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Groundnut (*Arachis hypogea*) Haulm marketing and constraints in selected Northern States, Nigeria

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This study examined the dynamics of groundnut haulm marketing in northern Nigeria states of Bauchi, Jigawa, Kano, Katsina and Kebbi. Using a market survey in each state, data were collected from 101 haulm sellers using chance sampling with the aid of a structured questionnaire. The data were analyzed using descriptive statistics to describe the profile of the sellers, seasonality in quantity traded, price and revenue; marketing margin to determine marketing profits; and Chi-square to highlight the importance of the marketing constraints. The result shows the mean age of sellers was 51 years, 99% were males and 79% were literate. Revenue obtained from sale of haulm exhibited significant variations across locations and from season to season. The average revenue was lowest at ₦71,983/ha in October-December and highest at ₦135,382/ha in July- September. The major constraints that significantly affected haulm sellers were lack of adequate capital, lack of storage facility, high cost of transportation, lack of shades, high taxation and uncertainty in the market. With the positive marketing margin from the trade, mass cultivation of the high haulm yield varieties and that relevant government and marketing agencies should tackle the important constraints in their states for improved haulm marketing were recommended.

Key words: Groundnut haulm, marketing margin, Season, price, Revenue, constraints, Nigeria

INTRODUCTION

Over the last few years, the Nigerian economy has witnessed an unprecedented decline occasioned by dwindling oil prices, inducing a negative economy-wide impact including a sharp contraction in the growth rate, growing external debt, rising unemployment and an increase in the general price level (Odupitan, 2017; Okoi, 2019). In a bid to reverse this ugly trend, the Nigerian government has acknowledged the need to carve out a

dwindling oil prices, inducing a negative economy-wide impact including a sharp contraction in the growth rate, new growth strategy centered on economic diversification (Uzonwanne, 2015; Federal Republic of Nigeria, 2017). Agriculture is seen as an essential pillar for diversifying the economy, achieving food and nutrition security, increasing non-oil revenue and creating jobs (World Bank, 2017). Livestock production is an important

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component of the country's agricultural sector and is a major source of livelihood to a significant proportion of the rural and urban poor households and serves as a source of food, employment, transport, a cash buffer, a capital reserve, and as a means to hedge against inflation (World Bank, 2017; Food and Agriculture Organization (FAO), 2018). In Nigeria, livestock production is a major occupation in the northern region and constitutes an integral part of rural livelihood. In this part of the country, crop-livestock systems are widespread and draught oxen provide power for the production of staple food crops. In addition, livestock are kept by households both for subsistence and as commodities for sale to raise income and buffer shocks (Thorpe and Duncan, 2012). According to Little et al. (2001), significant capital can be generated from livestock sales which, in turn, can be used for beneficial income diversification investments. Increased productivity and competitiveness of the livestock sector are, therefore, critical to livelihood and socioeconomic development and key to national security.

However, a major obstacle to increasing livestock productivity in Nigeria is feed scarcity, particularly in the dry season. Frequent and severe droughts occurrences, increasing population pressure, heightening climate variability, and recent insecurity and violent conflicts over scarce pasture and water resources have contributed to significant decline in the quantity and quality of pasture (Wasonga, 2009; Oronga, 2010; Pachauri et al., 2014). With declining availability and overuse of natural pasture, fodder production is seen as an alternative path to addressing the feed limitation in livestock production.

In Nigeria, groundnut haulm is one of the preferred fodders fed to livestock, particularly to ruminant animals during the dry season when there is scarcity of green pasture for grazing animals (Larbi et al., 1999; Bdliya, 2007). Groundnut is an important crop with multiple benefits especially in a mixed crop-livestock system where it contributes to soil fertility through nitrogen fixation, its grains are a source of highly nutritious food and the haulms serve as highly palatable fodder (Alemayehu, 1997). Bdliya (2007) noted that groundnut haulms are superior fodder resources that are highly valued in northern Nigeria and serve as a major source of protein for animal fattening which brings higher income to the farmer relative to income from selling the grains. Other studies found that feed supplementation with groundnut haulms leads to efficient feed intake and feed conversion ratio, improved weight gain, lower feed cost per Kg and higher profit margin (Bawa et al., 2008; Ososanya, 2012; Ribadiya et al., 2015; Tekle and Gebru, 2018).

In view of the scarcity and seasonality of pasture in Nigeria, several efforts have been put into developing improved varieties which have been promoted among the groundnut farmers in many parts of the country. One of such interventions is the Tropical Legume III (TL III)

project, a collaborative effort between the International Crops Research Institute for the Semi-arid Tropics (ICRISAT) and the Institute for Agricultural Research (IAR). The TL III project in Nigeria deliberately worked on how best to solve the problem of dry season livestock feeding by releasing some improved groundnut varieties that have dual purposes of producing grains and haulms that remain green even at harvest. These varieties, which include SAMNUT 24, SAMNUT 25 and SAMNUT 26 have high pod yields of 2-2.5 tons/hectare instead of the less than 1 ton/ha for the local varieties and also have high haulm yields of 2.5-3 ton/ha (Vabi et al., 2019). These varieties have better stay green quality compared to the older and traditional varieties that shed leaves at maturity and were disseminated and promoted under the TL III Project across the project States, providing opportunities for both livestock and non- livestock farmers to cultivate for either grain, haulm or for cash. To make the haulm available to buyers at both groundnut producing areas and those outside producing areas, the haulm is marketed and there is a huge market for it at present.

A number of studies have been carried out on fodder production and use in Nigeria (Shiawoya and Tsado, 2011; Garba et al., 2014; Jonathan, 2015). However, these studies focused mainly on the agronomic and nutritional characteristics of feed resources, and responses of animal to feed types and feeding practices. Information on groundnut haulm supply sources, transactional cost, marketing profit, seasonality in prices and revenues and the marketing constraints are not readily available in Nigeria. The availability of these and other information will be relevant to sustainable development of livestock feed markets in Nigeria, particularly to feed suppliers, marketing agents, and livestock producers in their investment decision making process as it relates to ruminant feeding in the dry season in Nigeria. This study therefore, specifically examine (i) the socio-economic characteristics of the groundnut haulm sellers; (ii) assess the marketing costs, prices and revenues at the different stages of marketing and profits by states; and (iii) examine the problems associated with haulm marketing at the sellers' end of the market.

MATERIALS AND METHODS

Sampling procedure and sample size

The survey was conducted in Bauchi, Jigawa, Kano, Katsina and Kebbi States in January 2019. These States were purposively selected as locations where the International Crop Research Institute for Semi-Arid Tropics (ICRISAT) already had an intervention under the Topical Legume Project (TL Project) for groundnut in Nigeria. The sampling units who are the respondents in the study are the haulm sellers in the markets visited. Twenty groundnut haulm sellers were selected by chance at the different groundnut haulm markets in each State. Except, Jigawa State where a female seller was found, and included in the sample, all others were males, Thus, twenty-one sellers were selected in

Jigawa State, which resulted in a sample size of 101 groundnut haulm sellers. Since there was no sampling frame and the sellers were few in numbers in the markets, the sample size was pre-determined and based on chance meeting in the markets on the days of the survey. Groundnut haulm markets are unique in the sense that in some cases they are located outside the normal markets in the towns and villages and in some other cases they are located within the urban markets and usually close to livestock section. The markets are few in numbers in the states even in the groundnut producing states. The itinerant traders/commission agents help in the distribution from farm gates to urban markets.

Data collection

The study used both quantitative and qualitative methods of data collection using research and extension officers of the Agricultural Development Project as the enumerators in each state. Ten markets were identified and purposively selected based on sale of groundnut haulms. The enumerators administered a structured questionnaire to the sellers in their language, mainly Hausa, to get their responses. The data collected includes information on the type of market, distance to market, socioeconomic characteristics of sellers, volume of haulm, seasonal prices, transactional costs, revenues from sale and marketing constraints of the respondents (sellers).
x^2 = Chi-square; f_o = observed frequency in a single category and f_e = expected frequency while $\Sigma = sum$, (df) = degree of freedom, r = number of rows and c = number of columns.

Data analysis

The data collected was analyzed using descriptive statistics such as frequency distribution, percentages and averages; marketing margin, Analysis of Variance (ANOVA) using F-statistics to compare the results between seasons and states and Chi- square analysis to determine the degree of associations between the constraint and the states. The model for determining the marketing profit represented by the marketing margin is given by

$Marketing\ Margin\ (MM) = Revenue\ from\ sale\ (R) - Marketing\ costs(MC)$

Where:
R = Average selling price X quantity of haulm sold
MC= Include cost of purchase of haulm at source and transactional costs (transport, taxes, labors, etc.)
   The Chi- square formula given by Aggarwal (2015) is:

$$\chi2 = \Sigma \frac{(fo - fe)}{fe}$$

$$df = (r-1)(c-1)$$

RESULTS AND DISCUSSION

Socioeconomic characteristics of the sellers

The results of the survey show that groundnut haulm marketing was a male dominated market as only in Jigawa State was a female marketer found in the business (Table 1). This is quite expected because marketing activities in Muslim communities as in this case is purely a male affair. Since marketing activities are labor intensive requiring movement from one location to another, the prevailing belief in the study area is that men are expected to engage in such activities while the women stay at home and takes care of the family. This is consistent with the findings of Asogwa and Okwoche (2012) and Baba et al. (2015) who highlighted male dominance in marketing of agricultural commodities.

   The age of the sellers is diverse and range from 30 to 80 years with majority in Bauchi and Katsina States falling in the 40-50 years' bracket; while in Jigawa and Kebbi States, the majority was 50-60 years. In Kano State, the majority was in 60-80 years' range but the average age across the States was 51 years. Kano State had the highest average age of 54, the highest among the five States. The results also revealed that the majority of sellers across the States have Islamic and adult education. However, in Kebbi State, majority have no formal education but surprisingly, there were sellers with tertiary education in the business, which is a sign that the business may be lucrative afterwards. Overall, the results demonstrate that about 79% of the respondents have gone through one form of education or the other and in line with technology adoption and diffusion theory, this implies that the uptake of innovative marketing strategies is likely to be high in the study area (Petry et al., 2019; Zilberman et al., 2019; Heiman et al., 2020).

   The survey highlights that the respondents derive the supply of haulms from various sources including farm gates, community markets, other markets and the middlemen. The supplies from farm gates are ranked first by 70.3% of sellers, followed by supplies from community markets (51.49%) and thirdly, supplies from other markets (44.55%). The other markets include isolated markets and selling points within the states. However, the middle men, who may have acted as primary buyers from farmers or sellers, were also involved in the supply of groundnut haulms to the respondents in the selected markets. The groundnut haulm is traded in dry form and packaged in bags.

Other feedstock sold by groundnut haulm sellers

As it is common with Nigerian food stock sellers to combine commodities in their trades, so the sellers of groundnut haulms also combine it with another feedstock. This practice is popular among traders for several reasons such as to obtain more revenue, as complements, for increase nutrient source, and based on demand. Some of the major feedstock sold along groundnut haulm is presented in Table 2. The common ones include cowpea haulm, cowpea bran, wheat bran, maize bran, rice bran, sorghum stalk, maize stalk, millet stalk, Sesame stalk and dry weeds. The popularity of each type of feedstock varies across States depending on availability. The study demonstrates that cowpea haulm and wheat bran seemed to be very important among the marketers in the study areas with each being

Table 1. Socioeconomic characteristics of groundnut haulm sellers.

Characteristics	Bauchi (n_1=20)	Jigawa (n_2=21)	Kano (n_3=20)	Katsina (n_4=20)	Kebbi (n_5=20)	Total (n=101)
Sex						
Male	20(100)	20(95.24)	20(100)	20(100)	20(100)	100(99.01)
Female	0(0)	1(4.76)	0(0)	0(0)	0(0)	1(0.99)
Age (years)						
<40	4(20)	1(4.76)	3(15)	0(0)	2(10)	10(9.90)
40-49	9(45)	5(23.81)	3(15)	10(50)	7(35)	34(33.66)
50-59	7(35)	10(47.62)	5(25)	6(30)	10(50)	38(37.62)
≥60	0(0)	5(23.81)	9(45)	4(20)	1(5)	19(18.81)
Mean	**46**	**53**	**54**	**52**	**50**	**51**
Educational level						
No formal	2(10)	2(9.52)	1(5)	2(10)	14(70)	21(20.79)
Islamic	11(55)	10(47.62)	10(50)	12(60)	3(15)	46(45.55)
Adult	3(15)	4(19.05)	6(30)	2(10)	0(0)	15(14.85)
Secondary	1(5)	3(14.29)	3(15)	1(5)	2(10)	10(9.90)
Tertiary	3(15)	2(9.52)	0(0)	3(15)	1(5)	9(8.91)
Source of supply*						
Farm gate	17(85)	10(47.62)	20(100)	10(50)	14(70)	71(70.30)
Community markets	13(65)	15(71.43)	4(20)	20(100)	0(0)	52(51.49)
Other markets	8(40)	8(38.10)	13(65)	15(75)	1(5)	45(44.55)
Middlemen	2(10)	4(19.05)	10(50)	7(35)	14(70)	37(36.63)

Values in brackets are percentages. *multiple responses allowed.

Table 2. Frequency distribution of other feeds sold by groundnut haulm sellers in the markets*.

Problems	Bauchi (n_1=20)	Jigawa (n_2=21)	Kano (n_3=20)	Katsina (n_4=20)	Kebbi (n_5=20)	Total (n=101)
Cowpea bran/haulm	-	3(14.29)	-	-	18(90)	21(20.79)
Wheat bran	2(10)	1(4.76)	3(15)	-	15(75)	21(20.79)
Maize bran	4(20)	1(4.76)	2(10)	6(30)	-	13(12.87)
Sorghum stalk	10(50)	2(9.52)	-	-	-	12(11.88)
Maize stalk	2(10)	9(42.86)	-	-	1(5)	12(11.88)
Soybean stalk	-	-	6(30)	5(25)	-	11(10.89)
Rice husk	7(35)	1(4.76)	-	-	-	8(7.92)
Dry weeds	1(5)	5(23.81)	-	1(5)	-	7(6.93)
Sorghum bran	1(5)	2(9.52)	-	-	-	3(2.97)
Sesame stalk	-	-	3(15)	-	-	3(2.97)
Millet stalk	2(10)	1(4.76)	-	-	-	3(2.97)

Values in brackets are percentages
*multiple responses allowed.

sold by 20.79% of the sellers and followed by maize bran sold by 12.87%. Sorghum bran, sesame and millet stalks are the least sold (2.97%) of the sellers.

Transaction costs in groundnut haulm marketing

The transaction costs associated with groundnut haulm marketing across the states at farm gate, village markets, other markets, and by middlemen is shown in Table 3. The results in Table 3 shows that at farm gate, it is the unit price that was significantly different at 5% level of probability between states as cost of purchase and transactional costs were not. In the village markets, the quantity purchased and cost of purchase were significantly different from state to state at 1% level of

Table 3. Transaction cost in groundnut haulm marketing according to sources of supply and states.

Source	Bauchi	Jigawa	Kano	Katsina	Kebbi	Total	F-test
Farm gate							
Qty of haulm bought (kg)	1,857	2,049	1,566	1,917	2,069	1,893	1.44
	(785)	(689)	(687)	(892)	(716)	(764)	
Price (₦/kg)	32	30	26	32	34	31	3.83**
	(6)	(6)	(5)	(7)	(8)	(7)	
Value (₦)	50,555	48,227	37,368	51,049	55,120	48,462	1.45
	(20,838)	(17,689)	(18,480)	(32,374)	(31,033)	(25,056)	
Marketing cost (₦)	3,898	3,903	3,861	3,628	3,556	3,770	0.51
	(1,091)	(941)	(616)	(1,108)	(1,310)	(1,028)	
Village market							
Qty of haulm bought (kg)	1,571	1,569	1,175	1,592	1,663	1,515	4.04***
	(424)	(442)	(530)	(329)	(399)	(455)	
Price (₦/kg)	43	34	34	33	37	36	3.08**
	(12)	(9)	(13)	(7)	(9)	(11)	
Value (₦)	64,327	54,908	41,704	54,997	60,681	55,319	4.36***
	(17,090)	(18,606)	(22,748)	(15,286)	(17,490)	(19,613)	
Marketing cost (₦)	1,473	1,601	1,400	1,507	1,516	1,500	0.63
	(403)	(354)	(482)	(400)	(426)	(411)	
Other markets							
Qty of haulm bought (kg)	3,045	4,099	2,741	4,269	3,661	3,568	2.50**
	(2,185)	(1,789)	(1,679)	(1,852)	(1,836)	(1,930)	
Price (₦/kg)	33	37	32	36	35	35	2.10*
	(7)	(7)	(6)	(7)	(8)	(7)	
Value (₦)	104,229	161,917	94,216	162,754	133,049	131,537	3.12**
	(74,933)	(91,159)	(73,073)	(83,726)	(79,775)	(84,269)	
Marketing cost (₦)	4,054	4,473	4,670	4,622	4,680	4,499	0.85
	(1,294)	(1,221)	(1,599)	(985)	(1,186)	(1,268)	
Middlemen							
Qty of haulm bought (kg)	3,492	2,103	1,903	2,260	2,918	2,531	1.98
	(2,415)	(1,897)	(1,957)	(1,847)	(2,291)	(2,132)	
Price (₦/kg)	38	44	32	41	45	40	4.77***
	(16)	(11)	(10)	(10)	(8)	(12)	
Value (₦)	123,289	91,913	56,033	98,904	121,959	98,355	2.32*
	(89,045)	(84,009)	(51,490)	(86,700)	(85,474)	(82,710)	
Marketing cost (₦)	1,114	1,151	1,591	1,099	1,227	1,236	1.39
	(682)	(736)	(862)	(811)	(779)	(782)	

Note: Values in brackets are standard deviations. ***<0.01, **<0.05, *<0.1; 1US$=365NGN at of survey.

probability while the unit prices were significantly different at 5%. This mean these parameters are very important consideration for haulm buyers at the village markets. In the other markets (isolated selling points), the quantity purchased, unit price was only significant from state to states at 10% level of probability. For the middlemen, the unit prices and cost of purchase differs significantly from state to state at 1 and 10% respectively. The transaction costs at farm gate, village markets, and other markets as well as middle men did not show significant difference between the states. This is so because most markets in the North West zone of Nigeria tend to charge fairly uniform market taxes and rates.

Groundnut haulm volume of sale, seasonal prices and revenues

The volume (quantity) of groundnut haulm sold depends on the season and varies from State to State and season to season (Table 4). The result shows that quantity sold ranges from an average of 1,926 kg in Bauchi State to 2,168 kg in Jigawa State from October to December. The volume of sales decreases slightly in all the States from

Table 4. Average Volume, price and revenue analysis of groundnut haulm marketing.

Season	Bauchi ($n_1=20$)	Jigawa ($n_2=21$)	Kano ($n_3=20$)	Katsina ($n_4=20$)	Kebbi ($n_5=20$)	Total (n=101)
Oct-Dec						
	1,926	2,168	1,734	2,040	1,950	1,966
Qty of haulm sold (kg)	(776)	(646)	(684)	(733)	(704)	(710)
	35	39	30	34	40	36
Price (N/kg)	(9)	(9)	(9)	(9)	(9)	(9)
	69,157	86,615	52,800	72,268	78,346	71,983
Revenue (N)	(38,585)	(38,294)	(25,136)	(36,097)	(33,560)	(35,861)
Jan-Mar						
	1,928	2,104	1,553	2,147	1,811	1,910
Qty of haulm sold (kg)	(1,071)	(867)	(731)	(991)	(885)	(923)
	47	49	37	48	59	48
Price (N/kg)	(18)	(13)	(12)	(15)	(15)	(16)
	84,568	99,860	60,941	101,375	103,339	90,114
Revenue (N)	(54,869)	(50,020)	(37,749)	(49,267)	(53,504)	(51,038)
Apr-Jun						
	3,167	2,687	3,257	3,328	2,752	3,035
Qty of haulm sold (kg)	(775)	(1,063)	(1,260)	(1,030)	(1,156)	(1,081)
	45	43	38	46	47	44
Price (N/kg)	(9)	(10)	(15)	(8)	(10)	(11)
	142,249	113,891	126,650	152,346	124,638	131,776
Revenue (N)	(44,080)	(48,060)	(70,147)	(49,804)	(54,988)	(54,781)
Jul-Sep						
	2,117	2,625	2,943	2,905	2,499	2,618
Qty of haulm sold (kg)	(1,436)	(1,510)	(1,420)	(1,799)	(1,510)	(1,539)
	50	48	40	59	54	50
Price (N/kg)	(18)	(15)	(15)	(17)	(23)	(18)
	113,822	136,382	129,451	173,144	124,063	135,382
Revenue (N)	(103,971)	(108,258)	(113,416)	(129,001)	(96,428)	(110,369)
F-test1	0.19	1.48	11.34***	2.81*	2.23	12.59***
F-test2	5.24***	4.33**	3.23**	15.21***	7.17***	27.13***
F-test3	2.02	2.67*	7.13***	7.94***	2.37	20.10***

Note: Values in brackets are standard deviations. ***<0.01, **<0.05, *<0.1; F-test1= Difference test in the quantity of haulm sold across seasons; F-test2= Difference test in price of haulm across seasons; F-test3= Difference test in revenue from haulm across seasons.

January to March, because is at this period, there is still available vegetation and farm left over stalk to browse. However, the quantity sold increased significantly from April to June with a range of 2,687 kg in Jigawa to 3, 328 kg in Katsina State, which corresponds to the peak of demand for supplementary feeding among livestock owners in the project States and other locations across the country. Usually, cattle and small ruminants from the north are transported to markets in the middle belt and southern regions of Nigeria thus creating increased demand for groundnut haulms in those markets particularly during the dry season. By the months of July to September, the volume of trade drops slightly as the rains set in and more natural pasture becomes available. Thus, F1-test in Table 4 show that the quantity purchased and traded in seasons differs significantly at 1% in Kano State and at 10% in Kebbi State. However, across the state, the quantities purchased and traded differ significantly at 1% level of probability. This is as a result of demand and supply differences across the states.

According to Nangole et al. (2013) and Lugusa (2015), fodder prices are characterized by spatial and temporal variations as a result of seasonal variations in rainfall that influence pasture availability and supply. The seasonal variation in production has been noted as a major constraint to agricultural marketing. In Nigeria, groundnut production depends mainly on rainfed agriculture, which influences production and supply of groundnut haulm. Farmers harvest their crop from October, the time when supply is high. Consequently, crop prices are lowest at this time. The results indicated that prices of haulm follow the season and volume traded varies from State to State, indicating that the sellers are not streamlined and regulated. The average price was lowest at harvest time from October to December and ranges from ₦30/kg in Kano State to ₦40/kg in Kebbi State. From January to March, the price rose from an average of ₦37/kg in Kano State to ₦59/kg in Kebbi State. The price decreased slightly from April to June from ₦38/kg in Kano State to ₦47/kg in Kebbi State, attributable to higher supply at this period. The highest price was realized in all the States from July to September with Katsina State recording as high as ₦59/kg. As the F-2 test in Table 4 show, the seasonal prices differ significantly between seasons in Bauchi, Katsina and Kebbi states at 1% level of probability while in both Jigawa and Kano states; the seasonal difference was significant at 5%. Across the states, the seasonal difference was significant at 1%.

These findings align with Jarial et al. (2016) who Similarly, the survey indicated that the revenue from haulm sale varied seasonally and from State to State. For instance, the average revenue across the States for the period of October to December was ₦71, 983 and this increased to ₦90,114 in January to March. The revenue jumps to an average of ₦131,776 by April to June and slightly increased again to ₦135,382 by July to September period. The F-3 test in Table 4 also show that the revenue realized from haulm sale was significantly different between seasons in Kano and Katsina states at 1% level each and at 10% level of probability in Jigawa state while across all the states, the difference was also significant at 1% level.

In effect, Table 4 shows that between October and December, prices and quantity of haulm sold differs significantly at 5% level of probability, while between January and March, prices and revenues significantly differ at 5% level of probability across the states. Between April and June, there was no significant difference, while between July and September, only the prices that was significantly different across the states. Thus, price is a key determinant of the volume sold and revenue earned in the trade.

Profitability of groundnut haulm marketing

The marketing profit measured by the marketing margin (MM) in the model and shown in Table 5 indicates that the haulm sellers in the markets across the states made profit from the trade. The respondents in Bauchi state made the least margin of ₦ 22,791, while the highest margin of ₦ 117, 469 was in Katsina state but the mean across the five states was N75, 525 and there was no significant difference between that states as shown by the F- test on the table. However, further examination of the table shows that the haulm buying prices and selling prices were significantly different at 1% level of probability across the states while total cost of marketing, quantity purchased and value differed at 5% level of probability between states. Revenue on the other hand only differs between states at 10% level of probability between states. The implication of this findings is that in spite of the differences, the profit is positive and therefore, there is incentive to continue groundnut haulm marketing across the northern states and even beyond and as long as dry season feed remains a problem in the zone and also as long as livestock trade from the north to south exist in Nigeria

Constraints to groundnut haulm marketing in project states

Groundnut haulm sellers like other agricultural commodity traders encounter problems. The important ones identified by the respondents included: lack of adequate capital base of traders (28% of respondents), lack of storage facility (21%), seasonality of supply and sale (17%), high cost of transportation and lack of shades under which to keep the commodity in the market (10%). High taxation (government revenue) was reported in Jigawa State, while price uncertainty was mentioned in Jigawa and Katsina States (Table 6). The test of association between the various identified constraints and the State shown by the chi-square in Table 6 shows

Table 5. Profit analysis of groundnut haulm marketing based on State of haulm sellers.

Variable	Bauchi (n1=20)	Jigawa (n2=21)	Kano (n3=20)	Katsina (n4=20)	Kebbi (n5=20)	Total (n=101)	F-test
Qty of haulm bought (kg)	9,966 (3,364)	9,820 (3,232)	7,385 (2,326)	10,038 (3,608)	10,310 (2,393)	9,507 (3,159)	3.12**
Buying price (N/kg)	37 (5)	36 (5)	31 (4)	36 (6)	38 (3)	35 (5)	5.9***
Value of haulm bought (N)	368,742 (157,303)	353,520 (142,276)	228,935 (92,546)	361,368 (162,932)	391,780 (126,066)	332,745 (145,792)	3.66**
Marketing cost (N)	10,539 (1,493)	11,128 (1,932)	11,523 (2,227)	10,856 (1,618)	10,978 (1,581)	11,006 (1,786)	0.81
Total Cost	379,281 (157,637)	364,648 (142,326)	240,458 (92,900)	372,224 (163,130)	402,758 (126,079)	343,751 (145,873)	3.62**
Qty of haulm sold (kg)	9,138 (2,240)	9,585 (2,322)	9,488 (2,528)	10,419 (2,699)	9,011 (2,093)	9,529 (2,389)	1.07
Selling price (N/kg)	44 (10)	45 (10)	36 (8)	47 (10)	50 (11)	44 (10)	5.33***
Total revenue	402,072 (151,734)	431,325 (163,085)	341,568 (155,250)	489,693 (158,803)	450,550 (133,815)	419,276 (156,562)	2.18*
Marketing margin (N)	22,791 (90,415)	66,677 (111,941)	101,110 (122,027)	117,469 (74,030)	47,792 (89,934)	75,525 (96,813)	0.03

Note: Values in brackets are standard deviations. ***<0.01, **<0.05, *<0.1.

that the problem of inadequate capital was statistically significant across Bauchi, Jigawa, Kano and Kebbi states at 1% level of probability. Similarly, the absence of market shades and problem of high cost of transportation were significant in Jigawa and Katsina at 1% level of probability. The lack of storage facility in the markets was significant at 5% in Bauchi, Jigawa, Kano and Katsina states; High tax charge was significant in only Jigawa state at 5%; the problem of buying on credit was significant at 5% in Kano while market uncertainty was significant at 5% in only Katsina State. A study by Mohammed et al. (2020) identified constraints to Sweet Melon marketing to include inadequate storage facilities and poor transportation among others. Thus, the relative importance of the marketing constraint to state and therefore, the relevant agencies of government and the marketing agencies and associations should focus on addressing those issues of importance in their states in order to

Table 6. Frequency distribution of marketing problems encountered by groundnut haulm marketers based on State.

Problems	Bauchi (n₁=20)	Jigawa (n₂=21)	Kano (n₃=20)	Katsina (n₄=20)	Kebbi (n₅=20)	Total (n=101)	Chi2
Inadequate capital	2(10)	4(19)	10(50)	12(60)	-	28(27.72)	26.95***
No storage facility	5(25)	3(14)	8(40)	5(25)	-	21(20.79)	10.7**
Seasonality	4(20)	1(4.76)	3(15)	6(30)	3(15)	17(16.83)	4.9
No market shade	-	6(28.57)	-	4(20)	-	10(9.90)	17.09***
Transportation cost	-	7(33.33)	3(15)	-	-	10(9.90)	20.1***
Shortage of haulm	3(15)	1(4.76)	3(15)	-	-	7(6.93)	7.17
High tax	-	3(14.29)	-	-	-	3(2.97)	11.78**
Buying on credit	-	-	3(15)	-	-	3(2.97)	12.52**
Market uncertainty	-	-	-	3(15)	-	3(2.97)	12.52**
Price uncertainty	-	1(4.76)	-	2(10)	-	3(2.97)	5.49
Others	1(5)	3(14.29)	-	-	1(5)	5(4.95)	5.97

Figures in brackets are percentages.

improve on groundnut haulm marketing system across the states.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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