**PERCEPTION ON NUTRITIONAL VALUE OF CRICKETS BY AKWA IBOM STATE UNIVERSITY COMMUNITY, OBIO AKPA CAMPUS**

**BY**

**NYONG, CHARITY LINUS**

**AK16/AGR/AEC/022**

**SUBMITTED TO**

**THE DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION**

**FACULTY OF AGRICULTURE**

**AKWA IBOM STATE UNIVERSITY**

**JUNE, 2022.**

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**IN PARTIAL FUFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELLOR OF AGRICULTURE (B. AGRIC) DEGREE IN AGRICULTURAL ECONOMICS AND EXTENSION**

**JUNE, 2022.**

**DEDICATION**

This research work is dedicated to God Almighty, my mother Mrs. Glory Linus Nyong and my loving husband Mr. Imoh, Akpan Inyang.

**ACKNOWLEGEMENTS**

My heartfelt gratitude goes to God Almighty for his mercy and grace that has brought me this far and kept me throughout my academic pursuit.

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To my backbone, my darling husband Mr. Imoh Akpan for staying true all this years.

My sincere gratitude goes to my friends who have in one way or the other supported and stood by me all through these years.

I pray that God Almighty will bless all of you in Jesus name, Amen.

Nyong, Charity Linus.

**CERTIFICATION**

I certify that this work was carried out by Nyong, Charity Linus with Reg. Number AK16/AGR/AEC/022 in the Department of Agricultural Economics and Extension, Faculty of Agriculture, Akwa Ibom State University.

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***ABSTRACT***

*The study analysed the perception on nutritional value by members of crickets by Akwa Ibom State University community, Obio Akpa Campus. The objectives of this study were to analyse the socio economic characteristics of the members of the University community, examine the awareness of the nutritional value of crickets, examine the perception of cricket consumption and determine how cricket consumption acceptability can be facilitated. Primary data used for the study were derived from a two-stage sampling survey of 160 randomly selected members of Akwa Ibom State University community. The data were analysed using descriptive statistics, four - point likert scale. The results for the socio-economic characteristics revealed that majority (51.2%) of respondent were male while 48.8% were of an average age of 34.56 years. Half of the respondents were single having an average monthly income of ₦92,006. Furthermore, the result showed that m*ajority *(70.6%) of the respondents were not aware of the nutritional composition of cricket while (60.6%) would love to taste cricket if given opportunity. Nutritional benefits (49.4%) followed by safety/edibility (6.3%) and affordability were the reasons for subscription to the advocacy on cricket consumption. Unhygienic (27.5%) followed by unpalatability (10.6%), no economic value (5.0%) and inexistence (0.6%) were the reasons for not subscribing to the advocacy on cricket consumption. Based on the findings, there is need to create awareness on the nutritional value of crickets and modify mode of preparations to make crickets attractive and hygienic for consumption.*

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**CHAPTER ONE**

**1.1 Background of the Study**

Developing countries generally are challenged by Protein-Energy malnutrition (lack of protein and energy food) and this according to Anugwom (2013) is because of high cost and over dependence on conventional animal protein sources which are often in limited supply. Protein-energy malnutrition is affecting over 100 million people in Africa and an additional 200 million are at risk (Maletnlema, 1992). It is a crucial public health problem for many developing countries (Dulger *et al.,* 2002). Protein is the body’s main source of nitrogen which accounts for about 16% weight of protein. The dietary protein reference intake (RNI) is 0.8grams of protein per kilogramme of body weight (0.8g/kg/day) for adult aged 19 and above and the protein reference nutrient intake (RNI) is 0.75g/kg/day. Pregnant women are recommended to add an additional 6g/day while lactating women are to add 11g/day. Daily RNI of 56 grams and 46 grams are recommended per day for the average sedentary man and woman respectively while for a typical African diet, RNI is suggested to be closer to1g/kg/day (FAO, 2010). This has led to bi-fortification of protein in most stable carbohydrates-specific food products of the region.

The situation in Nigeria is not different from other African countries particularly with the current economic recession experienced. Generally, poor economic situation in Nigeria has aggravated the poor nutrition status of the citizenry and malnutrition is said to be a drain on the nation’s human resources, hindrance to development, with enormous costs in human, social and economic terms (Nation Policy on Food and Nutrition, 2001). Literatures are replete with the consequences of malnutrition and the severity of it has warranted the 1992 Rome International Conference on Nutrition (ICN), resolution that nutritional well-being of all people is a pre-condition for development and a key objective of progress in human development.

Nigeria in an attempt to adopt the ICN resolution formulated and passed the National Policy on Food and Nutrition in 2001. The passage of the National policy on food and Nutrition provides a new opportunity to examine the intrinsic relationship between agriculture and nutrition. Increased agricultural productivity and maintaining good nutrition are acutely interrelated when it comes to addressing health issues in Nigeria. Although individual food choices can be influenced by a number of different drivers (poverty, political will etc.), an efficient and effectively implemented agricultural policy is certainly one of the most important of those drivers. It is the relative long term decline in agricultural productivity sequel to the neglect of the agricultural sector and the inverse effect of oil exploration in the country that has exacted on the state of agricultural production, food availability and nutritional status of the population. Of all these consequences of declining agricultural productivity, food insecurity is the most serious problem. This is because agricultural productivity influences food availability, stability of supply, access to food and quantity of food consumed. This in turn influences the nutritional status and food security of the population and the three most important consequences of food insecurity according to National Planning Commission (2001) are protein-energy (PEM), micro nutrients malnutrition and diet related non-communicable diseases. To check these seemingly dietary challenges, the psychic and cultural perceptions of the population need to be worked on. This is because the way we eat includes our ideas of what we think is healthy, sustainable, acceptable food. Succinctly, most food consumption is culturally based on prejudice irrespective of the nutritional content thereof. This is the case of edible insects in the world and indeed Nigeria. Anugwom (2013) opined that Entomophagy is a common practice in the tropics only varying with location, insect(s) consumed, and ethnic group. He posits that insects as a source of protein is better than many conventional sources of protein and juxtaposes the protein value of some edible insects with conventional animal protein sources like beef, pork, fish, eggs, and milk.

Today, the consumption of insect as foods, termed entomphagy - a technical term for eating insects, is not widely practised. However, it is estimated worldwide, that insect such as cricket are parts of the traditional diet of at least 2 billion people (Van Huis *et al.* 2013). Edible insect species mainly belong to the traditional and informal food systems (Roos, 2012). They constitute about 75% of all known animal species (Yoloye, 1998). Edible insects have played an important role in the history of human nutrition (Lyon, 1991). Archaeological evidences as well as analysis done on fossilized feaces reveals beyond doubt that the human race evolved as an ant-eating species (Ramos-Elorduy, 2009). Insects can be used as substitute ingredients in meat products; the products obtained have higher mineral content than traditional ones, and some texture properties (like elasticity) can be improved. In extruded products, insects are an alternative source of proteins to feed livestock, showing desirable characteristics. Isolates of proteins of insects have demonstrated bioactive activity, and these can be used to improve food formulations. Bioactive compounds, as antioxidant agents, insulin regulators, and anti-inflammatory peptides, are high-value products that can be obtained from insects. Fatty acids that play a significant role in human health and lipids from insects have showed positive impacts on coronary disease, inflammation, and cancer. Insects are very adept in converting what they have eaten into tissues that can be consumed by others about twice as chicken and pigs, and more than five times as efficient as beef. The food conversion efficiency of insects may be 20 times that of cattle (Durst & Shono, 2010). They constitute quality food for humans and emit low levels of green house gasses (van Huis, 2013) and one of such insect is the cricket.

Edible crickets are among the praised insects that are gaining recognition as human food and livestock feed with a potential for contribution to food security and malnutrition reduction. Globally, the sustainable use of crickets as food or feed is undermined by lack of information on the number of the edible crickets, the country where they are consumed, and the developmental stages consumed. Furthermore, lack of data on their nutritional content and risks to potential consumers limits their consumption or inclusion into food sources.

Nutritionally, crickets are reported to be rich in proteins, ranging from 55 to 73%, and lipids, which range from 4.30 to 33.44% of dry matter. The reported amount of polyunsaturated fatty acids (PUFA) is 58% of the total fatty acids. Edible crickets contain an appreciable amount of macro- and micro-mineral elements such as calcium, potassium, magnesium, phosphorus, sodium, iron, zinc, manganese, and copper. Also, crickets are rich in vitamins such as B group vitamins and vitamins A, C, D, E, and K, and they display high proximate content that can replace plant and livestock products.

Crickets play valuable roles in contributing to the economies of many countries and livelihoods, and they have medicinal and social benefits. Comparatively, its production uses a very small amount of space, animal feed, and energy, compared to the ruminant meat production. Equally, the supply of insect by cricket is very promising (Rumpold and Scluter, 2013).

With the environmental and nutritional benefits of crickets already established, an important next step for those hoping to promote entomophagy in diets is to consider the ways to increase the social acceptability of widespread insect and cricket flour consumption. They have a short life span, produce numerous offspring are amenable to human consumption and can flourish under a wide range of environmental conditions.

The potential nutritional value of insects in general and cricket in particular in human’s diet has long been recognized. In addition to providing a rich source of high quality proteins for human consumption, crickets and other related insects such as grasshoppers and locusts offer several other advantages as human food sources. No wonder that the Bible specified that John the Baptist was an Entomophagist- eating locust and wild honey. The utilization of insects and insect products in modern diets because of its nutritional contents is trendy. Several companies in the US and overseas are currently processing cricket to produce insect protein powders for human consumption to be used in the manufacturing of different food items including; energy bars, corn chips, cookies, etc. (Dossey *et al,* 2016). Even with these benefits of insects as food, the insect food market is said to grow relatively slow because of current cultural misconceptions about eating insects and to the relatively high cost of farm insects (Dossey *et al*, 2016, Dunkel and Payne 2016).

**1.2 Problem Statement**

Despite the importance of cricket as food or entomophagy, biodiversity and conservation efforts have focused mainly on other groups of animals, ignoring the vast world of insects. This delicacy is almost going extinct and the once day and night hunted prey by young people is a forgotten issue. In recent times, eating of insect is considered disgusting, primitive and weird. The eating of insects or entomophagy is not a common activity especially for urban dwellers mainly because of culture, religion and upbringing even when edible crickets are often considered a nutritious, protein-rich, environmentally sustainable alternative to traditional livestock with growing popularity among it consumers. This has great imprint on most urban children at very tender age and with prejudice will abhor these nutritional insects. While the nutrient composition of several insects and potential health impacts are characterized, the rural populace and a vast majority of the people are not aware of their near extinction. This has gendered more questions even as the growing population in the world needs to be considered in terms of protein-malnutrition with an assumed world population of nine billion by 2050.

The situation in a developing country like Nigeria with farmers-herders killing, cattle rustling, Nomadic Fulani neo-colonialism all in the name of provision of protein (beef) from cattles is appalling. Whereas, field crickets provide more than the minimum essential amino acids profile suggested by the World Health Organization Wang *et al.* (2004) and Finke *et al.* (1989) reported that the protein of the cricket is superior to soy protein for amino acid intake. Even when the literature is replete with the nutritional importance of insect, its habitat are destroyed both naturally and through anthropogenic causes. The destruction of ecosystems such as rainforests has resulted in countless habitats being destroyed. These biodiversity hotspots are homes to millions of habitat and they cease to exist once their habitats is being destroyed. This destruction has a follow-on effect, as species which coexist or depend upon the existence of other species also become extinct, eventually resulting in the collapse of an entire ecosystem. These time-delayed extinctions are referred to as the extinction debt, which is the result of destroying and fragmenting habitats. As a result of anthropogenic modification of the environment, the extinction rate has climbed to the point where the Earth is now within a sixth mass extinction event, as commonly agreed by biologists. Apart from the nutritional importance of the edible field cricket, it is considered as a stroke of good luck in various countries of Asia, especially China, and therefore kept as pets. It has 58% crude protein (CP) and 10% fat (Wang et al. 2004) contains 120 kcal/100g which is only comparable to the 150 kcal/100g of skinless chicken breast (van Huis *et al.,* 2013). This specie is not an exception in the extinction spree. However, the farmers are not equally budged by their near extinction perhaps because of ignorance of the nutritional value of the species or consumption prejudice.

Studies by Fasoranti and Ajiboye (1993), Adeduntan and Bada (2004), Banjo, Lawal, and Songonuga (2006), confirms the existence of entomophagy in Nigeria and near extinction of some species. Ekop, Udoh, and Akpan, (2010) equally confirms the existence of entomophagy in Akwa Ibom State and near extinction of some of these species. This revelation opens up some concerns which are yet to be addressed in the entomophagy and biodiversity conservation literature of Akwa Ibom State, and indeed Nigeria. The first is the awareness of the nutritional values of crickets in the study area, the second is the awareness of the near extinction of crickets in the study area and the third is the perceived causes of the near extinction of cricket in the study area.

This research will be based on.

The relevant specific questions will be:

1. What are the socio economic characteristics of members of University community?

2. Are the members of University community aware of the nutritional values of crickets?

3. How do they perceive the consumption of crickets in the study area?

4. What are the possible preferred solutions to facilitate the consumption of crickets in the study area?

**1.3 Objectives of the Study**

The general objective of the study is to critically analyse perceptions on the nutritional values of crickets by the members of Akwa Ibom State University community. Specifically, the study sought to:

1. determine the socio economic characteristics of the members of the University community.

2. ascertain respondents’ level of awareness of the nutritional value of crickets.

3. examine the perception of cricket consumption by the respondents.

4. identify the constraints to cricket consumption acceptability by the respondents.

**1.4 Significance of the Study**

If the quest for protein malnutrition in the country is not enough justification for the study, then the current farmers-herders clashes, cattle rustling and nomadic Fulani killings in the name of transporting cattle for increase protein is a justification. This is against the 3% world population growth rate against the farm animal growth rate of 2%. This study will go a long way to enlighten people on the nutritional value of crickets and also the need for proper environmental or land use management. Furthermore, it will educate the business acumen on the essence of venturing into cricket farming business or at least habitat conservation as a way of bridging the protein-energy malnutrition gap. For the scholars, research fellows and students, it will provide ready reference material that will be useful as a basis for further research studies thus pushing the frontier of existing knowledge and literature forward.

**1.5 Conceptual Definition of Terms**

1. Entomophagy: This is the consumption of insects as source of nutrition by humans. It can also be describe as a feeding behaviour that includes insect.

2. Cricket: Crickets are chirping insects that resembles a grasshopper, have small wings and antenna.

3. Nutritional Value: This refers to the contents of food and the impact of constituents on body. It relates to carbohydrates, fats, proteins, minerals, additives, enzymes, vitamins, sugar intake, cholesterol, fat and salt intake.

4. Extinction: This is the dying out or extermination of a specie. Extinction can be a natural occurrence caused by an unpredictable catastrophe, chronic environmental stress, or ecological interactions such as competition, disease, or predation.

5. Food security: According to the United Nations Committee on world Food Security, it means that all the people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food that meets their food preferences and dietary needs for an active and healthy life.

**CHAPTER TWO**

**LITERATURE REVIEW**

**2.1 Concept of Natural Habitat**

**2.1.1. Introduction and Overview of Natural Habitat**

A habitat is an area of the environment where an organism lives, feeds and breeds. Some organisms are site specific in their habitats, for example fish need water. Other organisms use different habitats for feeding, breeding etc. i.e. some birds will nest in trees but feed on the ground. Predatory organisms depend upon other species for their existence and therefore their habitat would be the same as that of their prey, thus creating a 'knock on' effect through the whole ecosystem.

**2.1.2 Conservation of Natural Habitat**

Habitat conservation is a management practice that seeks to conserve, protect and restore habitats and prevent species extinction, fragmentation or reduction in range. It is a priority of many groups that cannot be easily characterized in terms of any one ideology. Habitat loss invariably means the species near extinction and it could be caused by either natural or human activities.

**Natural Causes:** Habitat loss and destruction can occur both naturally and through anthropogenic causes. Events leading to insects extinction and natural habitat loss include climate change, catastrophic events such as volcanic explosions and through the interactions of invasive and non-invasive species. Natural climate change, events have previously been the cause of many widespread and large scale losses in habitat. For example, some of the mass extinction events generally referred to as the "Big Five" have coincided with large scale extinctions such as the Earth entering an ice age, or alternate warming events (Wilf, 2003). Other events in the big five also have their roots in natural causes, such as volcanic explosions and meteor collisions. Hut (1987) and Keller (2004), the impact has resulted in the Earth either receiving less sunlight or growing colder, causing certain fauna and flora to flourish whilst others perished. The big five mass extinction events have also been linked to sea level changes, indicating that large scale marine species loss was strongly influenced by loss in marine habitats, particularly shelf habitats (Hallam, 1999). Equally, methane-driven oceanic eruptions have also been shown to have caused smaller mass extinction events (Ryskin, 2003).

**Human Causes:** Humans have been the cause of many species’ extinction. Due to humans’ changing and modifying their environment, the habitat of other species often become altered or destroyed as a result of human actions. Even before the modern industrial era, humans were having widespread, and major effects on the environment. In the recent past, humans have been responsible for causing more extinctions within a given period of time than ever before. Deforestation, pollution, anthropogenic climate change and human settlements have all been driving forces in altering or destroying habitats. The destruction of ecosystems such as rainforests has resulted in countless habitats being destroyed. These biodiversity hotspots are home to millions of habitat specialists, which do not exist beyond a tiny area. Once their habitat is destroyed, they cease to exist. This destruction has a follow-on effect, as species which coexist or depend upon the existence of other species also become extinct, eventually resulting in the collapse of an entire ecosystem.

**2.1.3 Approaches towards Promoting Insect Conservation**

It is essential that we maintain the mutual value of well-being beyond today's perspectives, for long-term promotion of mutual well-being for future generations of both people and insects. This approach includes valuing insects for their own worth (i.e. having intrinsic value), but if we wish to galvanize action through communicating the hard value of conserving insects to civil society, then we must also engage instrumental value (Justus *et al.*, 2009). Instrumental value is the language of policy makers and environmentally responsible large corporate landholders who offer great opportunities for insect conservation across novel landscapes. To implement insect conservation based on value, we first require insect conservation psychology, which aims to understand and promote human care for insects, leading to insects serving us well, while also promoting human and insect well-being (Simaika and Samways, 2018).

Valuing nature and realizing the importance of interactions translates into a focus on ecosystems and landscapes for insect conservation success (Samways, 2007; Ellis *et al.*, 2012). Notwithstanding the great value of insect icons and flagship species for thematic insect conservation, most insects are neither iconic nor even particularly visible (Morris, 1987; Leandro *et al*., 2017). This makes the task of insect conservation difficult to justify in the eyes of civil society, and policy makers who represent them. By focusing on tangible and easily visualized landscapes, we aim to conserve them to ensure future survival of both insects and us. Careful and strategic conservation of landscapes conserves a whole range of species and their interactions (Samways, 2015). Furthermore, by taking this precautionary landscape approach, insect conservationists have leverage relating more to healthy and historically functioning landscapes than to the conservation of insects as items, which are often considered as small, arbitrary, and unworthy things that have little to do with human everyday life.

The landscape and its biodiversity is literally the larger picture, and individual insects the pixels in that picture. Together, the diverse landscape along with its insects and other biodiversity make up the scene that we appreciate, leading to the realization that the complete picture is something on which our existence and well-being depends (McClure *et al*., 2019). The public at large is beginning to recognize this through the essentially non-consumptive and well-being value of insect tourism and recreation (Lemelin, 2013).

The important methods to be adopted for conservation of insects and other wildlife globally are described below under the following heading: Habitat management, Establishment of protected area, Rehabilitation of endangered species, Captive breeding programme, Mass education and Promulgation of laws.

1. Habitat management: This indicates ecological study of habits and habitats of wildlife species, protection, preservation and improvement of habitats, census and statistical data regarding species to be conserved etc.

i. Fire control: Despite the often valid reasons for suppressing wildfires, the practice can change vegetation dramatically and sometimes harm species in the process. As previously noted, human activities have changed fire regimes across large areas of the planet, including some biodiversity hot spots. Getting the fire regimes right can be essential for conserving species.

ii. Flood control: In much the same way that human actions suppress fire regimes, they also control water levels, and the resulting changes can have important consequences for endangered species.

2. Establishment of protected area: Establishment of national parks, wildlife reserves, sanctuaries, zoological garden etc. serves many purposes:

(i) To conserve species in their wild state.

(ii) To provide scientific, educational and recreational opportunities and

(iii) To earn revenue by attracting tourists.

3. Rehabilitation of Endangered species: Under this objective, it is proposed to rehabilitate some threatened species of animals as well as plants in some protected habitats of its erstwhile distribution.

4. Captive breeding programme: It has been proposed to take up captive breeding programme for species whose survival in wild is severely threatened on account of impaired natural breeding.

5. Mass education: For any conservation programme, there is a great need of educating people to achieve their participation. Methods adapted are:

(a) Celebration of wild life week every year.

(b) Publicity through media and film shows.

(c) Holding conducted tours, essay competitions, lectures, seminars etc

(d) Setting up nature clubs in educational institutions.

(e) Publication of wildlife/insects books and journals.

(f) Establishment of natural history museums etc.

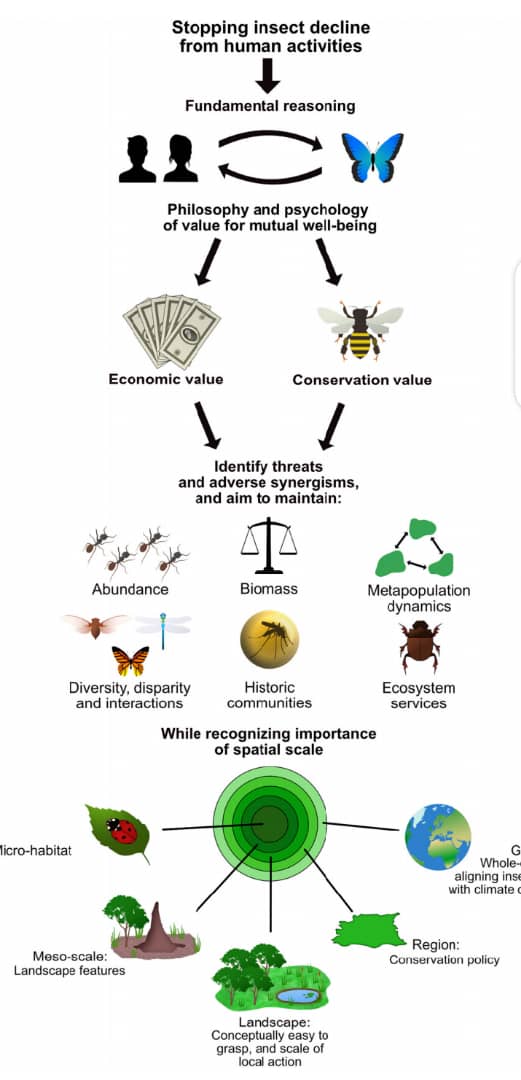
6. Promulgation of laws: Legislative measures for protection of insects should be properly established.

(i) Directive principles of state policy: The founding fathers of our constitution had realized the need of wildlife protection. This policy states that “The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country”.

(ii) Forest and wildlife in concurrent list: Forests and wildlife should be included in concurrent list in the constitution . By virtue of this provision, not only can Government control their protection and preservation, but certain Forest and Wildlife Sanctuaries of national importance can also be acquired by the Government under its powers of acquisition of property.

(iii) Wildlife protection Act: Providing special legal protection to wildlife in general and to endangered species. A provision for setting up of National Parks and Sanctuaries, where our wildlife can receive the fullest protection. Stringent punishments have to be provided against infringement of provisions of this Act.

**Fig 2.1:** Stopping Insect Decline From Human Activities



**Source:** Premalatha (2011)

Furthermore, we seek general principles that have global significance, while also embracing the need for specific local action and incorporating the intrinsic value of insects. We start here by identifying various key factors for insect survival, with the landscape level key in this process, while also recognizing the importance of smaller (meso-scale and microhabitat) and larger (regional and global) spatial scales (Fig. 2.1). This approach does not overlook species-specific strategies, such as conservation of red-listed species or addressing issues of insect species overexploitation, nor species-specific interactions, such as vertebrate or plant host and a particular insect interactor, especially where there is risk of co-extinction should the host disappear.

**2.2.0 Concept of Insects, Entomology and Entomophagy**

Insects are important to everyone--they are found almost any place and on almost everything. As you become more familiar with insects, you will be fascinated with the wide variety of forms and their ways of life. Many people have made the collection and identification of insects a useful hobby, others have made this science of insect study their life work.The study of insects is a science called entomology. A person who studies insects is called an entomologist.

They are the most diversified kind of animal life in existence, and, except for microbes, insects are the most numerous. Scientists have identified nearly a million different species of insects and expect that there may be that many more left to be discovered. In a forest you might be able to find 10,000 arthropods (insects, mites, centipedes etc.) per square foot in just the top 3 inches of litter and soil. The average number of insects in one square mile is more than all of the people on earth. The total weight of arthropods in the world is several times the total weight of all other land animals combined. Increasing knowledge of the damage done by insects, and the role they play in transmission of animal, plant and human diseases, emphasizes the necessary for correctly identifying these pests and knowing more about their life habits.

Entomologists have to alert for new pests and watch for new outbreaks of old pests. To do this one must be able to distinguish between insects that are injurious or potentially injurious and those that are beneficial or of no consequence to human welfare.

**2.2.1 Overview of Entomophagy**

The term entomophagy refers to the use of insects as food. The human consumption of insects has doubtlessly occurred for at least several centuries in Africa but the earliest recorded accounts dates back to the late 1700’s for locusts and winged termites consumption in South Africa . Insects have played an important part in the history of human nutrition in Africa, Asia and Latin America. Detailed information regarding diversity, mode of consumption and economic value of edible insects in all tropical and subtropical regions of the world has been compiled by De Foliart, Nonaka and Mitsuhashi (1989). Van Huis *et al.* (2013) has reported that there are approximately 250highly nutritious, edible insect species in sub-Saharan Africa, and Mitsuhashi arrived at a figure of at least 1,900 species of edible insects worldwide. Furthermore, over 1,400 recorded edible insects indigenous population in many Third World countries where animal protein is scarce use 30 species of insects or more as goodsources of protein with high fat content and many important minerals and vitamins .Ebenebe and Okpoko; identified malnutrition, poverty, religion and enlightenment assome of the promoting factors of enthomophagy. Time of eventualities; Civil war(during, before, and after the war) also affected people’s interests in entomophagy. In developing countries, Nigeria as a case study where there still exists issues of malnutrition and high rate of food insecurity worsened by the current spate of economic meltdown; consumption of edible insect is one major strategy to counter the existing problems of malnutrition. FAO recommended consumption of 34g of animal protein per person per day for normal growth and development but in Nigeria animal protein consumption level is at 7-10g/person/day while her counterparts like Somalia and Mauritania were getting 32-34g respectively FAO. Efforts to bridge the gap between animal protein deficit and human population growth rate has led to integration of alternative protein sources especially micro livestock into traditional farming system in compliance with FAO recommendation, yet animal protein deficit in the country is still unresolved. This is because the human population grows at the rate of 3% per annum while animal production grows at the rate of 2% per annum. This deficit persists as a result of the usual Nigerian factors; utter negligence of agriculture in general and its inherent potential, erroneous view of entomophagy as a taboo or an exclusive reserve for the rural poor or the traditionalists. The essence of this paper is to reawaken the Nigeria’s consciousness towards re-evaluating entomophagy as a good alternative and/or complement to the conventional nutrient sources in order to get more armed in waging war against the already looming food insecurity.

**2.2.2. Nutritional Compositions of Insects**

The merits of the use of insect as food have been expressed in several reports. All identifying edible insects as rich source of protein: Cricket (Gymnogryllus lucens 50.75% C.P, Variegated grasshopper (Zonocerus variegates) 26.8% and 38.72%, African Palm weevil (Rhyncophorus phoenicis28.42% and 21%, Rhinoceros beetle larva (Oryctes monoceros) 36.45% on dry weight. FAO showed that edible insects compare favorably with both fish and meat proteins. Most species of caterpillars have high levels of minerals such as potassium, calcium, magnesium, zinc, phosphorus and iron, as well as various vitamins. Ekpo and Onigbinde also elucidated the high nutritional value of fatty acids found in edible insects, according to them, edible insects has fatty acids with high iodine content, an indication of the degree of unsaturation of the oil. The iodine content in some insect oils include: Silkworm oil 117, lepodoptherous larva oil 112-119 and 108.6 -118. Edible insects are also reported to be rich in micro-nutrients especially iron, magnesium, zinc and thiamine, riboflavin respectively. In animal husbandry, poultry and fish production precisely, maggot meal is highly sorted after due to its high protein content (above 48% c.p). Insects are attractive and important natural source of food for many kinds of vertebrate animals including birds, lizards, snakes, amphibians, fish and other mammals. As stated by Premalatha (2011), it is ironic that ―all over the world [millions of dollars] are spent every year to save crops that contain no more than 14% of plant protein by killing another food source [insects] that may contain up to 75% of high-quality animal protein.

There are many species of cricket consumed worldwide, and specific analyses of different nutritional aspects of crickets have been done on several species, such as the field cricket (Gryllus genus), and the house cricket (Acheta genus). Thailands field cricket *Gryllus* *bimaculatus* (raw), contains 120 kcal/100g (van Huis *et al.*, 2013), which is comparable to the 150 kcal/100g of skinless chicken breast. The composition of a single field cricket is around 58% protein, and 10% fat (Wang et al. 2004); in contrast, the composition of a single house cricket is around 65% protein, and 20% fat (Runpold *et al.*, 2012). Field crickets provide more than the minimum amino acid profile suggested by the World Health Organization in order to be an adequate source of essential amino acids (Wang *et al*., 2004). In one study, it was observed that the protein of the house cricket was superior to soy protein for amino acid intake when fed to rats (Finke *et al.*, 1989). Vitamin B12, which occurs only in food of animal origin, and is vital for human health, is found in sufficient amounts in house crickets, at 5.4 μg per 100 g in adults and 8.7 μg per 100g in nymphs; the recommended dietary amount is 2.4 μg daily (van Huis *et al.*, 2013 & Baik, 1999). According to Rumpold *et al*. (2012), ―it can generally be stated that the majority of insects show high amounts of potassium, calcium, iron, magnesium, and selenium, as well as zinc. Acheta domesticus contains about 6-11mg of iron per 100g (Rumpold et al., 2012); for comparison, ground beef contains about 2.2mg iron per 100g.

Apart from the traditional use of insects in the feeding of some populations, insects are considered to be as one of the pillars of the future human nutrition for a variety of reasons.

First of all, mostly in places where the availability of nutritious foods is lacking, the insect nutritional value must be considered. Factors such as species, development stage, diet, and processing affect the insect nutritional composition (Oonincx & Dierenfeld, 2012). Generally, insects show interesting amounts of high quality proteins since all the essential amino acids are present in the recommended ratios (Belluco *et al*., 2013; Collavo et al., 2005). Vitamin E content is high in insects such as fruit flies (Drosophila melanogaster) and false katydids (*Microcentrum rhombifolium*), with values of about 110 mg/kg of dry matter (Oonincx and Dierenfeld, 2012). The type of habitat and diet may affect flavour and nutritive values of insects. As an example, in a study of Oonincx and van der Poel (2011), migratory locusts were fed with three different diets consisting either solely of grass, mixed grass and wheat bran, or combination of grass, wheat bran, and carrots. The wheat bran diets reduced the protein content and increased the fat content, whereas the addition of carrots further enhanced the fat content and provided high levels of β-carotene.

The importance of the nutritional value of insects is related to the demand for foods and water of the growing world population. It was expected that the demand for livestock products will double between 2000 and 2050, especially as a consequence of the increasing request for meat products by the population of the developing countries. Livestock rearing is responsible for 14% of the global greenhouse gas emissions (Gerber *et al.*, 2013) and requires a noticeable land use. According to Oonincx and de Boer (2012), to produce 1 kg of edible protein, mealworms required only 10% of the land needed for beef production. Furthermore, edible insects have the advantage to be farmed vertically (van Huis *et al.*, 2013). Another interesting index is the feed conversion ratio (FCR, expressed as kilogram feed/kilogram live weight). The following FCR data were found in literature: 1.7 for cricket (Collavo *et al.,* 2005), 2.5 for chicken, 5 for pork, and 10 for beef ((Smill, 2002). Since the percentage of edible weight greatly differs between conventional livestock (55% for chicken and pork, 40% for beef) and insects (80%), the FCR corrected for the edible weight shows that crickets (ratio of 2.1) are twice more efficient than chickens, 4 times more efficient than pigs, and 12 times more than cattle (van Huis, 2013). Furthermore, insects grow rapidly and can produce large amount of biomass for food in a short time (Premalatha, Abbasi, Abbasi, & Abbasi, 2011). All these findings strengthen the idea that insects can help mankind to solve food/protein shortages. Furthermore, a study performed by Mwangi *et al.* (2018) on 11 edible insect species that are mass-reared and 6 species that are collected from nature highlighted that: the insect levels of Fe and Zn are similar to or higher than in other animal-based food sources; high protein levels in edible insect species are associated with high Fe and Zn levels. Studies concerning the Life Cycle Assessment (LCA) of edible insects is still limited. Oonincx and de Boer (2012) found that the energy use in meal worm production was higher than in conventional animal products since insect growth and reproduction require temperatures of 20 - 30 °C. On the contrary, both land use and global warming potential were lower in meal worm production. Furthermore, insects are much easier to grow than large animals. According to Smetana, Schmitt, & Mathys (2019), fresh insect biomass is almost twice more sustainable than fresh chicken meat. The same authors highlighted that, when produced at large lot scale, protein concentrates from insects are competitive against animal-derived (whey, egg protein, fish meal) and micro algae, but have higher environmental impacts than plant-based meals. Recapping the environmental advantages of edible insect production, it can be stated that: greenhouse gas and ammonia emissions are negligible, at least in small-scale experiments (Oonincx *et al.,* 2010) and, a part from some exceptions (methanogenic bacteria have been detected in the hind guts of tropical species of cockroaches, termites, and scarab beetles), edible insects are unable to produce methane; the environmental impact is very low over the entire life cycle; insect production is not necessarily a land-based activity; insects are very efficient in converting feed into edible weight; the volume of water required to produce edible insects in equivalent amounts of conventional meat is low (FAO, 2013).

**Table 2.1 Vitamins and Other Nutrients in 100g Servings of Chicken and Beans Dishes in Comparison to Contents of Some Insects**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Thiamine** | **Riboflavin** | **Niacin** |
| **Daily Human Requirements** | **1.5mg** | **1.7mg** | **20mg** |
| Fraction met by roasted chicken | 5.4% | - | 45% |
| Fraction met by backed beans | 10.8% | - | 3% |
| Fraction met by termite | 8.7% | 67.4% | 47.7% |
| Fraction met by silk moth larvae | 224.7% | 112.2% | 26% |
| Fraction met by palm weevil | 201.3% | 131.7% | 38.9% |
| **PROTEINS AND IRON 100g SERVINGS OF BEEF AND TWO INSECTS** | | | |
| **FOOD** | **PROTEIN (g)** | **IRON (mg)** |  |
| **BEEF (Boiled)** | 22.3 | 2.9 |  |
| **SILK WORM LARVAE (Boiled)** | 28.2 | 35.5 |  |
| **GRASSHOPPER (Fried)** | 61.1 | - |  |

**Source:** Premalatha (2011).

Flour made from cricket is mixed to prepare pulp given to children to counter malnutrition. Termites are particularly high source of iron for those who are weak and anemic while red ants are rich in bone building calcium. Based on the phytate composition, insects could be consumed without much fear of harm to Humans and his animals in respect of phytic acid toxicity. Oxalate can bind to Ca present in the food thereby rendering Ca unavailable for normal physiological and biochemical role such as the maintenance of strong bone, teeth, nerve impulse transmission and cofactors in enzymatic reactions as well as clotting factors in the blood. Saturated fatty acids extracted from Locust Bean Tree Emperor Moth Larvae (Bunaea alcinoe) have a potential use for dietetic management of certain coronary heart diseases.

**2.2.3 Required Action to Promote Insect Consumption**

Global climate change and increasing food insecurity in many parts of the developing world may put insects regularly on the menu. Most edible insects are cheap, available and can provide a good source of protein and minerals needed to complement cereal based foods consumed in the developing countries. Hence, edible insects should be seen as not just a way to respond to the problem of inadequate nutritional intake but as a cheap, safer and nature oriented measure towards combating food insecurity. This can occur at different levels, with small scale and large scale propositions. In addition, a much lower consumption of energy and natural resources of insect farming (Lindroth, 1993; Nakagaki *et al.,* 1991), alongside high fecundity and a faster growth rate, make insect farming an option which deserves urgent global attention.

1. Awareness Campaign: There is urgent need for a sustained sensitization on merits.

2. Improving the hygiene during harvesting and sales will increase acceptability

3. Compelling caterers and hoteliers to include insects in their menu

4. Having many edible insect farms

5. Development of captive rearing facilities in order to increase availability Incorporation of insects into other feeds regularly will boost their consumption

6. Processing of insect into more durable forms like waffle, puffed balls and chips will promote its consumption

7. Serving of insect at the social functions organized by highly placed individuals; it should not be seen as poor man food any longer.

8. Inclusion of entomophagy in the academic curricular of the departments of; Agronomy, Food and Nutrition entomology in the Universities.

9. Development of advanced insect industry; conducting a market research on the insects that would work better for expected and targeted consumers in order to fit different preferences

**2.3.0 Socio economic Characteristics of Respondents**

Globally, the issue of infrastructure development and farmers income in the rural areas have been given serious attention by some scholars (Evans and Ngau, 1991; Corral and Reardon, 2001; Escobal, 2001; Ashley and Maxwell, 2001) in recent decades. Local infrastructure is identified not only as an engine for population stabilization (Zhao, 1999; Gorton, Hubbard and Hubbard, 2009) but it also reduces farmers cost of production and improves their income and livelihoods (Bryceson, 2002; Renkow, Hallstrom and Karanja, 2004; Babatunde and Qaim, 2010). In advanced economies such as North America and Europe, rural development and farmers wellbeing have been given a holistic and proactive attention (Gray, 2000; Flaten, 2002; Gorton, Hubbard and Hubbard, 2009), however the reverse has been the case in African countries (Bryceson, 2002; Jayne, Mather and Mghenyi, 2010), such as Nigeria (Ibrahim *et al.,* 2009; Babatunde and Qaim, 2010).

**2.3.1 People's Knowledge on the Economic and Nutritional Value of Crickets**

Insects, and specifically crickets, have long been overlooked as a source of essential nutrition in the Western world. Yet they provide comparable, if not higher and sometimes substantially so levels of calories, protein, iron, and vitamin B12 than meat, showing the potential for people to receive the most sought-after health benefits of meat by eating cricket products.

Motivations to eat crickets stem from their cultural and nutritional value, as well as their numerous environmental benefits. The current pressures on global food security, including climate change, population growth, and shifting dietary preferences, have ignited a search for more environmentally sustainable protein sources. Given that livestock production alone is responsible for about 14.5% of total human-induced greenhouse gas (GHG) emissions(Gerber *et al.,* 2013) there is a mounting need for more efficient animal production systems.

Edible insects have been touted as one such option, as they typically emit fewer GHGs (Oonincx, D. G. A. B. et al.2010) and require less land, water, and feed to survive and thrive than traditional livestock (van Huis, A. *et al.,* 2013). The result has significantly lowered environmental impact (Oonincx, D. G. A. B. *et al.,* 2010; Collavo, A. *et al*.,2005), and high desirability due in part to insects’ large edible body mass percentage, high feed-conversion ratio (Collavo, A. *et al.*, 2005), and ectothermic thermo-regulation, which limits energy expenditure on temperature regulation.

Entomophagy, the practice of eating insects, is not new however; it has been recorded throughout human history across the globe (Bodenheimer, F. S. 1951; DeFoliart, G. R.1995). Today, insects are regularly consumed by approximately 2 billion people (van Huis, A. *et al.*2013) spread across 80% of the worlds populations(Srivastava, S., Babu, N. & Pandey, H.,2009) in 130 countries (Ramos-Elorduy, J.,2009).

Another possible route to promoting entomophagy could therefore be to decrease the fear and therefore disgust and sense of contamination of insects through encouraging positive experiences with them. Farmers in most cases generally pay less attention to conserving insects or its near extinction. Firstly, the issue is that the human brain is not well equipped to assimilate and act upon perceived unseen and abstract themes such as insect conservation, which are nebulous and seemingly not relevant to everyday life. Yet, given that insects have played an important role in human culture for millennia (Kritsky and Smith, 2018), an effective strategy would be to convey the message that appreciation and conservation of insects is now essential for our future survival. Insect conservation psychology is enabling us to develop a culture of improved personal and collective responsibility towards promoting insect conservation as a necessary step for our survival. Secondly, though there are noble opportunities, we must recognize that many humans view insects as invisible and boring at best, and as ugly, small, mean, indestructible disease vectors at worst (Nash, 2004), so we seek to find non human charisma to provide us with essential new opportunities for moving forward on the entwined destiny of insects and humans (Lorimer, 2007), while recognizing that anthropomorphism plays a major role in biasing our views of wildlife conservation in general (Manfredo *et al.*, 2020).

**2.3.4 Factors Leading to People's Less Interest in the Knowledge on the Economic and Nutritional Value of Insects**

1. Some insects are associated with breakdown of buried coffin and corpse e.g. Termite

2. Some has obnoxious odours and unpleasant spots e.g. Variegated grasshopper) associated with evil spirit in some community.

3. Some look irritating e.g. African Palm weevil appears like a bloated maggot (Housefly larvae)

4. Their habitats e.g. Rhinocerous beetle grow in goat manure and so they are unhygienic

5. Unavailability e.g. Cricket (hardly found)

6. Presumed availability of many alternatives; conventional food are easily assessable.

**2.3.5. Insects and its Near Extinction**

Insects populations were noted as fast disappearing in the 1870's, the result of land enclosure’, ruthlessly turning furze to turnips and potatoes, being ill at ease in changed and changing surroundings and being heartlessly swept away in the present era of stream and telegraphy’ (Swinton, 1880). Since then, insect decline has accelerated, with indications of some alarming drops in abundance, biomass, populations, and species, with associated disruption of species interactions and services, but all yet to be fully quantified (Montgomery *et al.,* 2020). Known extent of declines is summarized in the companion review Scientists' warning to humanity on insect extinctions (Cardoso *et al.*, 2020).

Addressing this serious issue requires effective evidence-based strategies. Much work has already been done in various parts of the world. The extensive evidence is gathered and synthesized here, in words and graphics, to identify the most important ways forward for its near extinction, insect perception by farmers and conserving insects globally. This is done by the many authors here, who represent various sub-disciplines of insect conservation, drawing upon their knowledge in the field, and then distilling the evidence into essentially simple formulae.

**2.3.6 Changing People's Perception towards Promoting Crickets Conservation and Consumption**

Firstly, the value of insects to humanity needs better communication. Valuation is the foundation for what we do in practice, as it sets standards and directions. One approach is to address personal and collective well-being (eudaimonia), with conservation strategies likely to be more effective when we focus on these relational values (Chan *et al*., 2016).

This is because they hinge on relationships and responsibilities for a shared destiny. This means that our valuing insects is ethical and essential (Samways, 2017; Basset and Lamarre, 2019), and valuing insects goes beyond pure economic terms. However, this does not mean shutting our eyes to the fact that some insect species are of medical significance, and some are costly invasive alien organisms (Bradshaw *et al.*, 2016), while others have great practical value as natural enemies of forestry and agricultural insect pests (Hajek *et al.*, 2016).

**CHAPTER THREE**

**RESEARCH METHODOLOGY**

**3.0 Introduction**

This chapter explains the methodology that would be used in carrying out the research work. Crucial issues that will be discussed in this chapter includes, study area, study population, Sampling Procedure, data collection and techniques and ethical considerations.

**3.1** **Study Area**

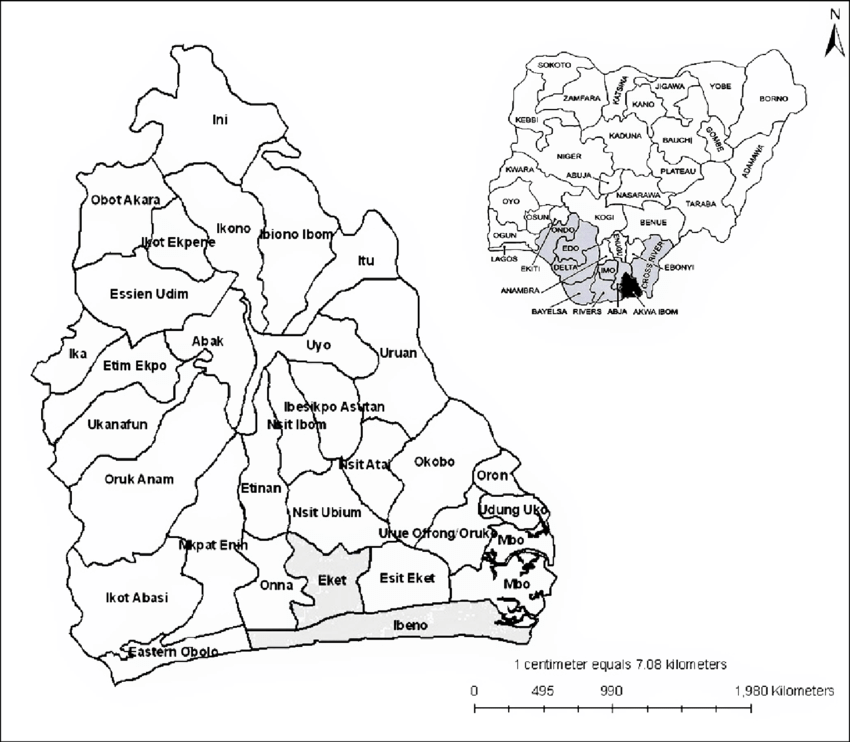
This research work was carried out in Akwa Ibom State University, Obio Akpa Campus in Oruk Anam L.G.A. precisely. Akwa Ibom State University,Obio Akpa Campus originally called Akwa Ibom State University of Technology, this is the second campus of the state University. It is a tertiary institution that offers affordable and quality university education in a number of areas. The campus houses the Faculties of Agriculture, Art, Social and Management Sciences. Being an old site of a tertiary institution, it already has roads that were paved since the 1950s when the campus began as a British colonial agricultural experimental station. Buildings already exist to be used by the Faculties of Agriculture and Management Sciences. There are academic, administrative blocks and laboratories. It also has large demonstrative farms for palm oil, rubber, fisheries, and small/large ruminate.

The campus has a sub urban setting, adjoining Abak town and is within 15 minutes drive from Uyo. It's topography is undulating with gentle hills and slopes which gives it a unique scene.

**3.2** **The Study Population**

The study population was made up of 160 randomly selected members from community where Akwa Ibom State University is situated.

**3.3 Map of Study Area**

****

Oruk Anam Local Government Area

**Fig 3.1**: Map of Nigeria Showing Akwa Ibom State and Akwa Ibom State Map Showing Oruk Anam Local Government Area

**Source:** [www.researchgate.com](http://www.researchgate.com)

**3.3** **Sampling Procedure**

A multi-stage sampling procedure was used to select the respondents in the study area. Purposively, the four faculties in Obio Akpa Campus were sampled. Four departments were randomly selected from the four faculties in Akwa Ibom State University, Obio Akpa Campus in Oruk Anam LGA. The respondents (students and workers) were randomly selected from each of the four departments giving a sum of 160 respondents for the study.

**3.4** **Source of Instrument for Data Collection**

The study made use of primary data. The primary data were collected by using a well-structured, pre-tested questionnaire which was given to the respondents. It was divided into sections to reflect the specific objectives of the study.

**3.5** **Analytical Techniques**

**Objective one and two and three** of this study were analysed using descriptive statistics which includes frequencies, percentages, means, etc.

**Objective four** was analysed using a four (4) points Likert-Scale type of strongly agree (score 4), agree (score 3), disagree (score 2) and strongly disagree (score 1).

**CHAPTER FOUR**

**4.0 Results and Discussion**

This chapter presents the results of the analysis of this study using variables enumerated in chapter three to fulfil the objective of the study.

**4.1.0 Socio economic Characteristics of Respondents**

This section analysed the socio economic characteristics of respondents in the study area which were gender, age, marital status, household size, educational level, major occupation and monthly income.

**Table 4.1: Frequency Distribution Of Respondents According To Gender**

|  |  |  |
| --- | --- | --- |
| **Gender** | **Frequency** | **Percentage (%)** |
| Male | 82 | 51.2 |
| Female | 78 | 48.8 |
| **Total** | **160** | **100.0** |

**Source:** Field survey, 2022.

According to Table 4.1, the result of this study revealed that 51.2% of respondents were male while 48.8% were female. This indicates that majority of the respondents are males. Meludu and Onoja (2018), Ancha *et al.* (2021) and Olarewaju *et al.* (2020) had similar findings on gender distribution of their respondents.

**Table 4.2: Frequency Distribution of Respondents According to Age**

|  |  |  |
| --- | --- | --- |
| **Age (years)** | **Frequency** | **Percentage (%)** |
| <30 | 68 | 42.5 |
| 30 -40 | 55 | 34.4 |
| 41 -50 | 26 | 16.3 |
| >50 | 11 | 6.8 |
| Total | 160 | 100.0 |
| Mean | 34.56 |  |

**Source:** Field survey, 2022.

The distribution of respondents according to age shown in Table 4.2 revealed that majority (42.5%) of the respondents were less than 30 years of age, 34.4% of the respondents were between ages of 30 -40 years, 16.3% of the respondents were between 41 -50 years while 6.8% were greater than 50 years of age. The mean age of the respondents was 34.56 years. This implies that majority (76.9%) of the respondents were 40 years and below of age. The Akwa Ibom State University community residents are youth. Therefore, their opinion on cricket consumption cannot be said to be that of the elderly.

**Table 4.3: Frequency Distribution of Respondents According to Marital Status**

|  |  |  |
| --- | --- | --- |
| **Marital Status** | **Frequency** | **Percentage (%)** |
| Single | 80 | 50.0 |
| Married | 71 | 44.4 |
| Widowed | 4 | 2.5 |
| Widower | 2 | 1.3 |
| Divorced | 3 | 1.9 |
| **Total** | **160** | **100.0** |

**Source:** Field survey, 2022.

The result in Table 4.3 showed that half (50.0%) of the sampled respondents were single, 44.4% were married, 3.8% were widow(er) while 1.9% of the respondents were divorced. Majority of the residents were not mainly from family setting so their views on cricket consumption can be taken as representative of personal views especially with respondents who were young and educated.

**Table 4.4: Frequency Distribution of Respondents According To Household Size**

|  |  |  |
| --- | --- | --- |
| **Household Size (numbers)** | **Frequency** | **Percentage (%)** |
| <5 | 89 | 55.6 |
| 5 – 10 | 67 | 41.9 |
| >15 | 4 | 2.5 |
| **Total** | **160** | **100.0** |
| Mean | 4.31 |  |

**Source:** Field survey, 2022.

The data in Table 4.4 presents the distribution of respondents based on household size. It shows that majority (55.6%) of the respondent had household sizes less than 5 persons, 41.9% had household sizes between 5 -10 persons while 2.5% had household sizes greater than 10 persons. The mean household size was 4 persons.

**Table 4.5: Frequency Distribution of Respondents According to Educational level**

|  |  |  |
| --- | --- | --- |
| **Educational level** | **Frequency** | **Percentage (%)** |
| Primary | 2 | 1.2 |
| Secondary | 22 | 13.8 |
| Tertiary | 136 | 85.0 |
| Total | 160 | 100.0 |

**Source:** Field survey, 2022.

Table 4.5 further revealed that all respondents had one form of education of the other with 85% of the respondents attending tertiary education, 13.8% attending secondary education while 1.2% attending primary education. This result corroborates with findings of Ancha *et al.* (2021) and Olarewaju *et al.* (2020) who reported that the respondents who had formal education were knowledgeable and had better opinions about cricket consumption.

**Table 4.6: Frequency Distribution of Respondents According to Main Occupation**

|  |  |  |
| --- | --- | --- |
| **Main Occupation** | **Frequency** | **Percentage (%)** |
| Farming | 90 | 56.3 |
| Artistry | 15 | 9.4 |
| Trading | 33 | 20.6 |
| Schooling | 17 | 10.6 |
| Others | 5 | 3.1 |
| **Total** | **160** | **100** |

**Source:** Field survey, 2022.

The data in Table 4.6 showed the distribution of respondents based on major occupation. It shows that greater percentage (56.3%) of the respondents were farmers, followed by (20.6%) traders, 10.6% were student, 9.4% were artisans while 3.1% of the respondents have other type of occupation. Since majority of the respondents here are farmers, cricket consumption can be adjudged to be due to their occupation or environment.

**Table 4.7: Frequency Distribution of Respondents According to Monthly Income**

|  |  |  |
| --- | --- | --- |
| **Monthly Income (**₦**)** | **Frequency** | **Percentage (%)** |
| <100000 | 111 | 69.4 |
| 100000 -200000 | 31 | 19.4 |
| 200001 -300000 | 9 | 5.6 |
| >300000 | 19 | 5.6 |
| Total | 160 | 100.0 |
| Mean | 92006.31 |  |

**Source:** Field survey, 2022.

The result in Table 4.7 presents the distribution of respondents based on monthly income. It showed that most (69.4%) of the respondents had monthly income of below ₦100,000; 19.4% had monthly income between ₦100,000 - ₦200,000 while 11.2% of the respondents had monthly income greater than ₦200,000. The average monthly income was ₦92,006.

**4.2.0 Awareness on the nutritional value of crickets by the respondents**

**Table 4.8: Frequency Distribution Of Respondents According To Awareness on the nutritional value of cricket**

|  |  |  |
| --- | --- | --- |
| **Statements** | **Frequency** | **Percentage (%)** |
| **Are you aware of cricket existence?**  Yes  No  **Total** | 135  25  160 | 84.4  15.6  100.0 |
| **Are you aware that cricket is very high in nutrient?**  Yes  No  **Total** | 86  74  **160** | 53.7  46.3  **100.0** |
| **Are you aware of the type of nutrient contained in it?**  Yes  No  **Total** | 47  113  **160** | 29.4  70.6  **100.0** |
| **What are the nutrients contained in cricket?**  Don’t know  Magnesium  Protein  Flavanoid  Vitamin, mineral and fiber  **Total** | 113  36  2  2  7  **160** | 70.6  22.5  1.3  1.3  4.4  **100.0** |

**Source:** Field survey, 2022.

The result of the study as presented in Table 4.8 shows that 84.4% of the respondents were aware of cricket existence while 15.6% were not aware of cricket existence. This implies that the respondents were aware of cricket existence considering the fact that most of the respondents were into farming as main occupation, during farming activities they must have seen crickets on their farms. Majority (70.6%) of the respondents were not aware of the nutritional composition of cricket while 29.4% were aware of the nutritional composition of cricket. This implies that majority of the respondents were not aware of the nutrients contained in it due to lack of education on the economic importance of crickets. The result also revealed that the nutrients mentioned by respondents were Magnesium (22.5%), Protein (1.3%), Flavanoid (1.3%) and Vitamin, mineral and fiber (4.4%).

**4.3.0 Perception on the consumption of cricket by the respondents**

**Table 4.9: Frequency Distribution Of Respondents According To Perception on the consumption of cricket**

|  |  |  |
| --- | --- | --- |
| **Statements** | **Frequency** | **Percentage (%)** |
| **What is your take on cricket consumption?**  No opinion  If proven edible, i can eat it  It is not edible  It is nutritious for the body  It doesn’t exist  It is detrimental to human health  It has a bitter taste  **Total** | 68  29  1  22  1  35  2  **160** | 42.5  18.1  1.8  13.8  0.6  21.9  1.3  **100.0** |
| **Given the opportunity will you love to have a taste of it?**  Yes  No  **Total** | 97  63  **160** | 60.6  39.4  **100.0** |
| **Will you subscribe to the advocacy on cricket consumption?**  **If yes, why?**  Due to its high nutritional benefit  If proven non detrimental/edible  It is affordable  **If No, why?**  Not hygienic  It doesn’t exist  It is not palatable  It has no economic value  **Total** | 79  10  1  44  1  17  8  **160** | 49.4  6.3  0.6  27.5  0.6  10.6  5.0  **100.0** |

**Source:** Field survey, 2022.

Table 4.9 further revealed that 42.5% of the respondents had no opinion on cricket consumption, 18.1% would eat it if proven edible, 1.8% opined that crickets are not edible, 13.8% suggested that crickets are highly nutritious for the body, 0.6% opined that cricket does not exist, 21.9% and 1.3% suggested that cricket is detrimental to human health and have a bitter taste respectively. Majority (60.6%) of the respondents would love to taste cricket if given an opportunity while 39.4% were not willing to taste cricket due to reasons best known to them. A total of 3 reasons were listed by respondents as being responsible for their subscription to the advocacy on cricket consumption. Nutritional benefits (49.4%) was the number one reason, followed by safety and edibility (6.3%) while the least reason was affordability. The result further revealed four reasons for unsubscribing to the advocacy on cricket consumption. Not hygienic (27.5%) was the number one reason, followed by unpalatability (10.6%), no economic value (5.0%) while the least reason was inexistence (0.6%).

**4.4.0 Constraints to Cricket Consumption acceptability by the Respondents**

**Table 4.10: Mean distribution of respondents according to constraints to cricket consumption acceptability**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Statements** | **Strongly Agree** | **Agree** | **Disagree** | **Strongly Disagree** | **Mean** |
| Education on cricket’s nutritional value | 67 | 49 | 27 | 17 | **3.04** |
|  | | | | **Mean score** | **2.50** |

**Source:** Field survey, 2022.

Table 4.10 shows the mean distribution of respondents according to factors facilitating acceptability of cricket consumption. Education on cricket’s nutritional value (3.04 ≥ 2.05) implies that educating the people on the nutritional value of cricket can facilitate the acceptability of cricket consumption. Enlightening people on the health benefits of consuming crickets would enhance their aspirations and desire to have a taste of it as well as informing others on the economic importance and health benefits of consuming crickets. Education will improve their knowledge and attitude towards cricket consumption.

**CHAPTER FIVE**

**SUMMARY, CONCLUSION AND RECOMMENDATIONS**

**5.1 Summary**

Findings shows that majority (51.2%) of respondent were male while 48.8% of respondents were female. 42.5% of the respondents were less than 30 years of age, 34.4% of the respondents were between ages of 30 - 40 years, 16.3% of the respondents were between 41 - 50 years while 6.8% were greater than 50 years of age. The mean age of the respondents was 34.56 years. 50.0% of the sampled respondents were single, 44.4% were married, 3.8% were widow(er) while 1.9% of the respondents were divorced. Majority (55.6%) of the respondent had household sizes less than 5 persons, 41.9% had household sizes between 5 -10 persons while 2.5% had household sizes greater than 10 persons. The mean household size was 4 persons. 85% of the respondents attending tertiary education, 13.8% attending secondary education while 1.2% attending primary education. 56.3% of the respondents were farmers, followed by (20.6%) traders, 10.6% were student, 9.4% were artisans while 3.1% of the respondents have other type of occupation. Most (69.4%) of the respondents had monthly income of below ₦100,000; 19.4% had monthly income between ₦100,000 - ₦200,000 while 11.2% of the respondents had monthly income greater than ₦200,000. The average monthly income was ₦92,006. 84.4% of the respondents were aware of cricket existence while 15.6% were not aware of cricket existence.

Based on awareness of the nutritional value of cricket, the result showed that majority (70.6%) of the respondents were not aware of the nutritional composition of cricket while 29.4% were aware of the nutritional composition of cricket. The result further revealed that the nutrients mentioned by respondents were Magnesium (22.5%), Protein (1.3%), Flavanoid (1.3%) and Vitamin, mineral and fiber (4.4%).

Based on perception on the consumption of cricket, the result showed that 42.5% of the respondents had no opinion on cricket consumption, 18.1% would eat it if proven edible, 1.8% opined that crickets are not edible, 13.8% suggested that crickets are highly nutritious for the body, 0.6% opined that cricket does not exist, 21.9% and 1.3% suggested that cricket is detrimental to human health and have a bitter taste respectively. Majority (60.6%) of the respondents would love to taste cricket if given an opportunity while 39.4% were not willing to taste cricket due to reasons best known to them. Nutritional benefits (49.4%) followed by safety/edibility (6.3%) and affordability were the reasons for subscription to the advocacy on cricket consumption. Unhygienic (27.5%) followed by unpalatability (10.6%), no economic value (5.0%) and inexistence (0.6%) were the reasons for not subscribing to the advocacy on cricket consumption.

Based on the constraints to cricket consumption acceptibility, the result showed that educating the people on the health benefits of consuming crickets would enhance their urge and desire to have a taste of it as well as informing others on the economic importance and health benefits of consuming crickets.

**5.2 Conclusion**

The result of this study examined the perception on nutritional value of crickets by members of Akwa Ibom State University community, Obio Akpa Campus. Findings showed that the respondents were educated but majority (70.6%) were not aware of the nutritional composition of cricket which was the reason why they do not consume crickets. The findings also showed that majority (60.6%) of the respondents were willing to have a taste of crickets if given an opportunity. It was also evident that lack of knowledge (education) was the constraint limiting the consumption of crickets by the respondents in the study area.

**5.3 Recommendations**

Based on the findings made on this research, the following recommendations are suggested and if adopted will help to facilitate consumption of cricket.

1. There should be more awareness on consumption of cricket since it is nutritious so that people can benefit from the numerous nutrients of these edible insects.
2. There is also need to develop other ways of preparing crickets to make them more attractive especially to the group of persons who see cricket as being unattractive and unhygienic.
3. There is need to provide educational programmes on the nutritive values of cricket which would enhance the chances of cricket consumption by respondents in the study area.

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