The Driving Force behind Increasing Grasshopper Frying Business in Maiduguri: Profitability or Joblessness?

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ABSTRACT

This survey was carried out in 2011 on grasshopper frying and retail selling business in Maiduguri. The objective of the study was to find whether the business is profitable or it is undertaken as a result of lack of job in the country. Fifty copies of questionnaire were administered on a sample of fifty respondents randomly selected for the study. The questionnaire took twelve months to administer and retrieve so as to cover the period of abundance and scarcity. Retail fryers mostly widows buy their fresh hoppers from collectors in 50kg polythene bags at a mean of N7,375.00, during the periods of abundance (October to May) and scarcity (June to September) at five designated market outlets in Maiduguri Metropolis. Retail selling prices after processing was at the mean of over N500.00 kg depending on location. Bags sold per day by a retailer range 1-7 bags also depending on location and retail prices per kg measure. The average age of retail fryers range between 10-60 years, with 31- 50 years dominating. Mean daily profit per bag is 5,760.00 naira, showing high profit margin. Grasshopper outbreaks over the passed three decades, shows declining trends, indicating the effectiveness of the grasshopper business, which have reduced the number of annual outbreaks reports. It is therefore, clear from this research that high profit margin and lack of job drove these women and children, particularly educated ones into this risky business.

Keywords: *Grasshoppers, Frying, Profitability, Joblessness, Women business.*

INTRODUCTION

Edible grasshoppers and locusts include *Nomadacris septemfasciata, Kraussaria sp Katantop sp., Anacridium sp., Cataloipus sp., Hieroglyphycus sp., Gelestorhinus sp., Locusta sp and Schistocerca sp.* The non-edible ones include *Zonocerus variagatus* which emits poisonous liquid when disturbed. The most common species found in Maiduguri and its surrounding environment are the edible ones (Onazi, 1971, Durow, 1976; IAR 1976; Popov, 1989). Grasshopper business was never heard of in Maiduguri earlier than twenty years ago, neither was it known as a commercial or an economic venture to such a magnitude as it is today. A young woman in her thirties, discovered large population of grasshoppers in her farm under shrubs in 1980s which she subsequently collected fried and sold at ease, hence the first woman grasshopper collector and fryer in Borno State. The unprecedented customer patronage gave her the courage to continue in the business. Today it has drawn public attention, generated employment and sensitized many to recognize the value of grasshopper in human and animal diets. It is today one of the biggest petty trading business venture in Maiduguri, patronized by jobless young men and women

including the elderly. Locust and grasshopper populations are known to fluctuate with season, because most hoppers lay their eggs towards the end of the rainy season and die, just to pick up again at the beginning of the next rainy season (Popov, 1989; Uvarov, 1966; Onazi, 1971; Oyidi, 1977). These insects are known for their voracious feeding behaviour and habits on both domesticated field crops and natural ecosystems (Battern, 1969; Brys, 1978; Apeji, 1988). Their body color mimicks where they live and carry the characteristic colour of that environment (Uvarov, 1966). Oyidi (1977, 1983) confirmed this, when he reported that *Ocnocerus diabolicus*, took reddish-black color of the Anara Forest Reserve environment around Kaduna areas after bush fires, but remain brown in Zaria. The mimicry of the environment, according to Paulton (1926), serves as a camouflage and protective device against predators and other natural enemies. Such mimicry however, depends on the intensity of the exposure of the hoppers to such an environment inducing it, because high body temperatures inhibit the production of melanin and insectorubin the color substances. But the above hypothesis may be a contrary view to an expectation that long exposure can cause change in body color. Therefore, the obscurity of the chemistry and history of such processes need more elucidation (Uvarov 1966).

Acrididae, are known to have diverse natural enemies such as predators, parasites and pathogenic organisms which kill substantial number of them. For instance, the egrets consume from 1666.7-5283.6 hoppers per bird per day over a three feeding shifts (Ashall and Peggy 1962, Sharah, 1998, 2007). Grasshoppers also play hosts to various virus and bacterial pathogens and other disease carrying agents, for example, *Mylabris quatuordecimpunctata,* Pell, which attack hopper adults, parasitize eggs and prey on them (NAS 1971, Hills 1983, COPR 1982). Before the coming of the German Technical Aid Team (GTZ) in 1975/76 using helicopter to carry out aerial spray of pesticides against these grasshopper species, *(Nomadacris sp., Kraussaria sp., Katantop sp. and Locusta sp.),* they were serious threat to cereal crop production in the Borno State (Sharah 1991, FDPCS (1987). Even then nothing was heard of grasshopper as economic venture or its commercial value until the 1980s which were the peak periods of their outbreaks in Borno State (Sharah, 1991). This study is therefore, set out to investigate and elucidate more on the driving force behind the increasing grasshopper business among the retail fryers in Maiduguri Metropolis and specifically determine the reason behind the down-trend of outbreak reports in locusts and grasshoppers in Borno State over the past two decades.

MATERIALS AND METHOD

This study adopted the survey research design to investigate the driving force behind the increasing grasshopper frying business in Maiduguri Metropolis which was selected as the study site in 2011 and stratified into five frying and retail selling market points. Stratified random sampling technique was employed to selected ten respondents from each of the market point. Fifty copies of questionnaire each carrying fifty questions were administered on participants in each of the market points to cover all the sections of the town. This was to ensure that a large number of retail fryers was captured. The study took one year to

capture these data, so as to include both the periods of hopper abundance (September to May) and scarcity (June to August) at the collection sites. The one year study was to ensure enough time for the collation of data, because of the seasonal grasshopper population fluctuations due to the uncertainty of the arid zone weather condition which do affect the market supply. The data for the period covered were merged, means determined and analyzed. Questionnaire retrieved were categorized and information recorded according to age, qualification, costs per bag, retailer prices, purchasing and selling points, years of experience, reasons for being in the business, period of boom and recess as well as profitability. The data for the study were analyzed using Analysis of Variance (ANOVA) and means separated by Standard Error (SE) and Least Significant Difference (LSD).

RESULTS AND DISCUSSION

Table 1 shows the age of grasshopper retail fryers and sellers in Maiduguri Metropolis. The table shows that ages 31-50 dominated the frying and retail selling business and is significantly different ($P<0.05$) from the other ages. However, ages 10-30 were mostly of school age and did most of the domestic activities. Ages 51-60 were older women who supervise the house activities, inspect and give directives. These cannot be at the frying and retail selling points; hence their numbers are less at the frying and retail selling markets. Table 2 shows the qualifications of these fryers and retail sellers of processed grasshoppers. There were significant difference ($P<0.05$) among the qualifications. The uneducated had the highest respondents, followed by the primary school leavers. NCE and SSCE were the next and OND and HND were the least. The involvement of HND, NCE, OND and SSCE may have been from lack of job satisfaction or poor remuneration and wish to have some cash at hand to assist in the family upkeep.

Table 3 shows the period of grasshopper abundance, scarcity and experiences of the respondents in the business. The table indicates that more than half of the respondents agreed that the period of abundance was after the rain season might have stopped (September to November) and seventy percent said rainy season (July to August) was the period of scarcity. These were significantly different ($P<0.05$) than the rest of the other periods. For experience, more than half were in the business for only two years and significantly different ($P<0.05$) from the other periods. The trend in the period spent in the business shows that those who spent twelve years and above were fewer and significantly different ($P<0.05$) than those with two to seven years. This trend indicates that those who have spent many years are aging out or have become rich and changed to another business and are being replaced with new hands. Table 4 shows the purchasing cost per bag of fresh grasshoppers by the fryers and retail sellers and the profit made per bag. More than eighty percent sold between one to two bags of processed hoppers in a day and were significantly different ($P<0.05$) from those who sold from three bags upward. The cost of fresh hoppers per bag varied from N4,000.00 during abundance and N11,000.00 during scarcity, which is significantly different ($P<0.05$) from each other. Mean cost of processing per bag is N126.00 and mean daily profit is N5,760.00, depending on number of bags sold per day. Table 5 shows the reasons for venturing into the hopper business, alternative

jobs when hoppers are scarce and how the business can be sustained. Profitability and lack of job were significantly different ($P<0.05$) from the reasons divulged by the respondents. This suggests that they are the main reasons why these women joined the business. During hopper scarcity, sale of bean cake, farming, frying and selling of fish and firewood/charcoal were significantly different ($P<0.05$) from the other alternatives. To sustain the business, more than half of the respondents did not want the Government to carry out chemical control measures against the hoppers so as not to pollute the hoppers (GIFAP, 1990a 1990b), while a fifth did not want bush meat hunters to burn the bushes so as not to destroy the hoppers and their eggs. These two reasons were also significantly different ($P<0.05$) from the rest of the other reasons given in order to sustain the hopper business in Maiduguri. Table 6 shows five years survey of frying and retail sales of processed grasshoppers in Maiduguri by the respondents. This compares how the business had fared over the years, the trends of retail cost per measure and accrued profit.

The mean purchasing cost of per 50kg of polythene bag of fresh hoppers soared to over three times in the five periods. Similar trends were observed in the processing cost, retail price per kg, proceeds and daily profit made per bag and each were significantly different ($P<0.05$) from the preceding year. The high daily profit made per bag seem to be the main reason why many women are involved in the business of frying and retail selling of processed hoppers in Maiduguri. Table 7 shows the mean annual grasshopper outbreaks in Borno State from 1977-2009. The table has shown that there was an effective measure carried in the 1970s by State, national and international agencies (Sharah, 1991; FDPCS, 1987; MANR, 1987). However, there was pest upsurge again in 1988-1998 due to the slacken control operations in these years. The discovery of the grasshopper business has significantly brought down the annual outbreak reports because there was no serious outbreak report again since 1999. Significant difference ($P>0.05$) is observed between the outbreaks of 1977-1987 and 1999- 2001. But between 1988 and 1998, the outbreaks were significantly higher ($P<0.05$) than the other two. Figure 1 shows the activities at the frying and retail selling points, while figure 2 shows already processed grasshoppers ready for consumers to patronize and satisfy their appetites.

Women of ages 31-50 dominated the business of frying and retail selling in the grasshoppers business, because they are more active and had no formal education than the other age groups. Some of these women were married and some widowed and had family responsibilities. They would not like to seat at home idling away their precious and valuable time with economic burdens staring them in their faces. This may be the reason why all age groups were involved in the business. The number of women involved in the frying and retail selling business had increased over the past five years because of its profitability and the lack of jobs. Most women who were involved have become very rich, build houses, gainfully employed and engaged in doing something positively rather than idling away their precious time. The business according to the women helped in solving emergency home cash problems, assisted their husbands in running the families and to pay children's school fees. The grasshopper business is an employer of labour, many children and women were hired to remove wings at some cost. Sour lemon/lime dealers had good

business also, because sour lemons were used in cleaning up unwanted odours from the grasshoppers that feed on such plants as *Balanitis aegyptiaca* and *Calatrophies sp.* (Popov, 1989). This prevents consumers being allergic to grasshoppers which have not been properly processed and have been mistakenly ingested and can sometimes cause fatal sickness. The allergy produces rashes on the skin, cause stomach ache, vomiting, diarrhea and even dehydration which may lead to death. Profitability table indicates mean profit of N5670.00/day, under which over 60% of the fryers and retail sellers fall, and this indicates clearly why many women join the business. All retail sales produce certain level of profit in both periods of abundance and scarcity, but increases with each succeeding year.

CONCLUDING REMARKS

Grasshopper business has come to stay in Maiduguri and is an effective cultural control method against grasshoppers and locust since it started more than two decades ago. The trend in the business has also reduced the trends in grasshopper outbreak reports from grasshopper and locust outbreak prone areas of Borno State. There has been down trends in outbreak reports from 1999-2009 and there were no reports of serious outbreaks since then. This has made grasshopper business in Maiduguri of high advantage to the farmers as they no longer loose their crops to these devastating insects. To collectors and retailers, it is a poverty alleviator, immediate cash supplier and a quick family cash problem solver. However, the fear by many entomologists is the probability of obliterating and eliminating the grasshopper species in due course as the vultures (scavengers) were eliminated from Maiduguri abattoir through poaching activities in the 1980s. Consequent upon the foregoing, the study can now authoritatively conclude that it is the profitability/lack of jobs that have attracted the fryers and retail sellers into the hopper business. This has made such human activities as an effective cultural control measure, which is relatively a less hazardous method than chemical and bush burning in Borno State in particular and arid zone in general. According to 88% of the respondents, there is the need therefore for the government to enact laws to ban bush-burning and stop chemical pest control in order to sustain and keep the women in this business. These two agricultural practices are against grasshopper business. These measures destroy the grasshoppers and their eggs, in addition to being highly seasonal.

Table 1: Mean age of fryers and retain sellers of processed grasshoppers in Maiduguri.

Gender	10-20	21-30	31-40	41-50	51-60
Male	4	0	0	0	0
Female	4	4	38	48	0
Mean	4	2	19	24	1
SE	1.528	2.000	19.000	24.000	1.000
LSD	4.000	2.000	19.000	24.000	1.000

Source: Survey, 2011.

Table 2: Qualification of fryers and retail sellers of processed grasshoppers in Maiduguri

Gender	HND	OND	NCE	SSCE	Primary	No Education
Male	0.00	0.00	0.00	0.00	0.00	4.00
Female	2.00	4.00	16.00	10.00	20.00	44.00
Mean	1.00	2.00	8.00	5.00	10.00	24.00
SE	1.000	2.000	8.000	5.000	10.000	20.000
LSD	1.000	2.000	8.000	5.000	10.000	20.000

Source: Survey, 2011.

Table 3: Period of abundance and scarcity of grasshoppers and time of experience

	Abundance			Scarcity		Experience	
Time	Frq.	%		Frq.	%	Year.	%
Every day	5	10.00	May	2	4.00	2	56.00
Every month	6	12.00	June	3	6.00	7	24.00
Jan.-February	5	10.00	Jul/Aug.	19	38.00	12	10.00
February	7	14.00	May/Aug.	21	42.00	17	6.00
Sept./Nov.	27	54.00	Unaware	5	10.00	>20	4.00
Mean	10	20.00		10	20.00	11.60	20.00
SE	4.266	8.532		4.123	8.246	3.265	9.421
LSD	9.983	19.966		10.019	20.038	11.591	20.633

Source: Survey, 2011.

Table 4: Purchasing cost of 50kg of fresh grasshoppers by fryers and retail sellers of processed hoppers

Bags sold/day		Cost/50kg bag		Processing cost/bag		Daily Profit/bag	
	Frq.	%	N	%	Item	N	N	%
1	40.00	4000.00	14.00		Transport	100.00	7000.00	16.00
2	44.00	6500.00	32.00		Ingredient	180.00	3950.00	4.00
3	8.00	6875.00	26.00		Wood/kero	220.00	4950.00	20.00
6	4.00	8500.00	20.00		Frying pan	100.00	5950.00	20.00
7	4.00	11000.00	8.00		Labour	50.00	6950.00	40.00
Mean	3.80	20.00	7375.00	20.00		126.00	5760.00	25.60
SE	0.707	9.033	1157.900	4.243		27.86	588.300	6.735
LSD	2.998	19.964	7375.823	19.985		126.914	5759.457	25.593

Source: Survey, 2011.

Table 5: Reasons for involving in the grasshopper frying business, alternative jobs during scarcity and how to sustain the business

Why in hopper business			Alternative jobs			Sustaining the business		
	Frq.	%		Frq.	%		Frq.	%
Joblessness	18	36.00	Bean cake selling	20	40.00	No bush burning	11	22.00
Profitability	19	38.00	Farm/fish selling	12	24.00	No chemical ctrl.	33	66.00
Interest	2	4.00	Petty trading	4	8.00	Loan to women	2	4.00
Friends	5	10.00	Firewood sales	11	22.00	No assistance	2	4.00
Good business	6	12.00	Public service	3	6.00	No comment	2	4.00
Mean	10	20.00		10	20.00		10	20.00
SE	3.536	7.071		3.082	6.164		6.008	12.017
LSD	10.007	20.011		9.986	19.971		9.974	19.948

Source: Survey, 2011.

Table 6: Five years survey on frying and retail sales of processed grasshoppers in Maiduguri

Time (yrs.)	Purchasing Cost/bag. N	Processing cost/bag. N	Retail cost per kg N	Proceeds per bag N	Daily profit per bag N
2005	3,600.00	213.00	150.00	7,500.00	3,686.70
2006	4,500.00	220.00	200.00	10,000.00	5,280.00
2007	5,300.00	326.00	250.00	12,500.00	6,874.00
2008	6,500.00	431.00	300.00	15,000.00	8,069.00
2009	11,000.00	555.00	500.00	25,000.00	13,345.00
Mean	6,180.00	369.06	280.00	14,000 .00	7,450.94
SE	1,295.900	65.125	60.415	3,020.800	2,926.150
LSD	6181.443	349.070	279.721	13,986.304	7,052.022

Source: Survey on prices of preceding years, using the questionnaires.

Table 7: Mean annual grasshopper outbreak reports for thirty three years (1977-2009)

Year	Mean annual outbreak reports	SE	LSD	P=0.05
1977-1987	5.91b	0.948	5.907	0.0001
1988-1998	14.91a	3.345	14.920	0.0012
1999-2009	4.36b	1.357	4.370	0.0092

Source: Ministry of Agriculture, Borno State Annual reports 1987, 1998 and Sharah 1991.

Fig. 1: Edible fresh grasshoppers-Nomadacris septemfasciata, Kraussaria sp. and Ornithacris sp. in the processing procedures before reaching the consumers. **Photo:** Dr. H. A. Sharah. ***Note:*** Measures varied from 125g, 250g, 750g, and 1kg (Fig. 1). The retail rates surveyed in each year was for 1kg measure only.

Fig. 2: An economically empowered woman and a large scale frying and retail seller at one of the major retail selling points in Maiduguri. Photo: Dr. H. A. Sharah

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