



**Assessment of Nile crocodile utilization (*Crocodylus niloticus*) in Dunukofia Local Government Area, Anambra State, Nigeria**

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**ABSTRACT**

Assessment of Nile Crocodile utilization was carried out in six communities of Dunukofia local government area in Anambra state. A sampling intensity of 0.5% of the total population of each community was used to get a sample size of 323 respondents. Data were collected through questionnaire and complemented with personal observation and in-depth interview. The data collected were analyzed using descriptive statistics such as frequency, percentage and mean and presented as tables and charts. Results revealed that 85.14% of the respondents do not utilize crocodile meat as food while 14.86% of the respondents utilize crocodile meat as food. The highest number of respondents (66.67%) eat crocodile meat because of its taste while the least number (2.08%) because it is cheap. Results on non-consumptive utilization of Nile crocodile revealed that highest number of respondents (43.65%) utilize crocodile for traditional medicine while the least number (6.19%) reported that crocodile is utilized for tourism. The result also revealed that the sources of crocodile are the river (68.42%), markets (28.17%), and hunters (3.41%). A high percentage of the respondents (88.50%) are not interested in starting crocodile farming while 11.50% of the respondents are interested in starting crocodile farming. Majority of the respondents (65.73%) are not interested in starting crocodile farming because crocodiles are dangerous, 21.68% do not have the skills, 7.34% said crocodile farming is not popular and the least (5.24%) reported that it is high capital. Crocodile body parts utilized as revealed by the respondents were the whole body (53.56%), the head (30.03%), the limbs (10.84%), and the tail (5.57%). It is recommended that the locals be encouraged to engage in crocodile farming to help conserve the remaining crocodile population in the wild as well as create employment opportunities.

**Keywords:** Traditional medicine; crocodile farming; crocodile meat; limbs.

**INTRODUCTION**

The Nile crocodile (*Crocodylus niloticus*) has always played a part in human culture. While being worshipped as holy creatures in some regions, crocodiles were hunted for their meat, skin elsewhere. Apart from food, products were also used for medical, religious or

decorative purposes (Fuchs, 2006). Historically, Nile Crocodiles were heavily hunted for their valuable hides and their numbers were severely reduced almost worldwide (Gans and Pooley, 1976; Fergusson, 2010). In Africa, the Nile Crocodile is under threat from freshwater habitat loss, conflict with humans (direct and indirect), and uncontrolled hunting for the wildlife trade, especially leather goods (Fergusson, 2010). Crocodiles are useful in diverse ways, varying from individuals to different cultural beliefs. Practically every part of crocodile is utilized. Commonly known, the skin of crocodile is used for making boots, shoes, wallets, belts, motorcycle seats, phone cases and chairs for interior decoration (Stickney, 2000). Oil obtained from saltwater crocodile is regarded as wonder oil. It can be used for pimples and eczema. It helps relieve burns, sunburn, cold sores, insect bites and stings. Crocodile oil can also enhance wound healing and prevent scar formation (Croc city, 2012). Crocodile bone contains a lot of calcium and phosphorus, can be used for the prevention and treatment of osteoporosis in the elderly, infants for calcium deficiency, and efficacy for improving rheumatism (Caldwell, 2010). Crocodiles have aesthetic value and people are fascinated with these huge and powerful predators. They form part of the traditional, wildlife of Africa which people travel around the world to see, photograph or hunt. Newsome *et al.*, (2005) came to the conclusion that the crocodile has become an iconic image of visitor experience. Crocodiles are economically important, with assets on a single well managed crocodile farm. Studies in Botswana have shown that the financial return on investment in crocodile farming is in fact higher than the mean economic rates of return (Barnes, 2001).

The extensive and unregulated hunting of crocodilians had devastated the wild populations with most populations being greatly depleted (Martelli, 2019). Nile crocodile which was once found in the Nigerian coastal waters right up to lake chad is fast disappearing due to loss of habitat and hunting (Nathaniel and Imeh, 2010). Britton (2008) expresses the opinion that people who live around crocodilians need to see advantages in conserving these reptiles. He suggested that it would be difficult for these people to support conservation efforts if crocodilians have no intrinsic, aesthetic, environmental, economic, social or cultural value to them. Harcourt (2009) has implicated the high international demand for crocodile skin for the endangering status of Nile Crocodile in Nigeria and therefore recommend thorough investigation and evaluation of the species and also the adoption of farming Nile crocodile species as a sustainable utilization program in Nigeria. The study is to provide information on the availability of crocodile which offers opportunity for their utilization, for the future and for the present generation. Hence, the need to remedy the factors affecting their availability.

## **MATERIALS AND METHODS**

### **Study Area**

The study was carried out in Dunukofia local government area in Anambra state. Anambra state is located in the southeastern part of Nigeria. It is situated between latitude  $5^{\circ} 32'$  and  $6^{\circ} 45'$  N and longitude  $6^{\circ} 43'$  and  $7^{\circ} 22'$  E respectively. The study area lies within the tropical region. The area is influenced by two climatic seasons, the dry and wet seasons. The wet season starts around May and ends in November, with a break in August, and an average annual rainfall of about 1800mm. The dry season lasts for about 4-5 months spanning the period from December to April. The prevailing winds are the southwesterlies which bring rains during the wet months and the northeasterlies or northwesterlies which occur during the

dry months and are known for the hazy harmattan conditions. The wind speeds are low, less than 2 m/s throughout the year. The relative humidity is high all the year round; 80% at night and between 65%-75% during the day. The ambient air temperature varies between 25<sup>0</sup>C and 32<sup>0</sup>C. The mean daily temperature is 28<sup>0</sup>C, while the average annual temperature is 27<sup>0</sup>C. However, the temperature can go up to 32<sup>0</sup>C during the hot periods of the year.

The soil type is deep red, porous and unconsolidated. The land surface is covered with vegetation. The area used to be the rainforest part of Nigeria that has been deforested due to civilization and urbanization. There are various tree species of commercial value found within the area. Farming (subsistence agriculture), trading and small-scale industries are the main source of economy of the study area.

### Sampling Technique

A preliminary visit was carried out at Dunukofia LGA office of the National Population Commission (NPC) to obtain an estimate of the population of the six communities in which assessment was carried out. The communities which include, Ukpò, Ifitedunu, Umunachi, Umudioka, Ukwulu and Nawgwu. A sampling intensity of 0.5% (proportionate sampling) of the total population of each community was used to get a sample size of 323 respondents (Table 1).

Table 1: Population Size of the communities in Dunukofia Local Government Area

Communities	Total population	Sampled population (0.5%)
Ukwulu	9978	50
Nawgwu.	10186	51
Ukpò	11394	57
Ifitedunu	11203	56
Umudioka	11175	56
Umunachi	10576	53
Total	64512	323

Source: National Population Commission, 2006

### Data Collection

Data were collected mainly through a semi structured questionnaire and complemented with personal observation and in-depth interview to elicit information on Nile crocodile utilization and conservation. A sampling intensity of 0.5% (proportionate sampling) of the total population of each community was used to get a sample population in each of the community (Table 1). A total of 323 copies of the questionnaire were administered and retrieved from the sampled respondents.

### Data Analysis

The data collected were analyzed using descriptive statistics such as frequency, percentage and mean and the results were presented as tables and charts.

## RESULTS

### Demographic Characteristics of Respondents

The results of the Demographic characteristics of respondents revealed that 50.77% of the respondents were females while 49.23% were males. The highest number of respondents (33.44%) fall within 58-67 years while the least number (5.26%) are between 68-77 years. The mean age of the respondents was 48.60 years.

Table 2: Demographic characteristics of respondents

Characteristics	Frequency	Percentage (%)	Mean
<b>Sex</b>			
Male	159	49.23	
Female	164	50.77	
Total	323	100	
<b>Age (Years)</b>			
18-27	33	10.22	
28-37	52	16.10	
38-47	65	20.12	
48-57	48	14.86	48.60
58-67	108	33.44	
68-77	17	5.26	
Total	323	100	
<b>Marital Status</b>			
Single	136	42.11	
Married	187	57.89	
Total	323	100	
<b>Educational Qualification</b>			
Informal education	11	3.41	
Primary education	56	17.34	
Secondary education	179	55.42	
Tertiary education	77	23.84	
Total	323	100	
<b>Occupation</b>			
Student	70	21.67	
Civil servant	34	10.53	
Trader	85	26.32	
Unemployed	21	6.50	
Business	88	27.24	
Farmer	25	7.74	
Total	323	100	
<b>Household Size</b>			
1-3	67	20.73	
4-6	133	41.18	5.61
7-9	113	34.98	
10-12	10	3.10	
Total	323	100	

The majority of the respondents (57.89%) were married with secondary education (55.42%) and engage in Business (27.24%) with a household size of 4-6 (41.18%). The mean household size was 5.61. This is shown in Table 2.

### Utilization of Crocodile Meat as Food

The results of the Utilization of Crocodile meat as food (table 3) revealed that 85.14% of the respondents do not utilize crocodile meat as food while 14.86% of the respondents utilize crocodile meat as food.

Table 3: Utilization of crocodile meat as food

Variable	Frequency	Percentage
Yes	48	14.86
No	275	85.14
Total	323	100

### Reasons for Eating Crocodile Meat

The results of the reasons for eating Crocodile meat (table 4) revealed that the highest number of respondents (66.67%) eat crocodile meat because of its taste, 27.08% because of its nutritive value, 4.17% because of its medicinal benefits, and 2.08% because of affordability.

Table 4: Reasons for eating crocodile meat

Variable	Frequency	Percentage
Its taste	32	66.67
Affordability	1	2.08
For medicinal benefits	2	4.17
Nutritive value	13	27.08
Total	48	100

### Non-Consumptive Utilization of Nile Crocodile by the Respondents

Results on non-consumptive utilization of Nile crocodile (Table 5) revealed that the highest number of respondents (43.65%) utilize crocodile for traditional medicine while the least number (6.19%) reported that crocodile is utilized for tourism.

Table 5: Non consumptive utilization of Nile crocodile by the study respondents

Variable	Frequency	Percentage
Traditional medicine	141	43.65
During festival	55	17.03
Leather making	64	19.82
For making Jewelry	43	13.31
Tourism	20	6.19
Total	323	100

### Sources of Crocodile in the Study Area

The result of the sources of crocodile in the study area (Table 6) revealed that 68.42% of the respondents obtained their crocodile from the community river, 28.17% from the market, and 3.41% from hunters.

Table 6: Sources of crocodile in the study area

Variable	Frequency	Percentage
River	221	68.42
Markets	91	28.17
Hunters	11	3.41
Total	323	100

### Perception of the Respondents on Population and Traditional Status of Crocodile

The results of the Perception of the respondents on Population and Traditional Status of crocodile (Table 7) revealed that majority of the respondents (75.23%) reported that crocodile population is decreasing, 17.96% reported that it is static while 6.81% said it is increasing. A high proportion of the respondents (72.14%) do not forbid crocodile utilization while 27.86% forbid crocodile utilization.

Table 7: Perception of the respondents on population and traditional status of crocodile

Variable	Frequency	Percentage
Increasing	22	6.81
Decreasing	243	75.23
Static	58	17.96
Total	323	100
Do you forbid Utilization of crocodile?		
Yes	90	27.86
No	233	72.14
Total	323	100

### Availability of Crocodile

The result of the availability of crocodile (Figure 1) revealed that 70.28% of the respondents reported that crocodile was not readily available, 22.91% reported that it was available, and 6.81% said it was readily available.

### Awareness of Crocodile Farming

The result of the awareness of crocodile farming (Figure 2) revealed that 69% of the respondents are not aware of crocodile farming while 31% of the respondents are aware of crocodile farming.

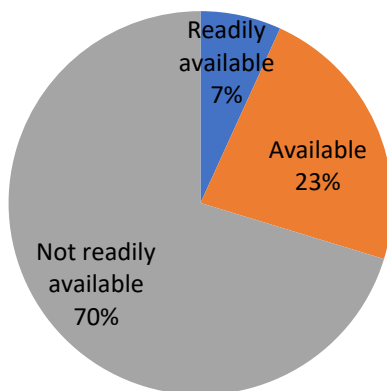


Figure 1: Availability of crocodile

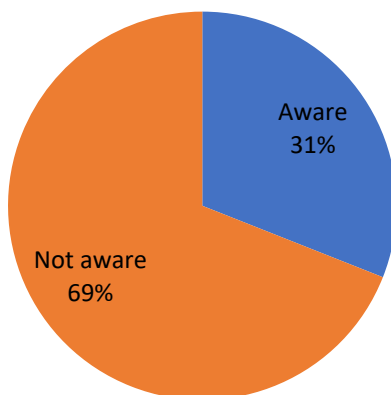


Figure 2: Awareness of crocodile farming

### **Respondents' Interest in Starting Crocodile Farming**

The result of the respondents' interest in starting crocodile farming (Table 8) revealed that 88.50% of the respondents are not interested in starting crocodile farming while 11.50% of the respondents are interested in starting crocodile farming. Majority of the respondents (65.73%) are not interested in starting crocodile farming because crocodiles are dangerous, 21.68% do not have the skills, 7.34% said crocodile farming is not popular and the least (5.24%) reported that it is high capital.

Table 8: Respondents' Interest in starting crocodile farming

Variable	Frequency	Percentage
Yes	37	11.50
No	286	88.50
Total	323	100
Why are you not interested in starting crocodile farming?		
Are Dangerous	188	65.73
High capital	15	5.24
No skills	62	21.68
Not popular	21	7.34
Total	286	100

### Crocodile Body Parts Utilized

The results of the Crocodile body parts utilized (figure 3) revealed that 53.56% of the respondents utilized the whole body, 30.03% utilized the head, 10.84% utilized the limbs, and 5.57% utilized the tail.

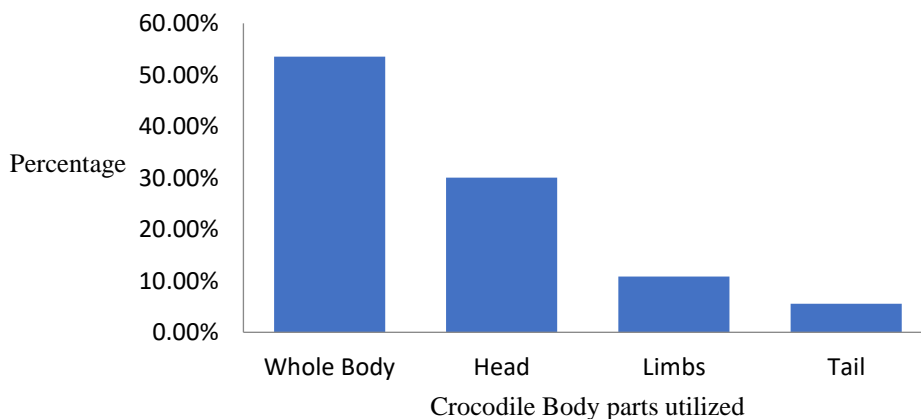


Figure 3: Crocodile body parts utilized

## DISCUSSION

The results revealed that majority of the respondents do not consume crocodile as food while few of the respondents consume crocodile as food. This is an indication that consumption of crocodile as food is not a delicacy in the study area and not popular. The majority of the respondents who consume crocodile as food consume it because of its taste. Apart from consumptive utilization, the respondents also utilize crocodile for non consumptive uses such as for traditional medicine while others utilize it for leather making, festival, for making jewellery, and tourism. This finding is in agreement with Fuchs (2006) that apart from food, crocodile products were also used for medical, religious or decorative purposes. The study revealed that crocodile population is decreasing as reported by the majority of the respondents. This decrease could be as a result of anthropogenic factors such



as hunting especially for the non-consumptive utilization of crocodiles for leather making. Caldwell (2015) reported that the current international trade of crocodile skin involves over 1.5 million crocodile skins per year that are legally traded by about 30 countries. The decrease in the population of crocodile in the study area could be the reason why crocodile was not readily available as reported by a high proportion of the respondents. This confirms the findings of Ijeomah and Efenakpo (2011). The results also showed that the majority of the respondents were not interested in starting crocodile farming. This finding is similar with the work of Ijeomah and Efenakpo (2011) who reported that majority of the respondents were not ready to engage in crocodile farming. A high proportion of the respondents were not interested in starting crocodile farming because they see crocodile as dangerous animal and a threat to humans. This finding is similar with King and Burke (1997) who reported that crocodiles are the largest predators in their habitats and can threaten humans and their livestock. With increased awareness and interest in crocodile farming, more people will go into crocodile farming which will help to increase crocodile population and conserve the crocodiles in the wild. People can travel from different parts of the world to see these crocodiles and serve as places of attraction for tourists. This is similar with the work of Newsome *et al.*, (2005) that crocodiles have become an iconic image of the visitors experience. Majority of the respondents revealed that the major source of crocodile is around community river. This finding agrees with Rice *et al.* (2005) that responses of crocodilians are directly related to suitability of environmental conditions and hydrologic change. The study also revealed that majority of the respondents utilized the whole body of crocodile. This is an indication that all parts of the body of crocodile are useful and confirms the findings of Tosun (2013) that the body parts of crocodile have been used for medicinal purposes in China, the teeth and bones used for making jewellery, and crocodiles often are kept in an enclosed area for tourist attraction purpose.

## CONCLUSION

It can be concluded from the study that majority of the respondents do not utilize crocodile as food but utilize it for non consumptive uses such as traditional medicine, leather making, festivals, jewellery making, and for tourism. The utilization of crocodile for consumptive and non-consumptive uses has reduced the population of crocodile which poses a serious problem to the conservation of crocodile in the study area. The majority of the respondents are not aware of crocodile farming and are not interested in starting crocodile farm. Majority of the respondents utilize the whole body of crocodile while others utilize the head, limbs, and tail.

Based on the findings from the study, it is recommended that crocodile farming should be practiced by individuals since it is possible to domesticate them. This will help to conserve crocodile population in the wild as well as create employment opportunities for individuals; Government and other relevant agencies should organize workshop to train individuals that are interested in going into crocodile farming.

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