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**Full Length Research Article**

Wild Edible Indigenous Plants in Kontagora Emirate Forests, Niger State, Nigeria

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ABSTRACT

Nigeria is endowed with high biodiversity that include indigenous and traditional food plants. The wild plants provide an important source of employment for those outside the formal sector in many tribes. The potential that indigenous wild plants have in food security and poverty alleviation has not been exploited. The method used in gathering the ethno botanical information was survey and interviews from elderly persons from the tribes of kambari and in Auna, Tungan-Bako, Salka and Madara in Kontagora. The study investigates the wild edible indigenous plants in Kontagora emirates. Thirty nine (39) species belonging to 22 families in 34 genera of wild angiosperms were studied. Caesalpiniaceae and Anacardaceae families had the highest ranked species of five (5) and five genera (5) each respectively. Cucurbitaceae, Tiliaceae and verbenaceae had two species in two(2) genera each respectively. The families of Rubiaceae and Bombacaceae and Rubiaceae had three species each. Pedaliaceae, Malvaceae and Rubiaceae each had two (2) species and the rest families had one species each respectively. The edible parts of the plants eaten includes leaves, pods, fruits, barks, rhizomes and Roots. The study recommends that conservation of wild edible plants should be coupled with improvement plan to the natives of the areas for sustainable utilization.

Introduction

In Nigeria and other African countries, there are hundreds of indigenous plants that contribute to the food security and plant play a vital role in the nutrition of the people particularly the rural populace [8]. Nigeria is endowed with high biodiversity that include indigenous and traditional food plants. The wild plants provide an important source of employment for those outside the formal sector in many tribes. The potential that indigenous wild plants have in food security and poverty alleviation has not been exploited. Nigerians have indigenous plants species growing wild, cultivated or semi cultivated. Those plants are well known to the hand of people. The plants are well adapted to tropical conditions, diseases, pests and drought. They contain high level of vitamins and minerals which can provide more than 100% of the daily body requirements for all ages and supplemental protein. Despite these values, the plants have been neglected for many years by researchers, policy makers and funding agencies and are currently threatened with extinction [6]. More so, low food production, seasonal food shortages, high post-harvest losses, poverty, high food prices, high unemployment, poor health facilities, low level of nutrition education cultural factors

and taboos that reduce access to food contribution to food in security

Indigenous fruits, leaves, vegetables, add a variety of colors, unique flavors and a range of textures to Nigeria diet. Wild and cultivated vegetables form parts of the main dishes or are used as condiments, imparting flavor and other desirable quality attributions to soups and sauces served with starchy staple foods, made from roots tuber and grains. In health benefits edible indigenous plants have health promoting natural constituents, especially vitamins and minerals that are vital for good health and wellness of the rural population in most localities they are the most common and relatively abundant sources of ascorbic acid (vitamin c). They are also rich in other health promoting phyto chemicals that have discrete bio-activities. They offer protection against several health conditions including cancer, coronary heart disease, high blood pressure, diabetes, inflammations and vital microbial infections [8]. The occurrence of these edible wild plants are affected by forest fires, by honey harvesters and game hunters, over harvesting of useful plant products sometimes damaging them to death without planting

seedlings to replace them and deforestation of farmland extension[12]

Despite the potential of wild indigenous plant species in improving the livelihood of poor communities' indigenous wild plants are threatened as a result of poverty, high population density which results in increased demand of indigenous edible plants and over dependence. Subsistence agriculture and economic policy rarely recognized the role of indigenous wild plants in economic development. It has been also observed that knowledge on wild food plants is on sharp decline. Unless efforts are made to educate younger generations about their importance, this knowledge may be lost in the near future.

Indigenous wild Nigerian plants as well other trees whose foliage and fruits eaten as food and medicines are of considerable nutritional and environmental significance. One of the most environmental problems is deforestation, uncontrolled wood falling activities and bush burning. The ecological studies on wild edible plants families and species composition is rare in Nigeria especially in Kontagora emirates. The study will be of great significance to ecologies, agriculturist, horticulturist, nutritionist, pharmacologist and plant breeders. The species abundance of wild edible plants will allow monitoring of changes and conservation of wild edible plants in the emirate.

The objective of the study was to collect information and identify wild indigenous plants in Kontagora emirates forests. The aim is also to identify the value of wild indigenous plants utilization and to provide a base line data for wild edible indigenous plants in the emirate.

The study was restricted on the wild edible indigenous plants In Kontagora emirate, Niger state Nigeria. The study covers families, species and edible plants parts used by the indigenous in the emirate.

Materials and Method

Study area

The survey was carried out in the two local Governments Areas of the emirate, Magama and Kontagora in Niger state, Nigeria. The tribes in the local Government areas are kambari, Dukkawa, Gwari and Bassawa . The ethno botanical data of the edible wild plants were collected from the tribes of kambari in Auna, Salka ,Tungan Bako in Magama Local Government Area and Madara in Kontagora Local Government Area through participatory rural appraisal and housewives. Observations and interviews from elders .Plants local names, edible parts and method of utilization were gathered from them with regard to each plant. The study was conducted for a period of two years from 2014-2015.

Table 1: Major Wild Edible Indigenous Plants According to Family, Genus and Edible Plant Parts

| S/N | Family | Genus | Species | Edible Parts |
|-----|------------------|----------------------|------------------------|--------------------|
| 1. | Caesalpiniaceae | <i>Afzelia</i> | <i>A. africana</i> | Leaves |
| | | <i>Cassia</i> | <i>C. obtusifolia</i> | Leaves |
| | | <i>Detarium</i> | <i>D. microcarpum</i> | Pods |
| | | <i>Senna</i> | <i>S. occidentalis</i> | Leaves/Pods |
| | | <i>Tamarindus</i> | <i>T. indica</i> | Fruits |
| 2. | Anacardiaceae | <i>Anacardium</i> | <i>A. occidentale</i> | Nuts/Fruits |
| | | <i>Lannea</i> | <i>L. schimperina</i> | Leaves |
| | | <i>Mangifera</i> | <i>M. indica</i> | Fruits |
| | | <i>Moringa</i> | <i>M. oleifera</i> | Leaves |
| | | <i>Spondias</i> | <i>S. mombin</i> | Fruits |
| 3. | Tiliaceae | <i>Corchorus</i> | <i>C. tricoloris</i> | Leaves |
| | | <i>Corchorus</i> | <i>C. olitorium</i> | Leaves |
| | | <i>Grewia</i> | <i>G. mollis</i> | Leaves/bark |
| 4. | Pedaliaceae | <i>Sesamum</i> | <i>S. indicum</i> | Leaves |
| | | <i>Sesamum</i> | <i>S. orientale</i> | Leaves |
| 5. | Curcubitaceae | <i>Mormodica</i> | <i>M. charanta</i> | Leaves |
| | | <i>Curcubita</i> | <i>C. maxima</i> | Fruits |
| 6. | Verbenaceae | <i>Parkia</i> | <i>P. biglobosa</i> | Fruit/pod/seed |
| 7. | Malvaceae | <i>Hibiscus</i> | <i>H. cannabis</i> | Leaves |
| | | <i>Hibiscus</i> | <i>H. sabdariffa</i> | Leaves/Fruits |
| 8. | Rubiaceae | <i>Gardenia</i> | <i>G. aqualla</i> | Fruits |
| | | <i>Gardenia</i> | <i>G. ternifolia</i> | Fruits |
| | | <i>Gardenia</i> | <i>G. sokotensis</i> | Fruits |
| 9. | Bombacaceae | <i>Adansonia</i> | <i>A. digitata</i> | Fruit/seeds/leaves |
| | | <i>Ceiba</i> | <i>C. pentadra</i> | Leaves |
| 10. | Amaranthaceae | <i>Celosia</i> | <i>C. argentia</i> | Leaves |
| 11. | Arecaceae | <i>Elaeis</i> | <i>E. guineensis</i> | Fruits/nuts/sap |
| 12. | Dioscoreaceae | <i>Dioscorea</i> | <i>D. praehensis</i> | Roots |
| 13. | Portalacaceae | <i>Portalacea</i> | <i>P. oleraceae</i> | Leaves |
| 14. | Cochlospermaceae | <i>Cochlospermum</i> | <i>C. tinctorium</i> | Rhizome |
| 15. | Annonaceae | <i>Annona</i> | <i>A. senegalensis</i> | Fruits/Flowers |
| 16. | Balanitaceae | <i>Balanites</i> | <i>B. aegyptiaca</i> | Fruits |
| 17. | Irvingiaceae | <i>Irvingiaceae</i> | <i>I. gabonensis</i> | Fruits |
| 18. | Loganiaceae | <i>Strychnos</i> | <i>S. spinosa</i> | Fruits |

| | | | | |
|-----|--------------|----------------------|---------------------|-------------|
| 19. | Convulvaceae | <i>Ipomea</i> | <i>I. muricata</i> | Leaves |
| 20. | Mimosaceae | <i>Sarcocephalis</i> | <i>S. latifolus</i> | Fruits |
| 21. | Olacaceae | <i>Ximenia</i> | <i>X. Americana</i> | Fruits |
| 22. | Sapotaceae | <i>Vitellaria</i> | <i>V. paradoxa</i> | Fruits/nuts |

The results from table 1 shows that thirty nine (39) species in 22 families belonging to 34 genera of wild angiosperms were studied. Caesalpiniaceae and Anacardaceae families had the highest ranked species of five (5) in (5) five genera each respectively. Tiliaceae, curcubitaceae and verbenaceae had two (2) species and 2 two genera each respectively. The families of verbenaceae had 3 three species in one group Bombacaceae and 3 species in 1 genera. pedaliaceae, malvaceae, and Rubiaceae each had two (2) species on one (1) genera each respectively and the rest families, each had one (1) species and one group respectively.

In addition, leaves and fruits are the most parts of the studied wild edible plant that the indigenes most fed on. The twelve (12) species of the studied wild plants leaves are eaten followed by eleven (11) species whose fruits are also eaten. The roots of *Dioscorea prehehensils* from Dioscorea family are also edible. *Elaeis guineensis* from the Arecaceae family sap is extracted, fermented and taken as wine. The rhizome of *cochlopernum tinctorium* is dug, peeled, sun dried and grinded into flour (kwata in Hausa, marigiji in kambari, for making stew and also a good remedy for treatment of malaria.

Discussion

The results from the findings reveal the nutritional aspects of the wild indigenous plant species in Kontagora emirate forests. The leaves, roots, flowers and bark were mostly edible. Some of the leaves are cooked in soup while, some of the fruits are dried and pounded as condiments e.g. *Annona senegalensis*, (*Gongole in Hausa, iyechi in kambari*) and the fruits (kambari=kabam) are juicy and sweet, when ripe. The leaves of *Moringa*, *Cassia*, *Doniana*, *Afzelia*, *Serina* and *Hibiscus* are also used as vegetables and are cooked in soup. The leaves are also boiled and mixed up with a grinded groundnut cakes (Hausa = kuli kuli) or grinded fried or burnt groundnuts seeds used to prepare local staple food called “Dambu” in Hausa

In addition, the fruit of *Vitex*, *Detarium* and *Tamarind* are used in the preparation of local juice and the leaves of *Vitex* are also in preparing local ink for writing. The extracted juice of *Vitex doniana* fruits is boiled to prepare local juice (tsime in Hausa, mace in kambari) so also extracted juice from the fruits of *A. occidentalis* is boiled to produce local juice, the nuts are also roasted and eaten. The *Curcubita* and *Cochlospermum* are grinded into powder and used for adding thickness to the soup. The pods of *Detarium* are also boiled and eaten, the fruits are also eaten raw when ripe. The leaves of *Adansonia* are used in preparing local Hausa soup ‘ Miyan kuka’ (kambari= malugu) and *Sabdariffa* soup known as ‘Miyan Saborodo’ or ‘miyan sure’.

Moreover, *Parkia biglobosa* powder can be eaten raw and the powder was used in making local pap from guinea corn and maize flour. The seeds are also used to processed local condiments called ‘ Daddawa in Hausa and in kambari tsanana

which adds flavor to soup. The seeds of *sabdariffa* are used to processed local spice called “Chiwande” in Dakarkari language. The oil producing wild plants like, *Vitel laria Paradoxa*, *Elaeis guineensis* and other plants which produce fruits are consumed directly by the indigenes at time of harvest. The *Vitellaria paradoxa* fruits are processed into oil known as ‘Man kade’ in Hausa and in Kambari “Manin mapesshe” which is also used for cooking soup, as body lotion, for treatment of bone dislocations, bone fracture and wound treatment.

Elaeis guineensis is extensively tapped for its sap “Bommi” in Hausa and in Kambari “Makula”. The tapped sap is allowed to ferment on the tree to produce culturally most significant beverage of the indigenes (palm wine) which is nutritious and very medicinal[4]. The nuts after processing the palm oil from the fruits are also processed again to produce oil called “Aledi” which is a very good body lotion to the indigenes.

The roots of *Dioscorea Praehensils* are also edible which are found growing wild and are good sources of carbohydrate as in Cassava, Yam, and Sweet Potatoes and are consumed mostly by the Dakarkari, Kambari and Dukawa in the villages. Plant can be cooked and eaten directly or pounded in mortar and pestle eaten with vegetable soup. It is a plant yielding non seed carbohydrate.

In the past, many more wild plants were used as additional sources of food. Before international fruits such as orange and mangoes became readily available in the markets, wild fruits and vegetables were much more appreciated most of the plants are noted in earlier sources as “famine foods” i.e. plants that can be eaten after processing in cases of severe food shortage. The development of food relief has meant that much of the knowledge about such edible wild plants is in danger of being lost.

Similarly, the information gathered about the *Cochorus spp* from the Kambari women interviewed revealed that the *Cochorus* leaves are good source of vegetables and can be cooked fresh and also be sun dried and preserved for years. The species are also cooked and mixed with a meat or smoke fish stew and it was used to prepare a post natal dish for nursing women mixed with spices and condiments which can be eaten along with staple food from *Zea mays*, guinea corn and millets. Also, some of these plants can be easily husbanded because they adapt bad weather conditions and can grow on any soil type, some during drought remains stunted in growth but resumes growth when rain finally come. *Curcubita* are fairly drought tolerant but sensitive to water logged soils are found mostly wide and can be cultivated intercrop mostly with cereals like maize and sorghum[3]. Various wild plants were used in the control of crop pests e.g. species from Ateraceae, meliaceae, verbenaceae and Rubiaceae families[1].

Apart from edibility, the wild edible plants provide both products and services. The plant products are easily identified as they are

tangible (fruits, fodder and medicines). The plant services are less readily observed e.g. soil improvement, and micro climate, modifications. The plants are also used as fallow crops, live fences, roofing, boundary markers, wind breaks and shelter belts, Shade nurses trees, Erosion control, cover crops, green manure, land reclamation species, lives supports and water clearing agents e.g. *Moringa Oleifera* and Fuel wood[10]

Edible parts of wide plants (fruits, flowers), leaves, tubers and rhizomes) are the nature's gift to mankind; these are not only delicious and refreshing but also a chief source of vitamins, minerals and proteins. The wild edible plants are the normal food for cattle grazers and the forest tribes[9] The ranges of plant species recorded help to avert hunger and malnutrition because they provide them with valuable vitamins, mineral elements, proteins and fats and oil. This is in conformity with the work of Nnamani ,Catherine ,Osebele, Happiness and Onek [2011] who showed the analysis of some traditional leafy vegetables such as *V. amygdalina*, *V. doniana* are good sources of iron , magnesium, sodium, potassium and calcium. The investigation also revealed that some of the plants serve as major sources of medicine for herbalist and local healers for various families of ethnic groups found in the emirate.

Conclusion

Wild edible fruits, seeds, leave contribute food security, controlling fire lines, planting most utilized and rare species to increase them to strengthen sustainable utilization. Strictness administered in farmland extension should contribute to the better conservation of wild edible plants in Kontagora emirate forest than before. Ethno botany should be extended to other areas of the emirate in order not only to preserve the traditional knowledge related to plants but to make it available to future generations as well.

Recommendations

- The wild edible plants should be conserved in situ and laws should be enforced to the conservation of wild edible plants for sustainable use
- The potential tapped from the wild edible plants should be coupled with the improvement plan to the natives of the study areas.
- Domestication of effective wild edible plants in other to elaborate their potentials which are cheaper and available for use by farmers.
- Adequate production technology and good marketing channels should be provided to the natives so as to improve their production.
- The natives should be enlightened to care for the edible wild plants in the same way as animals (wildlife).

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