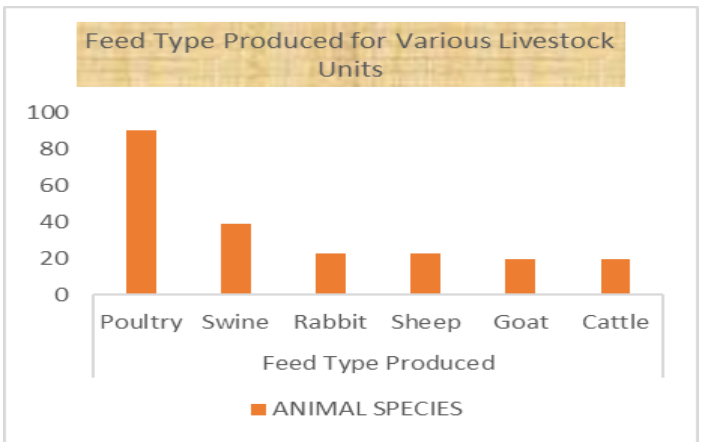


Figure 1: Business Experience of Feed mill Operators Figure 2: Feed Type Produced for Animal Species

Figure 3 reveals that 87.1% of the total feed output of the feedmill industry are produced for each of broilers and layers while 71% of the feed output serviced cockerel production. Broiler starter (87.1%), layer diet (87.1%) and cockrel (70.97%) were the main poultry diets produced (Figure 3) by the respondents. The distribution agrees with the expectation in the percentage feed distribution among the poultry birds, as layer are raised throughout the year while other birds are mostly preprared towards festive periods. This also showed the level of demand for poulrty eggs in Nigeria as a common source of protein among the populace. Study by Bello *et al*. (2015) reported that chikens (broiler, layers and cockerels) represent 83.34% commercial poultry production in Nigeria. This report gave credence to the finding of this study.

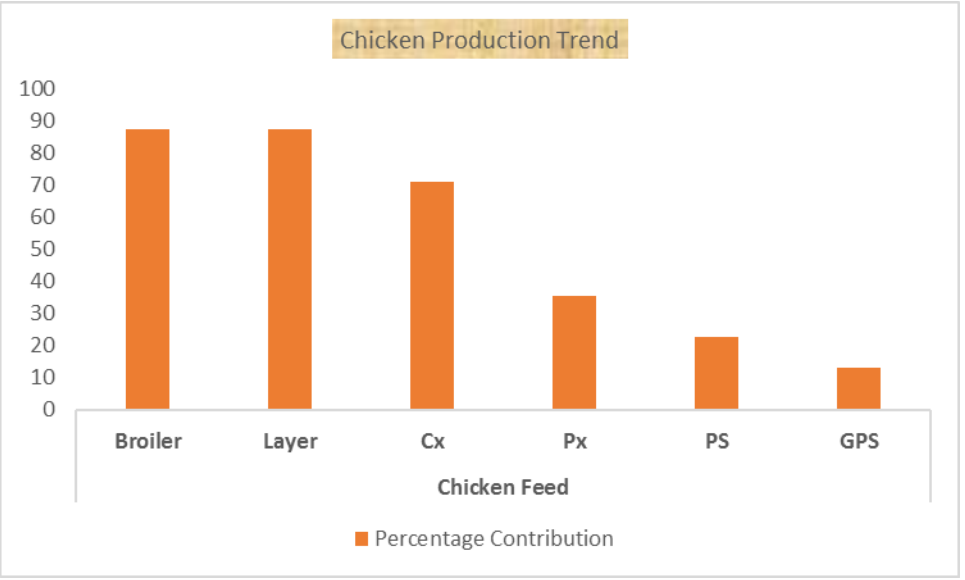
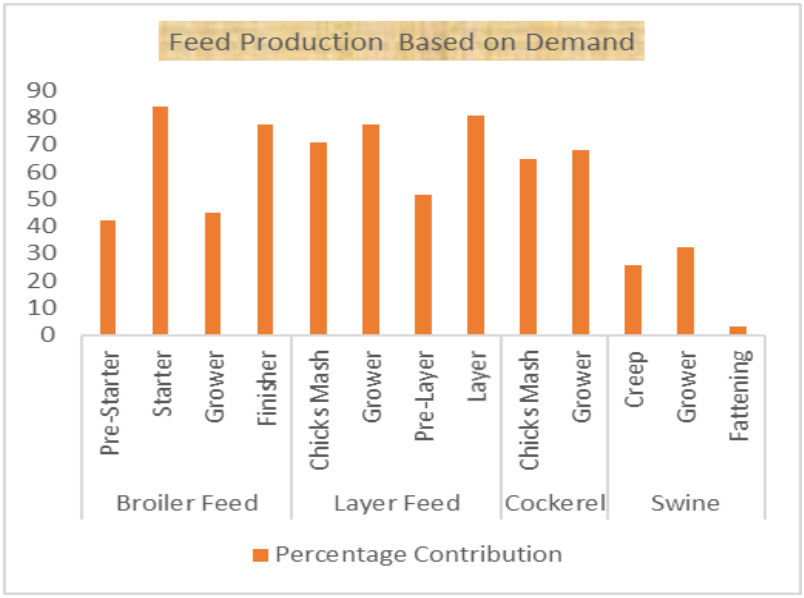


Figure 3: Feed Production Trend in Chicken Population

The results also revealed that broiler starter (83.87%), finisher (77.42%), chicks mash (70.96%), grower (77.42%) and layer (80.65%) were the main feeds requested by farmers and thus produced for different physiological stages in poultry (Figure 4). Figure 5 shows that maize was the preferred (93.55%) energy feedstuff utilised in livestock feed formulation while 16.13 % of the respondents used cassava as energy feedstuff in the formulated rations. Sorghum utilisation was only 3% of the energy required for livestock feed. The distribution in preference of the respondents in the use of maize as enegy feedstuff could be attributed to its high level of production as against cassava, even though Nigeria remains the largest producers of cassava in the world (Tewe, 2004).



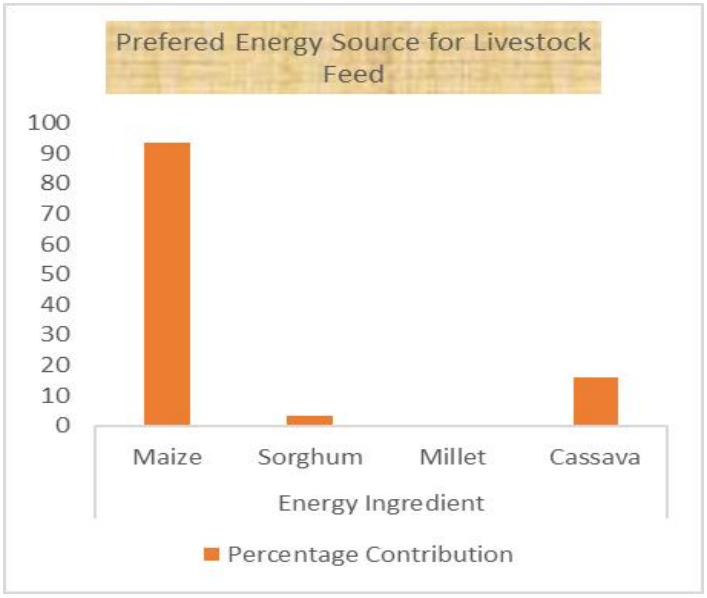


Figure 4: Feed Produced According to Demand Figure 5: Energy sources for livestock feeds

Also, the results showed that maize was used often (90.32%) times by livestock feed producers. Feed mill operators rarely use sorghum (29.03%) while 29.03% never include sorghum for feed production/formulation. This could be due to their anti-nutritiens. Sorghum and millet and their products contain tannins and phytates (anti-nutrients) which are the major phytochemicals which negatively affects their nutritive values and interfere with mineral absorption, palatability and protein digestibility (Onyango, 2013).

The results also showed that feedmillers rarely made use of cassava in feed production. This represented 35.48% of the respondents while 38.71% never included cassava in the feeds they produced (figure 6).

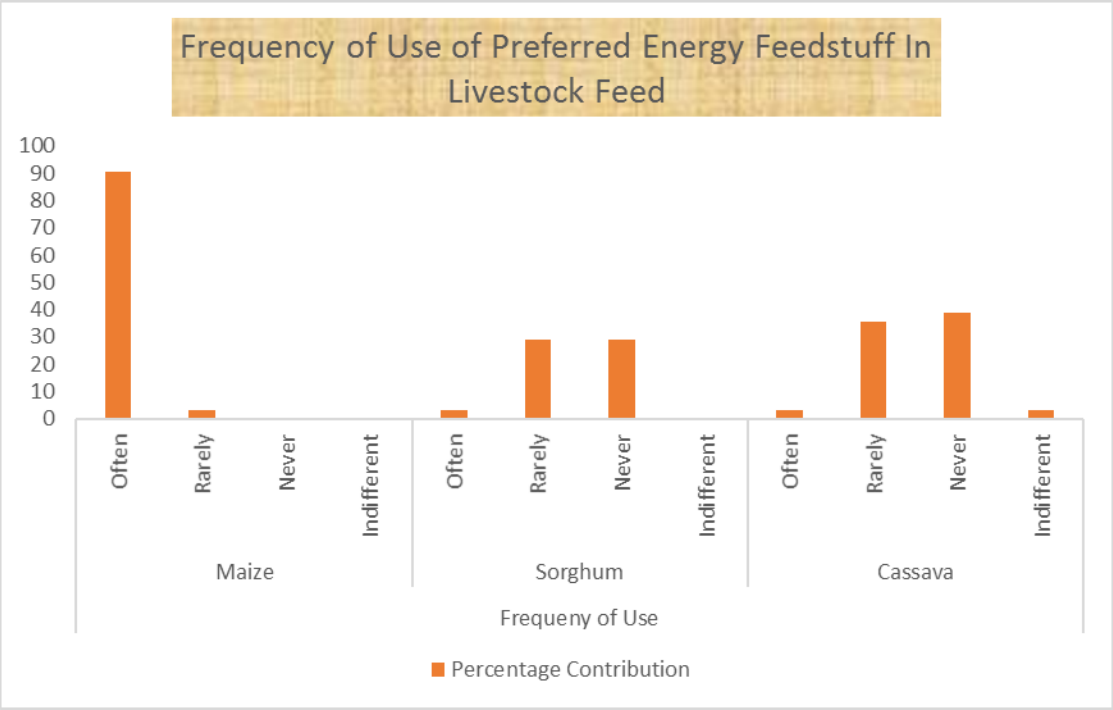


Figure 6: Preferred Energy Feedstuff in Livestock Feed

Majority (43%) of livestock feed producers used less than 5tons of maize day and these were mainly the small scale feed producers. While the medium scale feed producers utilised between 6-10tons per day, the integrated and custom feed millers used over 20tons. An industrial farm, for example disclosed that it uses more than 80tons of maize per day (Figure 7). This was not unexpected as the level of production is directly influenced by the installed capacity of the feedmill. The integrated farms and custom feed millers have large installed capaity (4-8tons) mixers and work 6-8hours and often times, they make use of maize.

Availability, ease of use and nutrient quality are some of the reasons advanced for use of maize as the preferred energy source in poultry diet. While seasonal scarcity of maize was responsible for increased use of cassava, feed mill operators utilised cassava due to availability and cost (Figure 8). This was possible since majority of the feedmill operators target poultry farms. Poultry are majorly intensively managed with high inputs and premium expectations thus their desire to keep to the targets. The report of Tewe (2004) who opined that intensive production pattern and productivity are being critical in production system is strategic to this finding.

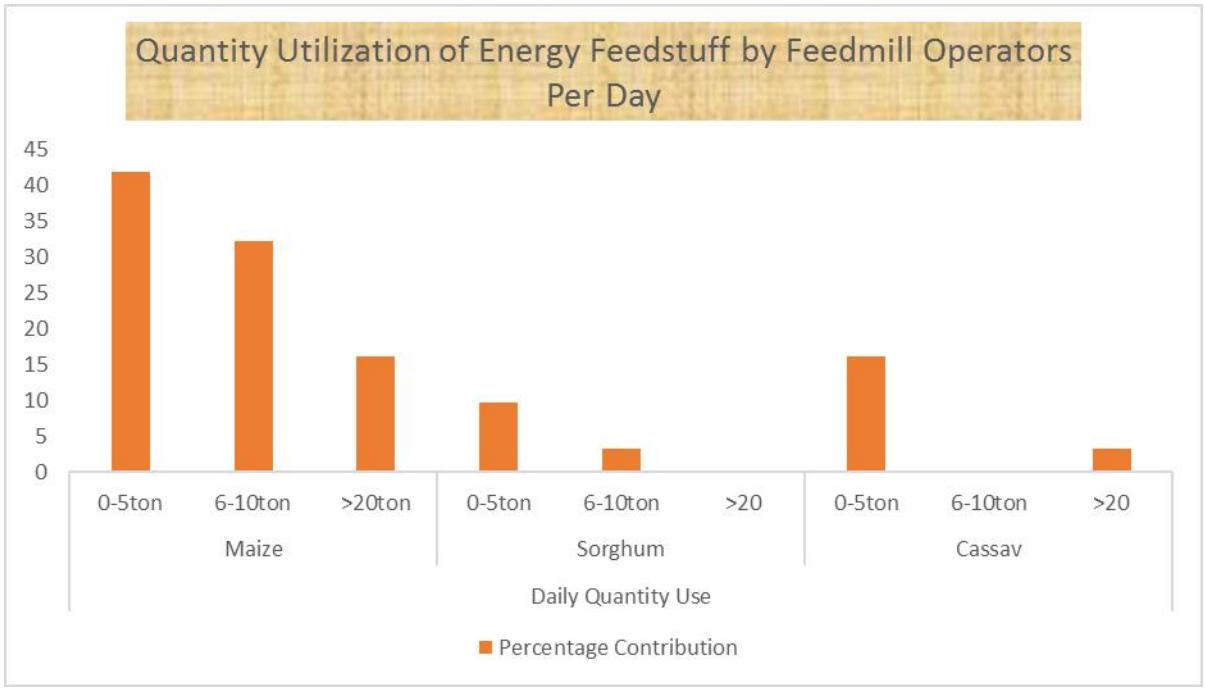


Figure 7: Energy Feedstuff Daily Utilisation

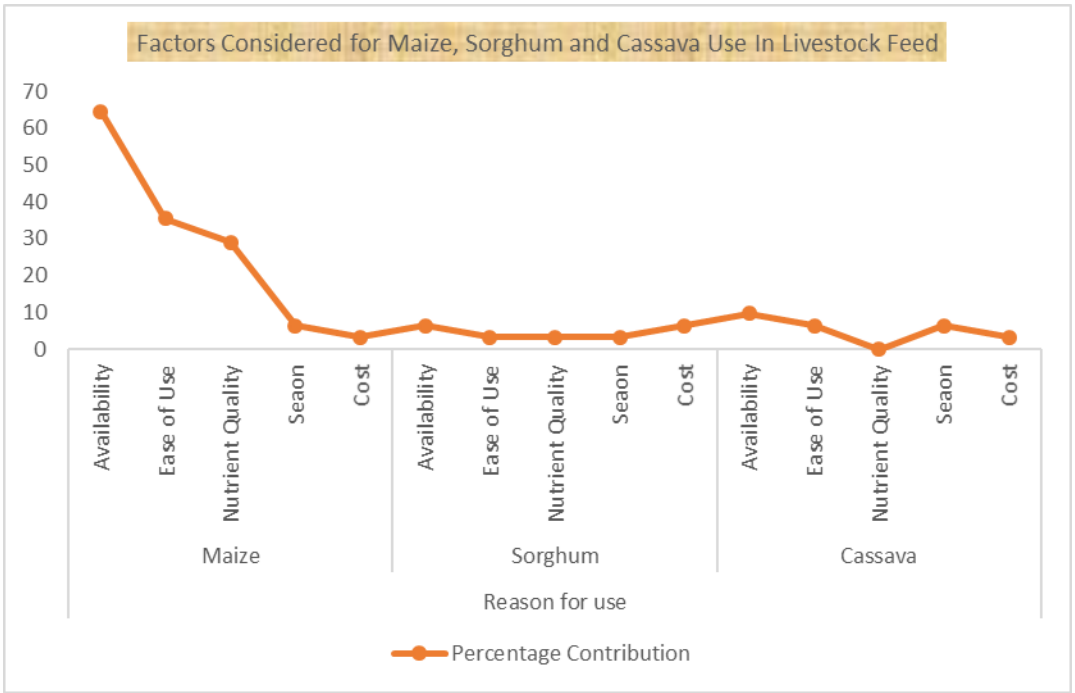


Figure 8: Factors considered for Maize, Sorghum and Cassava use for Livestock Feeds

Factors Affecting Cassava Utilization as Energy Feed Stuff in Livestock Feed

Overall high cost, high water content (wetness) and spoilage were the main factors identified to be militating against cassava utilization by feedmill industry. Some respondents also disclosed that cassava was too dusty. Where some oil seeds are included to reduce the dustiness, cost of production increased with loss profit margin to the feed producers (Figure 9).

Other reasons mentioned were that cassava is only suitable in broiler production if well prepared; egg produced from cassava based layer diet do not keep long; and cassava flour is too powdery.

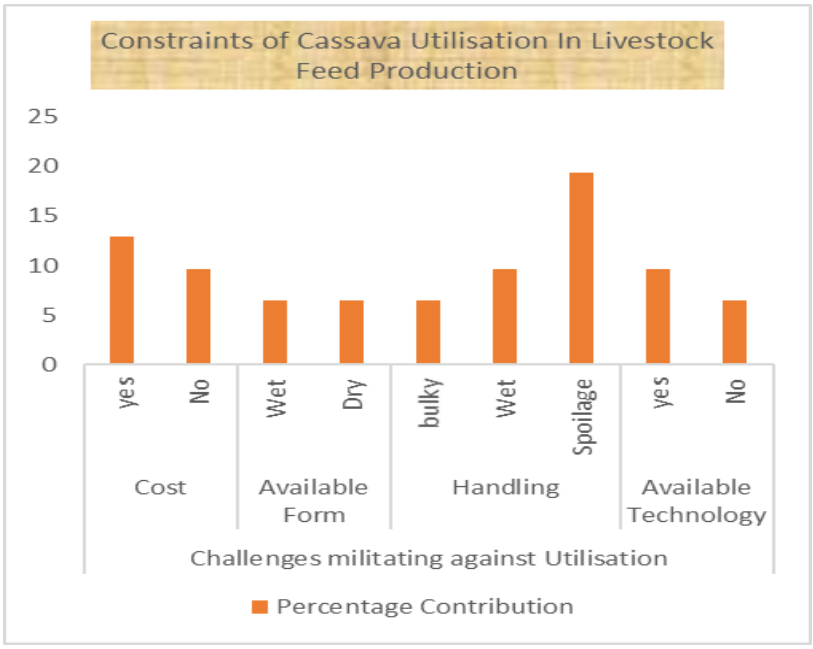


Figure 9: Constraint in Use of Cassava in livestock

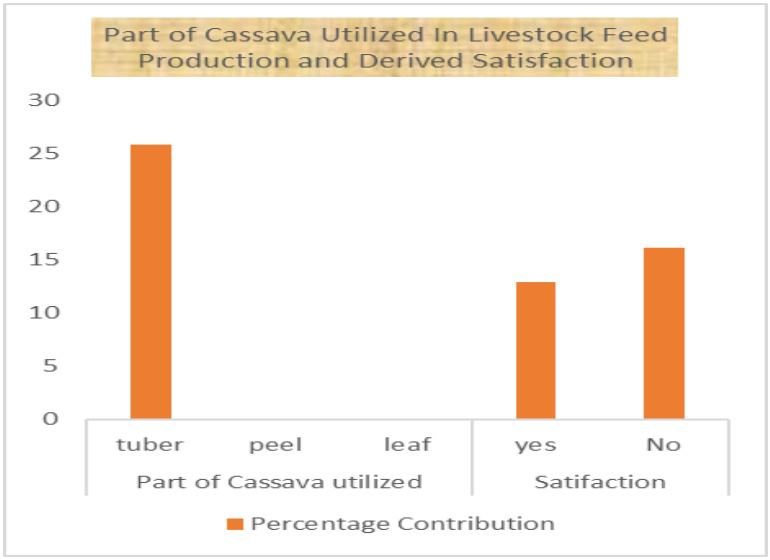


Figure10: Part of Cassava Utilized in Livestock

About 27% of the respondents made use of cassava tubers in formulation of livestock feed. Only 14% of the population recorded success stories while 18% registered dismal performance in result/output with the use of Cassava.

Conclusions

From the findings of the study, the following conclusions could be drawn:

1. Livestock feed mill operators in Nigeria have more than 20 years experience in the industry while many new small and medium scale operators have emerged in the last the 6 and 10 years.
2. Small and medium scale livestock feed producers form the largest (58%) population of the feed mill operators in Nigeria.
3. Poultry feed was the main feed produced by the industry and maize was the main energy feedstuff of the formulated feeds.
4. High water content and rate of spoilage were the main factors militating against cassava utilization by the feedmill industry.

Recommendation

From the outcome of this study, it could be recommended that efforts should be geared towards increased cassava yield per hectare. Also, improved processing method should be facilitated among cassava processors for it to compete favourably with maize as preferred energy feedstuff for the future.

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