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Assessment of Wild Leafy Vegetables Used for Combating Health Issues Among the People in Ekiti State

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ABSTRACT: *The consumption of wild leafy vegetables as part of a balanced diet is a common practice among local people. This study was carried out to assess wild leafy vegetables used for combating health issues among the people of Ekiti State. A multistage random sampling technique was used for the study. One hundred and twenty pre-tested questionnaires were randomly administered to respondents for the collection of data. Information obtained from the study revealed that, majority of the respondents are married (80.83 %), female (55 %). The study revealed that 30 different wild plant species leaves are collected and utilized as vegetables by the respondents in the study area with Vernonia amygalina and Talinum triangulare being the most sort among the respondents (7.66 % each). This was followed by Solanecio biafrae and Ocimum gratissimum with 7.59 % and 6.76 % respectively. The study revealed that each species of wild leafy vegetables collected was consumed for the treatment of more than one ailment. Methods of conservation revealed that 35.52 % of the respondents retained wildlings on their farmland while 33.45% adopted selective harvesting. Indiscriminate bush burning constitutes the major challenge against the conservation of these vegetables. Consequent to the results of this study it is recommended that the government encourage domestication of endangered species by enacting laws that will make it mandatory for estate developers to use a certain percentage of the land in their compound for home gardens.*

Keywords: *Wild leafy vegetables, Health issues, Conservation, Home garden, Ekiti State.*

I. INTRODUCTION

Vegetables are edible plants consumed either raw or cooked as part of man's main dish (Nnamani *et al*., 2010). However, when the part eaten as vegetables is mainly from the leaves, such vegetables are referred to as leafy vegetables. They are also called potherbs, greens, vegetable greens, leafy greens, or salad greens. Although they come from a very wide variety of plants, some shared a great deal with other leafy vegetables in nutrition and cooking methods (Vainio-Mattila, 2000). Medicinal plants are plants used in treating and preventing specific ailments and diseases that affect human beings and domestic animals. Medicine from plant sources has been in use throughout the ages and thus plays a significant role among rural dwellers. About 80% of the people in developing countries relied on the use of botanicals for their primary health care (Muthu *et al*., 2006).

Interestingly, some medicinal plants are known to be good vegetables. They have both medicinal and nutritional properties. They are a cheap source of protein, vitamins and essential amino acids (Amaechi, 2009). There had been an increased interest in various disciplines on the importance of medicinal plants and the contribution of phytomedicine to the well-being of great number of the world's population (Bimpa *et al*., 2007). Leaves have a considerable amount of calcium which is good for the growth and maintenance of bones, teeth

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and muscles (Onwordi *et al*.,2009). Among other minerals found in the leaves, are sodium, magnesium and iron. Sodium is involved in the regulation of plasma volume, acid-base balance, and nerve in muscle contraction (Akpanyung, 2005). Magnesium is a component of chlorophyll; an important mineral element in connection with ischemic heart disease and calcium metabolism in bones (Ishida *et al*., 2000). While iron is an important constituent of haemoglobin (Onwordi *et al*., 2009).

Wargovich (2000) described fruits and vegetables as a treasure house of a variety of nutrients and bioactive phytochemicals which are the important components of human daily diet. Wild vegetables in particular, play significant roles in the livelihood of many communities in developing countries of the world as food and for medicinal purposes (Arowosegbe, 2013). Vegetables have relatively high nutritional values and their consumption gives diversity to daily food intake (Arowosegbe *et al*., 2015). Nigeria is blessed with abundant supply of both cultivated and non-cultivated vegetables that grow seasonally (Oyeyemi and Tedela, 2014). Leafy vegetables contribute substantially to solving the problem of food scarcity (Yiridoe and Anchirinah, 2005). Many of these vegetables are under-utilized because of inadequate scientific knowledge of their nutritional potential (Awobajo *et al*., 2010) as well as their medicinal uses (Jimoh *et al*., 2010).

It is estimated that 80% of the populations of developing countries rely on traditional medicines, mostly wild leafy vegetables, for their primary health care needs (Schmincke, 2003). The use of these medicinal plants for the treatment of disease and infections is as old as mankind. Therefore, leaves of many indigenous plants consumed as vegetables are used in traditional medicine to cure diseases, heal injuries and infections (Okwu and Josiah, 2006). A large majority of these plant leaves are consumed as foods (Faleye and Ogundaini, 2012). These vegetable plants are found in the wild, semi-wild and cultivated areas as herbs, while some are trees, weeds and shrubs.

Wild leafy vegetables are essential sources of nutrients, and as a part of a healthy diet may be an effective strategy to reduce malnutrition. Low consumption of wild leafy vegetables in the human diet is one of the factors which lead to most deficiency diseases in man (Dweba and Mearns, 2011). The high demand for these wild vegetables has serious implications on the survival of several plant species, with many under serious threat of becoming extinct. Conserving these wild vegetables is very essential to prevent their total extinction from the natural flora. There is a great need therefore, for a study of this nature to carry out an inventory of wild leafy vegetables primarily consumed for their medicinal potential in the study area.

II. METHODOLOGY

The Study Area

The study was conducted in Ekiti State. Ekiti state is located in Southwest Nigeria. It lies south of Kwara and Kogi State. It is bounded in the west by Osun State and in the east and south by Ondo State. It is located between Longitude 4^0 5^1 and 5^0 45^1 East of the Greenwich meridian and Latitude 7^0 5^1 and 8^0 5^1 North of the Equator. The climate of the study area is of

West Africa monsoon type with dry and wet seasons. The wet or rainy season normally starts from late March to October with occasional strong wind and thunderstorms, usually at the onset and at the end of the season. The dry season normally starts from November to March and it is characterized by the cold wind of harmattan. The topography is hilly with large a number of hills of various sizes surrounding most of the towns and villages. The annual rainfall ranged from 1,200 mm to 1,500 mm. Temperature ranges from 21^0 C to 32^0 C throughout the year. The annual average relative humidity is about 90 % at 7.00 am and 65 % at 4.00 pm.

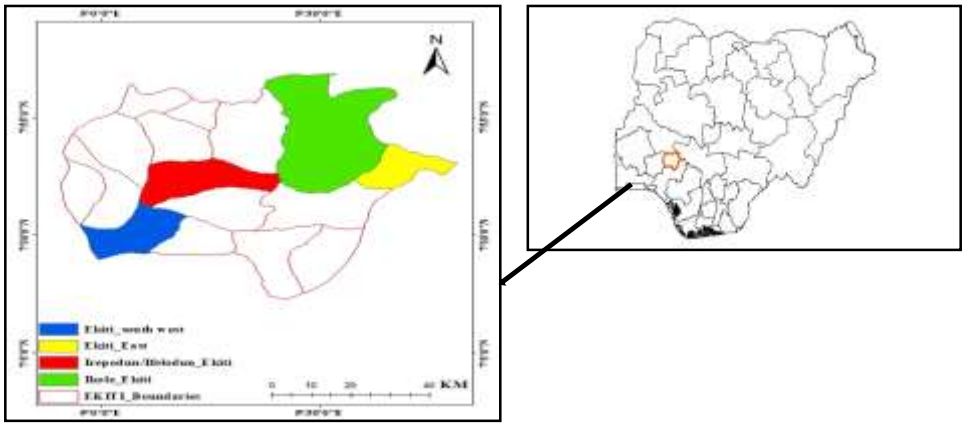

Figure 1: Map of Ekiti State showing the study area

Sampling Procedure, Data Collection and Analysis

A multistage sampling technique was used for the study. The study area was stratified into two zones viz; the derived savanna to the northern peripheries and the rainforest zone to the southern part. Four local governments were randomly selected (two from each of the vegetation zones) out of the sixteen local government areas of the state to give a 25% sampling intensity. Two communities were randomly selected in each of the sampled local governments to give a total of eight communities. Fifteen (15) respondents from each of the selected communities were sampled for interview making a total of 120 respondents. (Table 1). A pre-tested, semi-structured questionnaire was administered to the respondents. Data collected was analyzed using descriptive statistics of frequency table and percentage distribution.

Table 1: Distribution of respondents in the study area.

Vegetation zone	Local government	Towns	No of respondents
Rain forest	Irepodun/Ifelodun	Afao-Ekiti	15
		Iyin- Ekiti	15
	Ekiti south west	Igbaraodo-Ekiti	15
		Ilawe-Ekiti	15
Derived savannah	Ilejemeje	Ikole-Ekiti	15
		Ayedun-Ekiti	15
	Ekiti east	Omuo-Ekiti	15
		Ilasa-Ekiti	15
Total	**4**	**8**	**120**

III. RESULTS

Socio-economic Characteristics of Respondents

Results on gender showed that 45 % of the respondents are male while 55 % are female in the study area. The age distribution of the respondents showed that the majority (86.67 %) are above 40 years. Respondents' marital status shows that 80.83 % are married while 17.5 % and 1.67 % are divorcees and singles respectively. The result on household size shows that 52.5 % of the respondents have 5-7 members while 29.17 % have 1-4 members. The educational level of the respondents in the study area shows that 47.5 % had at least secondary education.

Table 2: Socio-economic characteristics of respondents

Variables	Rainforest	%	Derived savanna	%	Total	%
Gender						
Male	26	43.33	28	46.67	54	45
Female	34	56.67	32	53.33	66	55
Age						
21- 30	1	1.67	0	0	1	1.67
31-40	11	18.33	4	6.67	15	12.5
41-50	20	33.33	22	36.67	42	35.0
Above 50	28	46.67	34	56.67	62	51.67
Marital status						
Single	2	3.33	0	0	2	1.67
Married	49	81.67	48	80	97	80.83
Divorced	9	15	12	20	21	17.5
Household size						
1-4	21	35	14	23.33	35	29.17
5-7	29	48.33	34	56.67	63	52.5
≥ 8	10	16.67	12	20	22	18.33
Educational level						
No Formal Education	13	21.67	17	28.33	30	25
Primary	18	30	15	25	33	27.5
Secondary	20	33.33	22	36.67	42	35
Tertiary	9	15	6	10	15	12.5
Total	**60**	**100**	**60**	**100**	**120**	**100**

Vegetable collection and utilization in the study area

Table 3 shows that 28.26 % of the respondents collected their products from farmland while 26.37 % collected from the forest in the rainforest and the derived savanna respectively. The result also showed that 17.39 % and 17.58 % of the respondents in the rainforest and derived savanna respectively collect their products from home gardens. The result also revealed that 58.23 % and 64.38 % of the respondents usually go for their collection as the need arises in the rain forest and the derived savanna zones respectively. The result in table 4 showed that thirty (30) different species of wild leafy vegetables were collected by the respondents in the study area with *Solanecio biafrae, Vernomia amygalina* and *Talinum triangulare* being the most sort after by the respondents in rain forest (8.19 %) and 7.20 % in the derived savanna zone. This was followed by *Ocimum gratissimum* with 7.09 % in the rainforest and *Amaranthus hybridus* (6.84 %) in the derived savanna respectively. Table 5 shows that each species of wild leafy vegetable was consumed for treatment of more than one ailment by the respondents in the study area. Also, the result showed that most of the vegetables are available all the year round.

Table 3: Distribution of respondents by vegetable collection

Sources of collection	Rainforest	%	Derived savanna	%	Total	%
Farmland	26	28.26	23	25.27	49	26.78
Forest	24	26.09	24	26.37	40	21.86
Home garden	16	17.39	16	17.58	40	21.86
All of the above	26	28.26	28	30.77	54	29.51
Total	**92***	**100**	**91***	**100**	**183***	**100**
Collection frequency						
Everyday	15	18.99	9	12.33	25	16.34
Weekly	13	16.46	10	13.69	23	15.03

Once in 2 weeks	5	6.33	7	9.59	12	7.84
As the need arises	46	58.23	47	64.38	93	60.78
Total	**79***	**100**	**73***	**100**	**153***	**100**

*Multiple responses

Table 4: List of wild leafy vegetables in the study area

S/N	Local Name	Scientific name	Rainforest	%	Derived Savanna	%	Total	%
1	Worowo	*Solanecio biafrae*	60	8.19	59	7.08	119	7.59
2	Olugborogan	*Dracaena surculosa*	6	0.82	0	0	6	0.38
3	Ewuro	*Vernomia amygadalina*	60	8.19	60	7.20	120	7.66
4	Egbure	*Talinum triangulare*	60	8.19	60	7.20	120	7.66
5	Tete-atetedaye	*Amaranthus hybridus*	48	6.55	57	6.84	105	6.70
6	Odu	*Solanum nigrum*	45	6.14	38	4.56	83	5.30
7	Efinrinnla	*Ocimum gratissimum*	52	7.09	54	6.48	106	6.76
8	Efinrinwewe	*Ocimum canum*	41	5.59	50	6.00	91	5.81
9	Ebolo/ebire	*Crassocephalum crepidioides*	43	5.87	37	4.44	80	5.11
10	Koko eposo	*Colocasia esculenta*	12	1.64	8	0.96	20	1.28
11	Oha leaf	*Pterocarpus mildbraedii*	7	0.95	16	1.92	23	1.47
12	Ewuroodo	*Struchium sparganophora*	25	3.41	0	00	25	1.59
13	Odundun	*Bryophyllum pinnatum*	36	4.91	30	3,60	66	4.21
14	Yanrin	*Taraxacum officinale*	6	0.82	17	2.04	23	1.47
15	Elegede	*Curcubita pepo*	35	4.77	47	5.64	82	5.24
16	Ewuraigbo	*Dioscorea alata*	1	0.14	2	0.24	3	0.19
17	Efunle	*Aerva lanata*	12	1.64	29	3.48	41	2.62
18	Okun-eyin	*Diodia scandens*	3	0.41	9	1.08	12	0.77
19	Ewe ege	*Manihot esculenta*	39	5.32	45	5.42	84	5.36
20	Olofulofulo	*Sterculia tragacantha*	4	0.55	8	0.96	12	0.77
21	Ira	*Bridelia ferruginea*	45	6.14	49	5.88	94	6.00
22	Tebaje/oro-sapo	*Euphorbia hirta*	12	1.64	0	0.00	12	0.77
23	Ayunre	*Albizia zygia*	25	3.41	41	4.92	66	4.21
24	Bomubomu	*Calotropis procera*	0	0.00	11	1.32	11	0.70
25	Arere/ eruku	*Triplochiton scleroxylon*	33	4.50	42	5.04	75	4.79
26	Oshe	*Adansonia digitate*	2	0.27	17	2.04	19	1.21
27	Araba	*Ceiba pentandra*	11	1.50	19	2.28	30	1.92
28	Aluki	*Acacia sieberiana*	0	0	2	0.24	2	0.13
29	Esinsan	*Diospyros ferrea*	0	0	5	0.60	5	0.32
30	Osun	*Pterocarpus osun*	10	1.36	21	2.52	31	5.48
Total			**733**	**100**	**833**	**100**	**1,566**	**100**

Table 5: Medicinal uses and seasonal availability

S/N	Local Name	Botanical name	Seasonality	Medicinal uses
1	Worowo	*Solanecio biafrae*	Rainy season	Blood tonic, detoxification, energy booster, cough

2	Olugborogan	*Dracaena surculose*	All year round	Headache, anaemia, cancer, kidney disease.
3	Ewuro	*Vernomia amygadalina*	All year round	Fever, stroke, dysentery, malaria, blood sugar, missiles, stomach ache
4	Egbure	*Talinum triangulare*	All year round	Blood Tonic, constipation, indigestion, smooth skin
5	Tete-atetedaye	*Amaranthus hybridus*	Rainy season	Cancer, joint pain, strong bone, smooth skin, health problems, diarrhoea
6	Odu	*Solanum nigrum*	Rainy season	Back pain, blood tonic, dysentery
7	Efinrinnla	*Ocimum gratissimum*	All year round	Stomach ache, dysentery, back pain, cough and cold
8	Efinrinwewe	*Ocimum canum*	All year round	Stomach ache, dysentery, back pain, cough and cold
9	Ebolo/ebire	*Crassocephalum crepidioides*	Rainy season	Cancer, eye treatment, diabetics, kidney disease
10	Koko eposo	*Colocasia esculenta*	Rainy season	Asthma, diarrhoea, smooth skin, increased body weight
11	Oha leaf	*Pterocarpus mildbraedii*	All year round	Blood pressure, diarrhoea, strong bone, diabetics, digestion
12	Ewuroodo	*Struchium sparganophora*	Rainy season	Joint pain, fever, rheumatism, mental disorder
13	Odundun	*Bryophyllum pinnatum*	All year round	Cough, diarrhoea, dysentery, wound, fever, epilepsy, cancer
14	Yanrin	*Taraxacum officinale*	All year round	Reduce stress, liver disease, reduce high cholesterol, blood sugar, weight loss
15	Elegede	*Curcubita pepo*	Rainy season	Anti-ulcer, anti-cancer, diabetic, hypertension, detoxification
16	Ewuraigbo	*Dioscorea alata*	Rainy season	Piles, dysentery, cough, ulcer, leprosy, diabetics, asthma, cancer
17	Efunle	*Aerva lanata*	Rainy season	Ulcer, snake bite, wound, kidney problem, diarrhoea,
18	Okun-eyin	*Diodia scandens*	All year round	Dysentery, diarrhoea, asthma, convulsion,
19	Ewe ege	*Manihot esculenta*	All year round	Hypertension, headache, joint pain, fever, high cholesterol
20	Olofulofulo	*Sterculia tragacantha*	All year round	Diabetics, whitlow, cold, infections, diarrhoea, pain, fever, gonorrhoea, boil, snake bite
21	Ira	*Bridelia ferruginea*	All year round	Malaria, asthma, cancer, diabetics, gonorrhoea, joint pain, menstrual pain, stomach pain, yellow fever, cough
22	Tebaje /oro-sapo	*Euphorbia hirta*	Rainy season	Cough, asthma, gonorrhoea, pimples, tumor, digestive problem
23	Ayunre	*Albizia zygia*	All year round	Fever, stomach ache, cancer, depression, anxiety, diarrhoea,

24	Bomubomu	*Calotropis procera*	All year round	diarrhoea, skin disease, stomach problem, constipation, digestive, ulcer
25	Arere/ eruku	*Triplochiton scleroxylon*	All year round	Painkiller,
26	Oshe	*Adansonia digitate*	All year round	Tuberculosis, diarrhoea, dysentery, infection, toothache, malaria, fever
27	Araba	*Ceiba pentandra*	All year round	Headache, diabetics, heal wound, rheumatism
28	Aluki	*Acacia sieberiana*	All year round	Stomach ache, cold, diarrhoea, gonorrhoea, kidney problem, rheumatism
29	Esinsan	*Diospyros ferrea*	All year round	Asthma, leprosy, cough, menstrual pain, dysentery,
30	Osun	*Pterocarpus osun*	All year round	Smooth skin, joint pain, infections, gonorrhoea, eczema

Conservation and Challenges

Table 6 shows that 35.52 % of the respondents in the study area adopt retention on farmland for the conservation of the plant species. Other conservation methods adopted by the respondents in the study area are selective harvesting (33.45 %) and planting at the backyard (31.03 %). The result also revealed that 26.73 % and 25.35 % of the respondents opined that indiscriminate bush burning and land clearing for farming activities were the major challenges against the conservation of wild leafy vegetables in the study area. (Table 7)

Table 6: Distribution of respondents by methods of conservation

Conservation methods	Rainforest	%	Derived savanna	%	Total	%
Retention on farm	50	35.21	53	35.81	103	35.52
Selective harvesting	48	33.80	49	33.11	97	33.45
Planting at the backyard	44	30.99	46	31.08	90	31.03
Total	**142***	**100**	**148***	**100**	**290***	**100**

*Multiple responses

Table 7: Distribution of respondents by challenges of conservation

Challenges of conservation	Rainforest	%	Derived savanna	%	Total	%
Indiscriminate bush burning	56	26.17	60	27.27	116	26.73
Farm clearing	53	24.76	57	25.91	110	25.35
Ignorance	48	22.43	33	15.00	81	18.66
Insect attack	22	10.28	26	11.82	48	11.06
Urbanization	35	16.36	44	20.00	79	18.20
Total	**214***	**100**	**220***	**100**	**434***	**100**

*Multiple responses

IV. DISCUSSION

The observed involvement of a high percentage of married elderly women in the collection and utilization of wild leafy vegetables in the study area is not unexpected because these groups of women are mothers and they are responsible for the preparation of food for household consumption. The fairly large family size coupled with the low level of education of the majority of the respondents could be a major reason for the preference

for consumption of different species of wild leafy vegetables among the people in the study area. Since these vegetables are gotten mostly from farmland and forest land most time at no cost as revealed in Table 8. It is therefore economical and affordable for most rural households that are not financially buoyant but have to prepare soup almost on daily basis to feed their members. This assertion corroborates the submission by Olujobi (2015) that the use of indigenous or wild plant leaves as vegetables, especially among low-income rural dwellers provides the necessary dietary requirement at least for their immediate family.

The observed frequency of vegetable collection either every day or as the need arises by the respondents is proof that the consumption of wild leafy vegetables is a means of livelihood for the people in the study area. A similar assertion has been reported by Olujobi (2015) that the exploitation of forest resources is an important source of food and income, especially for rural dwellers. The wide acceptability and consumption of vegetables like *Solanecio biafrae, Vernonia amygalina, Talinum triangulare* and *Ocimum gratissimum* among the respondents throughout the study area could be attributed to their medicinal value, seasoning properties with a sweet aroma and ease of domestication. It is a common practice for most households to have these vegetables planted in their backyard which makes them easily accessed whenever they are needed.

The high number of different species of wild leafy vegetables collected and consumed by the people in the study area for the treatment of a wide range of ailments attest to how important these vegetables are and it is a proof that it has become part of the people's culture, especially in the area of health care delivery. This assertion is in agreement with Arowosegbe *et. al* (2015) who report that the consumption of vegetables contributes significantly to the nutrient requirements and health benefits of the people of Ekiti State. Because of the importance of these wild leafy vegetables to the livelihood of the people in the study area, the people adopted some conservation strategies such as retention on farmland, selective harvesting and domestication of some species through the home garden system. This action has helped in making these vegetables available at all times thereby ensuring sustainable production. Also, preservation methods such as sun drying, air drying and blending into powder are some strategies put in place to reduce wastage. The respondents, however, decried some challenges against the conservation of these vegetables which include indiscriminate bush burning and farm clearing among others.

V. CONCLUSION

The results from the study have revealed that leaves of thirty (30) different species of wild plants were collected and utilized as vegetables by the respondents in the study area with *Vernomia amygalina, Solanecio biafrae* and *Talinum triangulare* being the most sort among the respondents. Also, it has been revealed that each species of wild leafy vegetable was consumed for the treatment of more than one ailment by the respondents in the study area. The study also revealed that these wild leafy vegetables are usually sourced from farmland and natural forest while a few of them are domesticated at the backyard. Also, results from the study revealed that some conservation methods adopted by the respondents in the study area include retention of naturally grown plant species on farmland, selective harvesting of the products, and planting of some species at the backyard. The study also revealed that indiscriminate bush burning, clearing of farms for agricultural purposes and urbanization are the major challenges against the conservation of these wild vegetables.

VI. RECOMMENDATION

Consequent to the health benefits of these wild leafy vegetables to the people in the study area, domestication of some endangered species should be encouraged by the government through laws that will make it mandatory for estate developers to use a certain percentage of the total land in their compound for home gardens.

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