

THE DIETARY ROLE OF TRADITIONAL VEGETABLES IN THE RURAL COMMUNITIES OF IMO STATE, NIGERIA

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ABSTRACT

Household surveys were conducted in three rural communities selected from the three agricultural zones of Imo State and aimed at identifying those traditional vegetable species that feature regularly in peoples' diets. The survey involved interviews of 10 household representatives (mainly women) selected randomly each month from each of the three communities involved in the study for a period of one year. Results revealed that 22 traditional vegetable species were regularly consumed in the communities, 13 or 59.09%, being domesticated, while 9, or 41.09%, were wildlings. Each household consumed an average of five (5) different species of vegetables weekly with each species being consumed an average of two (2) times weekly. Domesticated leafy vegetables (DLVs) were, however, the species consumed most of the times (consumed 66.57% of the times compared with 33.43% for wild leafy vegetables WLVs). Results also revealed that the consumed vegetables were either purchased or freely acquired. However, whereas more than 60% of the consumed DLVs were acquired through purchases, only 39.81% of consumed WLVs were purchased. Those households who purchased their vegetable needs were spending an average of N 284.20 weekly for that purpose, while those who obtained their vegetable needs free were saving a sum of N 265.50 weekly. Results also revealed that the major reasons for the consumption of the vegetables were the belief in their high nutritive value (41.18%), better flavor and taste they gave to the meals (17.26%), and family preferences (11.91%). With a preference rating of 79.14%, *T. occidentalis* was the species preferred most by the respondents, while the most preferred WLVS were *G. africanum* (18.37%) and *Pterocarpus spp.* (7.03%). It is recommended that the highly preferred domesticated vegetable species be further developed, while those of their WLVS components be domesticated and their production commercialized to ensure increased availability of these vegetables.

Keywords: Rural Households; Traditional Vegetables; Wild Leafy Vegetables; Domesticated Vegetables; Consumption

BACKGROUND:

Since time immemorial, useful plants have been handled by human societies for medicinal and food purposes. While, the hunter– gatherer societies still continue to profess such lifestyles, the agricultural societies did not eliminate the use of non-

cultivated resources (Misra, S., Maikhuri, R.K., Kala, C.P., Rao, K.S., & Saxena, K.G. (2008). Today, most human plant food is based on rather limited number of crops (12 crops contribute more than 85 – 90% of world's calorific intake), but it is clear that in many parts of the world, the use of wild plants is not negligible (Prescott-Allen and Prescott-Allen, 1990; Cavendar, 2006). In Imo State, as in many other parts of southeastern Nigeria, for instance, such wild plants that are in common usage are wild leafy vegetables (WLVs). Such vegetables find uses in soups, stews, porridges, and relishes, which accompany carbohydrate staples. Apart from their dietary role, these vegetables also form important items of trade, particularly for women. For most of these women, income from the sale of these vegetables represents their only source of cash income.

Although a number of studies have documented the diversity of wild and semi-wild plants in common usage as vegetables in southeastern Nigeria, including their nutritional composition and seasonal importance (Okigbo, 1975; Okigbo, 1986; Okafor, 1979; Okafor, 1991), none have, however, been able to undertake an in depth study of the actual consumption of these vegetables by the people. Studies of such nature would not only help to bring to the fore the extent of contribution of WLVs to the nutritional wellbeing of the people, but would also help in identifying species with food security potentials for further research, development, domestication, and commercialization purposes. It was on these premises that the study was anchored. The study has, as it's major objective, the identification of traditional vegetable species that feature regularly in the peoples diet and comparing the level of consumption between the wild and domesticated leafy vegetable components of these vegetables.

THE STUDY AREA

The study was conducted in three rural communities selected from the three agricultural zones of Imo State Nigeria. Imo State is located within the southeastern part of the country and lies within longitude 6^o35' and 7^o25' east and latitude 5^o12, and 5^o56' north (Imo State Government, 2000). The state has a tropical climate with two distinct seasons in a year, rainy and dry seasons. Mean annual rainfall is 2,000 mm, a humidity range of 51% and 84%, while mean temperature ranges between 25^oC and 34^oC, respectively (Beak Consultants Limited, Geomatics International Inc. and Gaomatics Nig LTD, 1999).

With a total land area of 5,081 km² and a population of 3.94 million (Federal Republic of Nigeria, FRN, 2009), the state has a high population density of 774.43 people per km². The population is predominately rural and is agriculturally based with the sector, employing more than 80% of the population. Common food crops include cassava, yam, cocoyam, plantain, banana, rice, beans, maize, and a wide range of local wild and semi-domesticated plants.

DATA COLLECTION AND ANALYSIS

In order to identify the commonly consumed traditional leafy vegetable species in the various rural households in Imo State, household surveys were undertaken. Three rural communities were involved in the study, one chosen from each of the three agricultural zones of the state. The major criteria employed in the selection of a community was that it must lie within 25 km radius to the respective zonal headquarter and must have a functional market. The rural communities involved in the study were Umuaka in Orlu, Umuagwo in Owerri, and Amaraka in Okigwe.

Ten household surveys were undertaken monthly in each of the selected communities for a one year period. Structured questionnaires and interview guides were administered on each household representative (mainly women). Some information sought by the questionnaire included the various traditional vegetable species consumed in the household within the last week preceding the interview (i.e. one week memory recall), the number of times each species was consumed, mode of acquisition, cost of the vegetables, reasons for their consumption, and the respondents vegetable species preferences. Samplings were done at random and with replacement.

Out of a total of 360 questionnaires administered to the various households during the one year period, 244 that were correctly filled were retrieved, representing 67.75% retrieval rates. The questionnaires were coded while simple descriptive statistics, such as frequencies, percentages, and means were used to analyze the data and tables used to summarize the data.

In order to determine the respondents' vegetable species preferences, they were asked to mention two most preferred vegetable species in their descending order of preferences and these were analyzed using the formula (Franzel, S., Jaecmicke, H., & Janssen, W. (1996). thus:

$$\frac{\text{Sum of rank order values of species}}{\text{The number of interviews undertaken}} \times 100/1$$

Average rank order values =

RESULTS AND DISCUSSION

Commonly Consumed Traditional Leafy Vegetables Species in the Rural Communities of Imo State

Results showed that 22 species of leafy vegetables belonging to eleven (11) genera and ten (10) families were commonly consumed in the various rural households in the study area. Out of this number, 13 (59.09%), belonging to six genera and six families, were domesticated while 9 (40.91%), belonging to five genera and five families, were wild or undomesticated (Table 1). A similar survey in southwestern Nigeria, identified twenty (20) leafy vegetable species, but only about eight (8) were relatively cultivated for consumption, while the rest exist in the forests (AVRDC, 1994). Results also showed that the majority of the households (53.28%) consumed between 5-6 different species of vegetables weekly, while 38.11% indicated that they consumed between 3-4 different species weekly. An average number of different species of vegetables consumed weekly per household was found to be five (5) (Tables 2).

One important findings of the study was that most of the closely related species were not differentiated by the various households, but were rather seen and treated as one and the same species. Included in this category are the three *Solanum*, *Vernonia*, and *Ocimum* species; the two *Amaranthus* and *Curcubita* species, and the two *Pterocarpus* species namely *P. soyauxii* and *P. mildbraedi*. Due to this non differentiation, these species are grouped together and treated as one in the rest of the discussion. On the bases of this grouping, what we eventually have are 13 groups of species, seven being domesticated and six undomesticated.

TABLE 1: The traditional vegetable species commonly consumed in the rural communities in Imo State, Nigeria

| | Botanical Name | Family | English Name | Vernacular Name |
|----|----------------------------------|-----------------------|----------------------|------------------------|
| 1 | <i>Telferia occidentalis</i> | <i>Curcubitaceae</i> | Fluted pumpkin | Ugu |
| 2 | <i>Solanum aethiopicum</i> | <i>Solanaceae</i> | Egg plant | Añara |
| 3 | <i>Solanum melongena</i> | <i>Solanaceae</i> | Egg plant | Añara |
| 4 | <i>Solanum macroparum</i> | <i>Solanaceae</i> | Egg plant | Añara |
| 5 | <i>Vernonia amygdalina</i> | <i>Compositae</i> | Bitter leaf | Olugbu |
| 6 | <i>Vernonia colorata</i> | <i>Compositae</i> | Bitter leaf | Olugbu |
| 7 | <i>Vernonia calvoana</i> | <i>Compositae</i> | Bitter leaf | Olugbu |
| 8 | <i>Talinum triangulare</i> | <i>Portulacaceae</i> | Water leaf | Mgborodi |
| 9 | <i>Amaranthus hybridus</i> | <i>Amaranthaceae</i> | Green | Inine |
| 10 | <i>Amaranthus caudatus</i> | <i>Amaranthaceae</i> | Green | Inine |
| 11 | <i>Curcubita pepo</i> | <i>Curcubitaceae</i> | Vegetable marrow | Ugbogiri |
| 12 | <i>Curcubita moschata</i> | <i>Curcubitaceae</i> | vegetable marrow | Ugbogiri |
| 13 | <i>Murraya koeningii</i> | <i>labiatae</i> | Curry | Iko |
| 14 | <i>Pterocarpus soyauxii</i> | <i>Papilionaceae</i> | Barwood | Oha ocha |
| 15 | <i>Pterocarpus mildbraedi</i> | <i>Papilionaceae</i> | White camwood | Oha ojii |
| 16 | <i>Pterocarpus santaliniodes</i> | <i>Papilionaceae</i> | Waterside camwood | Ntulukpa |
| 17 | <i>Gnetum africanum</i> | <i>Gnetaceae</i> | Gnetum | Okazi |
| 18 | <i>Piper guineense</i> | <i>Piperceae</i> | Guinea black pepper | uziza |
| 19 | <i>Gongronema latifolium</i> | <i>Asclepaidaceae</i> | | Utazi |
| 20 | <i>Ocimum viride</i> | <i>Labiatae</i> | Basil plant | Nchanwu |
| 21 | <i>Ocimum gratissimum</i> | <i>Labiatae</i> | Thyme or fever plant | Nchanwu |
| 22 | <i>Ocimum basilicum</i> | <i>Labiatae</i> | Basil plant | Nchanwu |

Source: Field Survey, 2007

TABLE 2: The average number of vegetable species consumed weekly per rural household in Imo State Nigeria.

| No. of vegetable Species | Freq (F) | Percentage | Midpoint (X) | (FX) | Mean (x) |
|--------------------------|------------|--------------|--------------|-------------|--------------------------|
| 1-2 | 14 | 5.74 | 1.5 | 21 | $\frac{\sum FX}{\sum F}$ |
| 3-4 | 93 | 38.11 | 3.5 | 325.5 | |
| 5-6 | 130 | 53.28 | 5.5 | 715.0 | |
| 7-8 | 7 | 2.87 | 7.5 | 52.5 | |
| Total | 244 | 100.0 | | 1114 | 4.57 |

Source: Field Survey, 2007

Consumption Patterns of the Traditional Vegetable Species by the Various Rural Households in Imo State

TABLE 3: A year's average for the weekly consumption and expenditure patterns of various vegetable species by the various rural households in Imo State, Nigeria for the year 2007.

| | | No of H.H that cons. | % of H.H that cons | Freq. of cons/wk | Man freq/week | % of H.H that bought | Total exp./wk | Exp/H.H/ week | % of H.H that obtained |
|----|-------------------------|----------------------|--------------------|------------------|---------------|----------------------|---------------|----------------|------------------------|
| 1 | <i>T. occidentalis</i> | 235 | 96.31 | 731 | 3.11 | 46.93 | N695.42 | N74.70 | 53.75 |
| 2 | <i>Solanum spp</i> | 51 | 20.90 | 127 | 2.49 | 59.72 | N153.64 | N48.71 | 40.28 |
| 3 | <i>Vernonia spp</i> | 177 | 72.54 | 372 | 2.10 | 48.67 | N312.92 | N37.42 | 50.89 |
| 4 | <i>T. triangulare</i> | 111 | 45.49 | 197 | 1.77 | 46.65 | N242.08 | N52.11 | 49.74 |
| 5 | <i>Amaranthus spp</i> | 69 | 28.28 | 135 | 1.96 | 65.29 | N177.72 | N52.35 | 30.39 |
| 6 | <i>Curcubita spp</i> | 11 | 4.51 | 20 | 1.82 | 32.14 | N60.0 | N60.0 | 67.86 |
| 7 | <i>M. koeningii</i> | 11 | 4.51 | 26 | 2.36 | 38.33 | N120.0 | N85.0 | 61.67 |
| 8 | <i>Pterocarpus spp</i> | 114 | 46.72 | 210 | 1.84 | 53.90 | N219.17 | N48.45 | 46.10 |
| 9 | <i>P. santalinoides</i> | 2 | 0.82 | 4 | 2.0 | ---- | ----- | ---- | 100.0 |
| 10 | <i>G. africanum</i> | 151 | 61.89 | 331 | 2.19 | 71.13 | N880.0 | N93.44 | 30.77 |
| 11 | <i>P. guineense</i> | 49 | 20.08 | 91 | 1.86 | 68.98 | N122.0 | N27.36 | 31.94 |
| 12 | <i>G. latifolium</i> | 42 | 17.21 | 104 | 2.48 | 17.71 | N66.67 | N43.75 | 82.29 |
| 13 | <i>Ocimum spp</i> | 31 | 12.70 | 67 | 2.16 | 11.67 | N60.0 | N60.0 | 85.0 |
| | Total | 1054 | 431.96 | 2414 | 28.14 | 561.12 | | N683.29 | 730.68 |
| | Mean | 81.08 | 30.85 | | 2.16 | 43.16% | | N56.94 | 56.21% |
| | DLVS | 665 | 38.93 | 66.57% | 2.23 | 60.19% | | N58.61 | 48.53% |
| | WLVS | 389 | 26.45 | 33.43% | 2.09 | 39.81% | | N54.60 | 51.47% |

Source: Field Survey, 2007

Table 3 contains the summary of the results of the weekly consumption patterns of various traditional vegetable species averaged for the year, 2007. Columns 1 and 2 of the table show the average number and the percentage of the respondents

whose family households weekly consumed each of the vegetable species during the one year period. As the two columns show, the most commonly consumed vegetable species was *T. occidentalis*, as indicated by 96.31% of the respondents, followed closely by *vernonia spp.* (72.54%), and *G. africanum* (61.89), respectively. On the average, each of the vegetable species was consumed weekly by the households of 30.85% of the respondents. On the basis of the two vegetable groups, whereas each DLV species were consumed by the households of 38.93% of the respondents, those of WLV species were consumed by 26.57%.

The table also shows that *T. occidentalis* was the most frequently consumed vegetable species (consumed an average of 3 times weekly), followed closely by *Solanum spp.* (2.49 times weekly), and *G. latifolium* (2.48 times weekly). On the average, however, each of the vegetable species was consumed an average of two times a week. Ogle and Grivetti (1985), in a similar survey in Swaziland, found that WLVs were consumed more than two times a week. In comparative terms, however, DLVs were consumed 66.57% of the time, while WLVs were consumed only 33.43% of the time (Column 3). In a similar study in Lushoto, Tanzania, Fleuret (1979) found that WLV species were used 81% of the time, compared with 17% for cash crop vegetables. The ready availability of DLVs could be responsible for the higher patronages accorded them.

Columns 5 and 8 show the percentages of each of the respondents whose household members either purchased their vegetable needs or acquired them freely. On the average, whereas 60.19% of all consumed DLV species were purchased, only 39.81% of WLV species were obtained through purchases, while 51.47% were freely acquired. Thus, the majority of WLV species consumed in the rural communities in Imo State are still acquired freely. However, a higher percentage of some WLV species are presently being acquired mainly through purchases. For instance, 71.13% of *G. africanum* and 68.98% of *P. guineense* consumed were purchased. The increasing purchase of these vegetables is an indication of their increasing scarcity in the state.

For instance, the greater percentage of *G. africanum* being consumed in Imo State today comes from other states, particularly the Cross River State.

Finally, columns 8 and 11 contain the average weekly expenditures and saved costs resulting from either vegetable purchases or their free acquisitions, respectively. As the two columns show, consumption of *G. africanum* attracted the highest weekly expenditure of N 93.44, on the one hand, and estimated saved costs of N 110.37, on the other hand. This portrays it as the most expensive of all traditional vegetables. On the average, however, each rural household that purchased their vegetable needs expended a sum of N 56.94, while those who obtained theirs freely saved a sum of N 53.10 weekly per species. Thus, since each household consumed an average of five (5) different species of vegetables weekly (table 2), it, then, meant that each rural household was expending an average of N 284.70 (i.e. N 56.94 x 5) weekly; N 1,138.80 (i.e. N 2,84.90 x 4) monthly; and N 13,665.60 (i.e. N 1,138.80 x 12) yearly. On the same token, those who freely acquired their vegetable need saved an average sum of N 265.50, N 1,062.00, and N 12,744.00 weekly, monthly, and yearly, respectively. For those who obtained their vegetable needs free, the saved costs could be used to purchase other food items not readily available in the household or be used for other purposes. Thus, the use made of these traditional vegetables and their role in people's livelihoods is more than can be captured in monetary terms.

Reasons for the consumption of the various vegetable species

Table 4 shows the various reasons adduced for the consumption of the various vegetable species by the various rural respondents in Imo State. The most important reason adduced for the consumption of the vegetable species was the belief in their high nutritional values (41.18%), followed by the better flavor and taste they give to the meal (17.26%), family preferences (11.91%), type of meal for which they were used for (10.13%), and their medicinal values (9.10%). Others are due to ready availability of the vegetable (5.07%) because of their free acquisition (4.41%) and because of their relative cheapness (1.03%). The results of this study did not agree with the findings of Fleuret (1979), who noted that in Lushoto, Tanzania, wild leaves were valued mainly because of their relative cheapness and easy accessibility. Also, in confirmation of their medicinal role, Maikhuri, R.K., Nautiyal, S., Rao, K.S., & Semwal R.L. (2000). and Nautiyal, S., Maikhuri, R.K., Rao, K.S., & Saxena, K.G. (2003) noted that whilst many wild herbs are eaten as leafy vegetables, the majority does play an opportunistic or overlapping role as medicine, and hence adding extra value, and thereby making them very attractive and important to the users.

TABLE 4: The reasons adduced for the consumption of the various vegetable species

| | No | % | No | % | No | % | No | % | No | % | No | % | No | % | No | % |
|-------------------------|------------|--------------|-------------|-------------|------------|-------------|------------|--------------|-------------|--------------|------------|--------------|------------|-------------|------------|-------------|
| <i>T. occidentalis</i> | 34 | 26.77 | 19 | 35.19 | 3 | 27.27 | 14 | 12.96 | 22 | 11.96 | 150 | 34.17 | 8 | 17.02 | 16 | 16.67 |
| <i>Solanum spp</i> | 6 | 4.72 | 5 | 9.26 | ---- | ---- | 7 | 6.48 | 7 | 3.80 | 22 | 5.01 | 1 | 2.13 | 3 | 3.13 |
| <i>Vernonia spp</i> | 22 | 17.32 | 3 | 5.56 | 3 | 27.27 | 17 | 15.74 | 52 | 28.26 | 59 | 13.44 | 9 | 19.15 | 31 | 32.29 |
| <i>T. triangulare</i> | 8 | 6.30 | 10 | 18.52 | 1 | 9.09 | 12 | 11.11 | 14 | 7.61 | 36 | 8.20 | 5 | 10.64 | 7 | 7.29 |
| <i>Amaranthus spp</i> | 8 | 6.30 | 1 | 1.85 | 3 | 27.27 | 7 | 6.48 | 7 | 3.80 | 37 | 8.43 | 4 | 8.51 | 6 | 6.25 |
| <i>M. koeningii</i> | ---- | ---- | ---- | ---- | ---- | --- | 2 | 1.85 | 1 | 0.54 | 4 | 0.91 | 1 | 2.13 | --- | --- |
| <i>Curcubita spp</i> | ---- | ---- | 1 | 1.85 | ---- | --- | 2 | 1.85 | 1 | 0.54 | 5 | 1.14 | 1 | 2.13 | 5 | 5.21 |
| <i>Pterocarpus spp</i> | 12 | 9.45 | 5 | 9.26 | ---- | --- | 12 | 11.11 | 20 | 10.87 | 35 | 7.93 | 8 | 17.02 | 4 | 4.17 |
| <i>P. santoliniodes</i> | ---- | ---- | --- | ---- | ---- | --- | --- | --- | 1 | 0.54 | -- | ---- | --- | ---- | --- | ---- |
| <i>G. africanum</i> | 26 | 20.47 | 9 | 16.67 | ---- | --- | 20 | 18.52 | 23 | 12.50 | 56 | 12.76 | 3 | 6.38 | 7 | 7.29 |
| <i>P. guineense</i> | 5 | 3.94 | ---- | ---- | 1 | 9.09 | 4 | 3.70 | 18 | 9.78 | 12 | 2.73 | 1 | 2.13 | 6 | 6.25 |
| <i>G. latifolium</i> | 5 | 3.94 | ---- | ---- | --- | ---- | 7 | 6.48 | 7 | 3.80 | 17 | 3.87 | 4 | 8.51 | 8 | 8.33 |
| <i>Ocimum spp</i> | 1 | 0.79 | 1 | 1.85 | --- | ---- | 4 | 3.70 | 11 | 5.98 | 6 | 1.37 | 2 | 4.26 | 3 | 3.13 |
| Total | 127 | 11.91 | 54 | 5.07 | 11 | 1.03 | 108 | 10.13 | 184 | 17.26 | 439 | 41.18 | 47 | 4.41 | 96 | 9.10 |
| DLVs | | 11.11 | --- | 5.56 | --- | 1.42 | --- | 8.69 | --- | 14.81 | -- | 44.59 | --- | 4.13 | --- | 9.69 |
| WLVs | | 13.46 | ---- | 4.12 | --- | 0.27 | --- | 12.91 | ---- | 21.98 | --- | 34.62 | --- | 4.95 | --- | 7.69 |

Source: Field survey, 2007

- A= Due to family preference
- B = Due to ready availability
- C = B/cos of their relative cheapness
- D = B/cos of type of meal for which they were used
- E = B/cos it gives better flavour and taste to the meal
- F = B/cos of the belief in its high nutritive value
- G = B/cos it's acquisition was free
- H = B/cos of it's medicinal value

Respondents Vegetable Species preferences

Result showed that *T. occidentalis* was the species preferred most by the respondents with a preference rating of 79.14%. This was followed by *Vernonia spp* (19.27%), *G. africanum* (18.27%), *T. triangulare* (9.51%), and *Pterocarpus spp.* (7.03%) (Table 5). Thus, *G. africanum* and *Pterocarpus spp.*, both which are WLW species, occupied the third and fifth positions in preference ratings of the respondents. These preference ratings conform to the levels of patronages, accorded these vegetables as reflected by the number and percentages of respondents whose households consumed the vegetables on a weekly bases (columns 1 & 2 of

TABLE 5: Preference ratings of the various vegetable species in the various rural communities in Imo State, Nigeria.

| | Vegetable species | Ratings (%) |
|----|-------------------------|-------------|
| 1 | <i>T. occidentalis</i> | 79.14 |
| 2 | <i>Vernonia spp.</i> | 19.27 |
| 3 | <i>G. africanum</i> | 18.37 |
| 4 | <i>T. triangulare</i> | 9.52 |
| 5 | <i>Pterocarpus spp.</i> | 7.03 |
| 6 | <i>Solanum spp.</i> | 5.90 |
| 7 | <i>Amaranthus spp.</i> | 4.76 |
| 8 | <i>G. latifolium</i> | 3.40 |
| 9 | <i>P. guineense</i> | 2.49 |
| 10 | <i>Ocimum spp</i> | 2.49 |
| 11 | <i>Curcubita spp.</i> | 0.23 |

Source: Field survey, 2007

CONCLUSION AND RECOMMENDATION

The study has shown that the traditional vegetables are regularly consumed by the rural people in Imo State and, therefore, play a critical role in the nutritional wellbeing of the people. The average weekly spending or savings through the purchase or free acquisition of these vegetables also portray them as playing a very important role in the rural economies of the people in

Imo State. These vegetables should, therefore, not be overlooked in any plan aimed at improving the nutritional wellbeing of the people.

It is recommended that the WLV components, particularly those high in the peoples' preference ratings namely, *G. africanum* and *Pterocarpus spp.*, be domesticated and their production commercialized, while those of DLV components be further developed. Also to reduce expenditure on vegetables, households are encouraged to own and operate their own vegetable gardens no matter their sizes.

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