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Full Length Research Paper

Profitability drive against risk: the case of grasshopper collection business in Maiduguri, a semi-arid zone of north-eastern Nigeria

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This research was conducted in Maiduguri (1°5 N and 13° 10NE), on edible Sahelian grasshopper species such as *Nomadacris spp., Kraussaria spp. Ornithacris spp*. collection business. The objective of this study was to find out the reasons behind the involvement of male collectors in such a risky night expedition. Collection were made from the bush in the night using light traps, sweeping, packing and bagging into 50 kg polythene bags, which are then conveyed to the markets by road to Maiduguri for whole-sale. Fifty questionnaires containing fifty questions each were administered. These were distributed to fifty respondents to answer during the twelve months of the research. The twelve months was meant to cover the period of abundance (October to May) and scarcity (June to September) as the rains commences. During the rainy season, cost per bag of 50 kg of fresh grasshoppers ranged between ₦4, 000 to 11,000 mean of ₦7375. Daily collection ranged from 1 to 8 bags per night shift per person, depending on hopper abundance and density at the sites, time spent at the collection point, number of cooperate collectors and the availability of empty bags for packaging. Collection time begins as from 6 pm to 6 am (night collection) to enable them bring their catches to the markets in the morning, where they sell their catches early and move on to another businesses. This was a male (96%) dominated business, with only two (4%) (female pioneer collectors), who later withdrew due to hazards and fear of rape at night. Profit obtained by each collector was N6856.25 per bag per trip. The research has shown that all the respondents have alternative jobs to fall back to during the periods of hopper scarcity and because of the uncertainty in the availability of these insects all the time.

Key words: Harvesters, light trapping, joblessness, profitability, poor remuneration, poverty alleviator, risk, hazards.

INTRODUCTION

Grasshopper, is the common name for those Acridids with mandibulate mouth parts that live or fly, multiply and feed mostly on the grass family Graminaceae and other palatable and juicy domesticated farm crops. Many species of Acidids are not edible, (*Zonocerus variagatus*). The edible ones include the Red Locust (*Nomadacris septemfasciata)*, *Kraussaria* sp, *Katantop* sp, *Gelestor luinus* sp, *Locusta* sp and *Schistocerca* sp. and the most common species found in the Arid and Semi-arid environments. This zone has the highest insect species in Nigeria for example, Maiduguri and its surroundings (Onazi, 1971; Durow 1976).

More than three decades ago grasshopper business was not heard of as an economic venture in Maiduguri. A young woman (Mrs. Parmata Gadzama), and a restaurant owner, introduced this business as a delicacy to those who patronize her cafeteria and beer parlour. Her discovery of large grasshopper (*N. septemfasciata*) population, under shrubs in her farm attracted her attention. She collected a bag full, fried and sold them with ease. This made her and her children continue the collections. She became the first female collector and retailer in Maiduguri. Today many youths including para-military, retired military personel, civil servants, low income earners and people without jobs are now involved in this lucrative venture of grasshopper collection.

Grasshoppers, particularly locusts are known for the

damage they cause due to their behavior and feeding habits on fields crops e.g. *Pennisetum* sp, *Arachis hypogea, Vigna ungiuculata* and *Sorghum bicolor* (Battern, 1969; Brys, 1978; Apeji, 1988; Popov, 1989; Manawadu and Sharah, 1990; Sharah, 1991, 1998, 2007). Hoppers in the arid and semi-arid zones vary in body colour, mimicking the environment they live in (Uvarov, 1966). IAR (1976) and Oyidi (1977, 1983), reported that *Ocnocerus diabolicus,* took reddish-black color mimicking the Forest Reserve of Anara near Kaduna after bush fires, but remain brown in Zaria. This characteristic mimicry of environmental colour according to Paulton (1926), serve as camouflage and protective device against predators and natural enemies. Such environmental colour mimicry, he continued depends on the intensity of exposure of the grasshoppers to such an environment inducing the colour. Although, high body temperatures inhibit the production of melanin and insectorubin (colour substances), the aforementioned hypothesis is a contrary view to such an expectation, that long exposure can cause changes in body colour. The obscurity of the chemistry and history of such processes need more elucidation (Uvarov, 1966).

Grasshoppers and Locusts (Orthoptera: Acrididae), are preyed upon by many predators. One egret in particular can consume from 1666.7 to 5283.6 hoppers per day (Ashall and Peggy, 1962; Sharah, 1998, 2007). Hoppers also play host to various disease pathogens, for example, viral and bacterial pathogens, which are their disease agents and other natural enemies, such as *Mylabris quatuordecimpunctata* Pell. These are adult and egg parasites and predators of grasshoppers (NAS, 1971; Hills, 1983; COPR, 1982; LHB, 1983).

Before this research was conducted, Red locust (N. *septemfasciata), Locusta sp*, grasshoppers (*Kraussaria angulifera*, *Katantop* sp, *Oedaleus sp.),* were very serious crop pests in Borno State (Sharah, 1991). This research was specifically meant to determine the reasons why more people are now in the business despite the eminent dangers involved in the collection venture.

MATERIALS AND METHODS

This study was conducted in Maiduguri (11° 51N N and 13°10N E), the Borno Sate capital in 2010 and 2011, from January to August of each year because, Maiduguri is the centre where the grasshopper whole-sale collectors and retail fryers make their business.

Fifty questionnaires were designed each containing fifty questions and ten of each were administered to the five major whole-sale and retail selling points in the study area. The five points used for the study were; Baga road, Post Office/ GRA, Gamboru/Bama, Damboa/Kano Park and Jos road. The study was conducted for twelve months purposely to include the periods of abundance (October to May) and scarcity (June to September). After data coalition from the questionnaires, analysis of variance (ANOVA) was used to analyzed the data and means separated using least significant difference (LSD) as shown in the tables.

RESULTS

Plate 1 show the activities at the whole-sale markets where buying, loading bags of fresh hoppers into taxi cabs, removal of wings from the hoppers and displaying fresh hoppers were taking place. Table 1 shows the age of whole-sale grasshopper collectors (supposedly men only business). The youngest age among the male collectors was 21 years, with ages 21 to 40 dominating and with only two (4%) initial female collectors between ages 51 to 60. Age was therefore, not a barrier in this profession, except that male youths dominated the hunt as they were stronger, more zealous and active. Significant difference ($P<0.05$) were observed between ages of 21 to 40 and other ages. This indicates that younger male collectors were involved more than all the other age groups, because they were fearless, can endure hardships and more zealous than older men.

Table 2 shows the qualification of those involved in this venture. Those with Senior School Certificate Examination (SSCE), dominated with significant difference ($P<0.05$) from other qualifications, followed by the uneducated. The other qualifications were not significantly different ($P>0.05$) from each other. This shows that these two groups (SSCE and the uneducated) were those above the teen-age group and those who are jobless. Those with Higher National Diploma (HND), Nigeria Certificate in Education (NCE) and Ordinary National Diploma (OND), were in the venture due to poor remuneration, interest and the need to have more cash at hand for the family up-keep. Primary leavers were also few, as this group are either school leavers or drop-outs or awaiting results and wish to stay at home to assist their parents with the domestic work.

Table 3 shows period of hopper abundance, scarcity, time of good business and period spent in the business. Period of good business corresponded to the period of hopper abundance (September to July) and were not significantly different ($P>0.05$) from each other. This suggests that hopper abundance, determines the success of the business and scarcity cause the business to collapse. September to July seem to be the period of abundance and consequently is also the period of good business. August to January were months of scarcity and also correspond to the period of bad business. Those who have spent over eight years experience is over 8%, and shows that the business have long been going on in the state. This also suggests that grasshoppers, which are abundance in the State, are enough to sustain the business for some years to come.

Table 4 shows the reasons for venturing into such risky

Plate 1. Business transactions between fresh grasshopper collectors (whole-sellers) and retail fryers at the whole- markets in Maiduguri.

Table 1. Mean age of respondents of grasshoppers collectors in percent of total questionnaire retrieved.

	Age group				
Gender	**10-21**	**21-30**	**31-40**	**41-50**	**51-60**
Male	0.00	40.00	52.00	4.00	0.00
Female	0.00	0.00	0.00	0.00	4.00
Mean	0.00	20.00	26.00	2.00	2.00
SE	0.000	20.00	26.000	2.000	2.000
LSD	0.000	20.000	26.000	2.000	2.000

business and the alternative jobs to fall to during hopper scarcity. Significant difference ($P<0.05$) is observed with those who are in the business because of being very profitable (54%) than the rest of the reasons. Those respondents who return to the village to farm, do petty trading or stay in office were significantly different

Table 2. Qualification of the grasshopper collectors and whole-sellers respondents in percent.

	Qualification					
Gender	**HND**	**NCE**	**OND**	**SSCE**	**Primary**	**Uneducated**
Male	2.00	10.00	4.00	48.00	10.00	22.00
Female	0.00	0.00	0.00	0.00	0.00	4.00
Mean	1.00	5.00	2.00	24.00	5.00	13.00
SE	1.000	5.000	2.000	24.000	5.000	9.000
LSD	1.000	5.000	2.000	24.000	5.000	12.960

Table 3. Period of grasshopper abundance, scarcity good business and experiences in the business.

Variable	Abundance		Scarcity		Period of good business		Experiences in the business	
	Frequency	**%**	**Frequency**	**%**	**Frequency**	**%**	**Year**	**%**
All year	3.00	6.00	5.00	10.00	1.00	2.00	1.00	2.00
Cool period	2.00	4.00	6.00	12.00	2.00	4.00	2.00	4.00
All months	2.00	4.00	10.00	20.00	2.00	4.00	4.00	4.00
Jan.-July	7.00	14.00	3.00	6.00	6.00	12.00	6.00	8.00
June-Sept.	1.00	2.00	5.00	10.00	6.00	12.00	8.00	12.00
Aug.-Jan.	2.00	4.00	14.00	28.00	2.00	4.00	9.00	24.00
Sept.-July	13.00	26.00	2.00	4.00	14.00	28.00	10.00	12.00
0ct.-May	16.00	32.00	2.00	4.00	12.00	24.00	>10.00	24.00
Not aware	5.00	10.00	5.00	10.00	5.00	10.00	Not aware	10.00
Mean	5.67	11.33	5.78	11.56	5.56	11.11	6.25	11.11
SE	1.795	3.590	1.310	2.620	1.547	3.093	1.780	2.710
LSD	5.673	11.345	5.777	11.554	6.821	11.105	6.568	11.112

Table 4. Reasons why these grasshopper collectors ventured into the business and alternative jobs during scarcity in percentage.

Variable	**Frequency**	**%**	**Variable**	**Frequency**	**%**
Joblessness	5.00	10.00	Farming	10.00	20.00
Good business	5.00	10.00	Petty trading	10.00	20.00
Friend influence	2.00	4.00	Back to village	10.00	20,00
Poor remuneration	5.00	10.00	Stay in office	7.00	14.00
Very profitable	27.00	54.00	Water hawking	2.00	4.00
Quick cash	2.00	4.00	Porridge selling	3.00	6.00
Interest	2.00	4.00	Fish selling	3.00	6.00
No response	2.00	4.00	Bean cake selling	3.00	6.00
Mean	6.25	12.50		6.25	12.50
SE	3.010	6.021		1.411	2.822
LSD	6.262	12.523		8.251	12.502

($P<0.05$) from those who go for other alternatives. This is an indication that the hopper business is more profitable than other jobs, that is why the collectors return to the hopper business during the period of abundance.

Table 5 shows the materials required when a collector wishes to start the grasshopper business. It also shows the methods of collection, and the number of bags collected per a night shift and per month. The minimum amount a collector requires is ₦518.75 and because these materials can last for a long time, collectors make reasonable profits. Burn-fire was the most common method used in the during the collection and varied

Table 5. Materials required by the collectors at the beginning of the collection venture.

Material	Cost of materials (N)		Collection method		Number of bags collected			
					Per night		Per month (20 days)	
			Frequency	%	Frequency	%	Frequency	%
Transport	100.00	Burn-fire	28	56.00	3	26.00	25	8.00
Coverall	1750.00	Raking	7	14.00	4	8.00	40	32.00
Rakes/sticks	350.00	Light trap	10	20.00	3	20.00	90	22.00
Cutlass/axe	800.00	Hand picking	1	2.00	5	8.00	100	16.00
Basket/cans	250.00	Leaf beating	1	2.00	6	8.00	120	4.00
Torch light	550.00	Hand collection	1	2.00	2	24.00	60	8.00
Sacks/bags	250.00	Bagging	1	2.00	7	6.00	140	4.00
Packer/broom	100.00	Packing	1	2.00	8	6.00	160	4.00
Mean	518.750		6.25	12.50	4.81	12.50	91.88	12.50
SE	194.550		3.342	6.684	0.750	3.022	16.901	3.634
LSD	519.449		6.250	12.500	4.748	3.237	91.941	12.246

Table 6. Potential hazards which the grasshopper collectors were exposed to during the collection.

Hazard	Frequency	Percentage
Snake bite	16	32.00
Attack from beasts	4	8.00
Robbery attack	10	20.00
Stings from scorpions	12	24.00
Getting lost	5	10.00
Accidents	2	8.00
Sickness	1	2.00
Mean	7.14	14.29
SE	2.121	4.241
LSD	7.146	14.292

significantly (P<0.05) from other methods employed. Raking and light trapping, though not popular as the burn-fire was however, patronized by only 14% and 20% of the respondents respectively. Number of bags collected per one collector varied significantly (P<0.05) with those collecting from 2 to 3 per night and those collecting from 40 to 100 per month were dominating and were also significantly different (P<0.05) from the rest.

Table 6 shows the list of potential hazards the collectors were exposed to during the night expedition. These hazards according to them were the reasons for the high cost of materials initially needed when preparing for the night venture. Those who revered snake bites, robbery and stings from scorpions were significantly different (P<0.05) and more than the rest of the other hazards. This suggest that in this part of the region, which have sandy-loam soils, flat and open terrains and few shrubs, scorpions and robbery are the real threats. Some of the threats were less prevalent and scarcely mentioned due to the nature of the environment.

Table 7 shows the mean grasshopper out break reports for thirty two years (1977 to 2009) in Borno State. There were intense control campaign operations in the 1970s by the German Aids Team (GTZ) and the State Government, which help to bring down the outbreaks reports for eleven years from 1977-1987 (Sharah 1991). At the expiration of the contract of the International Aid group, and control operations slackened, there were upsurge again in the out-break reports from 1988-1998, due to poor control campaigns, poor and uncoordinated control methods and lack of resources (Sharah, 1998, 2007; MANR, 1987, 1998, 2008). The combined efforts of the grasshopper business ventures and the sporadic and ineffective State and Local Government Authority control teams, assisted in bringing down the annual pest out-break reports to significantly lower level (4.36) as from 1999 to 2009. The annual out-break reports from 1988 to 1998 (14.91) were significantly different (P<0.05) from those of 1977 to 1987 and 1999 to 2009, which were not significantly different (P>0.05) from each.

Table 7. Mean annual grasshopper outbreaks for thirty two years (1977 to 2009) in Borno State.

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

Table. 8 Whole-sale market points for collectors, prices per bag of 50k g weight of grasshoppers and total estimated proceeds per day and month (20days) of collection work.

Market points	Bags brought to mkts/day	Mean price/50k g bag (₦)	Total proceeds/ day (₦)	Profit per bag (₦)	Mean bags sold/month	Total proceeds/ month (₦)
Gubio Rd.	25 (13.02)	6,500.00	162,500.00	5,981.25	500	3,250,000.00
Post office	33 (17.19)	6,875.00	226,875.00	6,356.25	660	4,537,500.00
Kano Rd.	42 (21.88)	8,500.00	357,000.00	7,981.25	840	7,140,000.00
Baga Rd	42 (21.88)	11,000.00	462,000.00	10,481.25	840	9,240,000.00
Bama/others	50 (26.04)	4,000.00	200,000.00	3,481.25	1000	4,000,000.00
Mean	38.40	7,375.00	281,675.00	6,856.25	768	5,633,500.00
SE	4.297	1157.900	55708.000	1160.145	85.930	1114E+.060
LSD	38.415	7375.823	281882.480	6866.321	768.214	5637.144

Percent in bracket.

It is clear from this table that no serious out breaks have been reported since 1999 and that no serious and massive control campaigns were embarked upon since 1999 in Borno State. This has shown the effectiveness of the grasshopper business ventures that is the cultural control, in bringing down the hopper population in the State, at the same time empowering and engaging many people who do not have jobs.

Table 8 shows the five major outlet whole-sale market selling points. Each market is supplied with certain quantity (bags) of fresh grasshoppers by the collectors and whole-sellers to the retail markets around the Maiduguri Metropolis, from where the retail fryers get their supplies, which are not significantly different ($P>0.05$) from each other. Significant difference ($P<0.05$) were however, observed between the first market (Gubio) and the last market (Bama road) supplies. Similar trends are observed in the mean prices per 50kg bag for daily and monthly proceeds, profit per bag and were also significantly different ($P<0.05$) from each other. Mean profit made by each collector is N6856.25 per bag per day, although the profits varied depending on market location. Thus the more bags collected, the more the profit accrued which confirms the reasons why many men ventured into this risky business.

DISCUSSION

Grasshopper, business has come to stay in Maiduguri and its environs, where majority of the edible Sahelian species are found (Popov, 1989). Although, grasshoppers were eaten many centuries ago, (from the Biblical history of John the Baptist), it was not known to be a commercial venture as it is today. The financial gains have influenced particularly the youths who have no jobs. All levels of qualification were involved, except degree holders. This is also a pointer to the fact that it is the lack job; poverty and profitability are the main attracting factors into this risky business. The soaring cost of these hoppers can be attributed to the risks involved during collection, cost of initial preparatory materials, and cost of transport and hopper scarcity.

The hopper business has created many jobs for the youths and easy souvenirs to commuters moving into the hinterlands to visit relatives. Fear of hazards and other dangers were reported by all the respondents interviewed and the unprecedented precautions taken before going out for the venture attest to this, which could have been the reason for almost no reports of these dangers occurring. The unity in the group, strengthened them, removed fears and increased their vigor, because the methods used in the collection demand cooperation in trapping, pilling, bagging, tying, carrying and loading the heavy fresh insects onto tracks which cannot be done by an individual.

The high levels of poverty and the uncertainty of the economic situation in the country have made each family, individuals and the society seek for means to improve on their earnings, which is another driving force into this

business. The profit is attractive for those who could collect from two bags upwards, and because most of the materials needed for collection can last for as long as the collector can take good care of them without replacement, increases the chances of making daily profit much higher, attractive and encouraging.

In conclusion, the supposedly male only business has succeeded in elucidating and unmasking the reason behind the soaring prices of the processed grasshoppers. The high demand of the commodity by the consumers has continued to keep the business thriving, not withstanding the eminent dangers and hazards involved. High profit, job creation and poverty alleviation, in addition to being protein supplement, which meat and fish are supposed to provide, have kept the business unending as long the hoppers are available. Public servants, confessed to the fact that the business is a good poverty alleviator, quick cash problem solver and quick cash earner. It help fill the gap created by poor remuneration in the government service and re-iterated their intentions to continue in the business as long as Government remuneration stays low. More than 30 years ago grasshoppers and locusts were the major pest problem of the North East (Durow, 1976). This study however, has revealed that the recent grasshopper business activities have brought down the hopper pest problem in Borno State. Quelea birds (*Quelea quelea quelea),* have become the major crop pest which is being reported every rainy season instead of locust and grasshoppers. This is a clear indication and revelation, that the grasshopper business is another effective cultural control strategy, good economic and profitable commercial venture and to a greater extent an advantage to farmers and the agricultural sector of Borno State.

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