# PROMOTION OF UNDERUTILIZED INDIGENOUS PUMPKIN (*Cucurbita maxima* D.) FOR FOOD / NUTRITION SECURITY IN THE SOUTHEAST AGROECOLOGY OF NIGERIA

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## ABSTRACT
There is need to promote and support the implementation of initiatives that make the most use of locally available plant biodiversity such as pumpkin to address food and nutrition security issues. Out of more than 500 vegetable plant species available in Nigeria, less than 15 are currently developed and used for food and as industrial raw materials, while some of the remaining vegetable plants such as pumpkin (C. maxima D.) are underutilized due to a number of factors identified. This paper outlines five issues: understanding underutilized indigenous foods; nutritional / uses, health benefits of indigenous pumpkin, challenges and strategies for indigenous pumpkin (*Cucurbita maxima* D) production in the Southeast agroecology.
Keywords: Underutilized indigenous pumpkin, nutritional / uses, health benefits of indigenous pumpkin, challenges and promotion strategies

## INTRODUCTION
### Underutilized indigenous food
Underutilized plants are those species which are generally underexploited but which have potential to contribute to food security, health (nutrition/ medicine), general income and environmental services (Anon, 2006). They have inherent potential to contribute to socio-economic and industrial development, and poverty alleviation. The Northern region of Nigeria has 39 endemic species, while the West and Central parts of the country have 38. It has been estimated that the highest degree of endemism occurs in low land forests of the South eastern part which has 128 endemic species (NEST, 1992). Indigenous food that is often synonymous used signifies food naturally existing or originating in a place or country rather than arriving from another place. The terms "local" or "traditional" food have also been used as synonyms. With regard to the geographical distribution, often a species could be underutilized in some regions but not in others. Understanding the unique local species and varieties of food often requires new identification; food analysis and dietary assessment methods that help define the utilization and application of the food and its systems to the community context in which they are applied.Acquring nutrient data and intake data for food species and varieties is an integral part of understanding the impact of biodiversity on food security. Less is known about the food benefit or toxicity of the wide range of plants that were traditionally eaten in ancient times. Many of these foods for years are now eliminated from our diet. The small number of vegetable plants we do eat e.g. *Telfaira occientalis (*fluted pumpkin*),Talimum triangulare* (water leaf*), Lycopersicon esculentum* (tomato), *Allium cepa* (onion) - more or less in that order are been increasingly well utilized, studied, known and widely distributed and there is knowledge about their vitamin content, antioxidant and health protective effects whereas some vegetables such as *Cucurbita maxima* (pumpkin) *Amarathus viridis* (green amaranth), *Gnetum africanum* (eru), *Vernonia amygdalina*(bitter leaf), *Hibiscus sabdariffa* (roselle),*kalanchoe pinnata* (Restoration plant; oda opue), *Gongronema latifillium* (bushbuck), *Moringa oleifera* (drumstick leaf), *Ocimum viridis* (scent leaf) and many more vegetables deserve more attention from extension and research. This paper examines the nutritional/ uses and health benefits of underutilized *Cucurbita maxima* D. in the southeast agroecology with a view to promoting its sustainable development.

*Cucurbita maxima* D. is one of the most underutilized crops in southeast agroecology of Nigeria which belongs to the family, cucurtabiceae, and originated from Central America. Pumpkin is a creeper and is occasionally found on the roofs of houses in the Southeastern Nigeria. The parts which are used are as follows fruit, leaves, seed, pulp, and even the fruit stalk. Mitra *et al*., 2009 noted that the fruits of pumpkin are large weighing 8 to 10 kg, sometimes up to 20kg and the medium sized fruit of "*Arka chandan*", an old variety from Indian institute of horticulture research, Hessaraghatta, weighs 2 to 3 kg and has orange color flesh. Taxonomical position of Cucurbita maxima Division: Spermatophyta; Sub-Division: Angiospermae; Class: Dicotyledonae; Sub-Class: Polypetalae; Series: Caliciflorae; Order: Passiflorales; Family: Cucurbitaceae; Genus: Cucurbita; Species: maxima. The world-wide production of all types of pumpkins in 1998 amounted to 14,671,000 tons; the total area cultivated was 1,180,000 ha. The world-wide production of pumpkin is distributed by continents in the following way:

**Table 1: World-wide Production of Pumpkin by Continents**

| Continent | Thousand tons |
|---|---|
| Africa | 1,315 |
| Asia | 9,265 |
| Europe | 2,411 |
| North America | 253 |
| Oceania | 254 |
| South America | 842 |

**Source**: FAO Production Yearbook (1998)

**Table 2: The ten first countries producing all types of pumpkins**

| Country | Tons |
|---|---|
| India | 3,300,000 |
| China | 3,071,000 |
| Ukraine | 1,200,000 |
| Egypt | 570,000 |
| Iran | 500,000 |
| Italy | 460,000 |
| Turkey | 395,000 |
| Mexico | 350,000 |
| South Africa | 330,000F |
| Spain | 300,000F(*) |

**Source**: FAO Production Yearbook (1998).

In 2001, the world production of pumpkin and squash (all *Cucurbita* species taken together) was estimated at 16.4 million ton from 1.2 million hectare, and production in Africa at 1.8 million ton from 140,000 hectare. China and India are the largest producers with nearly 4 million ton each, followed by Ukraine (900,000 ton) and Egypt (360,000 ton). In tropical Africa, a production of 205,000 ton has been recorded for Rwanda, 120,000 ton for Cameroon and 70,000 ton for Sudan. The international demand for pumpkin seeds, especially from *Cucurbita maxima*, is significant but official statistics are not available. This demand is mainly from Arab countries, where roasted seeds are a popular snack, but recently also from Western countries, where the seed oil is now in demand for the pharmaceutical and cosmetics industry. At national level, the leaves, fruits and also seeds are found on local markets

In Nigeria, the production of pumpkin has not be ranked, the focus has been on increasing the production of well known, widely distributed vegetables which have resulted in a substantial increase of the per capital availability of these crops whereas neglecting indigenous vegetable crops which are less deleterious to the environment and highly endowed with nutritional and medicinal values. Pumpkin (*Cucurbita maxima* D.) is considered by many Nigerian scientists as underutilized specie based on the fact that its existence is presently threatened due to its neglect in southeast agroecology and other parts of Nigerian. Pumpkin fruit typically plays an important role in the traditional setting as a cover crop and weed control agent, so its cultivation is often the most ecogically appropriate form and the nutritional deficiencies of the food can often be compensated for with other readily available foods. Neglected and underutilized food resources constitute the bed rock of the diversity in traditional and indigenous food systems of developing communities. Traditional and indigenous foods such as pumpkin are less deleterious to the environment, address cultural needs and preserve the cultural heritage of Southeast agroecology (Faccido, 1990).

***Cucurbita maxima* D - A Nutritious fruit**.

People in Southeast agroecology eat pumpkin fruit either as pumpkin porridge or by boiling the fruit and serve with sauce (fresh red oil garnished with vegetables, chopped onion and sliced pepper).

**Figure 1: Cooked pumpkin served with sauce and Pumpkin porridge**

**NUTRITIONAL VALUE**

From the nutrition perceptive, the composition of pumpkin fruits per 100 g edible portion (67% of purchased, flesh only, seeds removed, peeled thickly) is: water 95.0 g, energy 55 kJ (13 kcal), protein 2.3 g, fat 0.2 g, carbohydrate 2.2 g, fibre 1.0 g, Ca 65 mg, P 19 mg, Fe 1.1 mg, β-carotene 450 µg, thiamin 0.16 mg, riboflavin trace, niacin 0.1 mg, folate 36 µg, ascorbic acid 18 mg (Holland *etal*.,1991).The composition of pumpkin leaves per 100 g is: water 89.2 g, energy 113 kJ (27 kcal), protein 4.0 g, fat 0.2 g, carbohydrate 4.4 g, fibre 2.4 g, Ca 477 mg, P 136 mg, Fe 0.8 mg, β-carotene 3600 µg, thiamin 0.06 mg, riboflavin 0.32 mg, ascorbic acid 80 mg. The composition of pumpkin seeds (without shell) per 100 g is given as: water 5.5 g, energy 2331 kJ (555 kcal), protein 23.4 g, fat 46.2 g, carbohydrate 21.5 g, fibre 2.2 g, Ca 57 mg, P 900 mg, Fe 2.8 mg, thiamin 0.15 mg, niacin 1.4 mg (Leung *et al*., 1968). Pumpkin seeds also contain considerable amounts of vitamin E.

All cucurbits contain triterpene glycosides called cucurbitacins. These compounds are present in all plant parts in different concentrations. If concentrated in the edible parts, they cause a bitter taste.

| Pumpkin, raw | |
|---|---|
| Nutritional value per 100 g (3.5 oz) | |
| **Energy** | 109 kJ (26 kcal) |
| **Carbohydrates** | 6.5 g |
| Sugars | 2.76 g |
| Dietary fiber | 0.5 g |
| **Protein** | 1 g |
| **Vitamins** | |
| Vitamin A equiv.<br>beta-Carotene<br>lutein zeaxanthin | (53%)<br>426 µg<br>(29%)<br>3100 µg<br>1500 µg |
| Thiamine (B1) | (4%)<br>0.05 mg |
| Riboflavin (B2) | (9%)<br>0.11 mg |
| Niacin (B3) | (4%)<br>0.6 mg |
| Pantothenic acid (B5) | (6%)<br>0.298 mg |
| Vitamin B6 | (5%) |

| | |
|---|---|
| | 0.061 mg |
| Folate (B9) | (4%)<br>16 μg |
| Vitamin C | (11%)<br>9 mg |
| Vitamin E | (3%)<br>0.44 mg |
| Vitamin K | (1%)<br>1.1 μg |
| **Minerals** | |
| Calcium | (2%)<br>21 mg |
| Iron | (6%)<br>0.8 mg |
| Magnesium | (3%)<br>12 mg |
| Manganese | (6%)<br>0.125 mg |
| Phosphorus | (6%)<br>44 mg |
| Potassium | (7%)<br>340 mg |
| Sodium | (0%)<br>1 mg |
| Zinc | (3%)<br>0.32 mg |
| Other constituents | |
| Water | 91.6 g |
| **Source**: USDA Database entry | |

**USES**

Different parts of the plant have been used as medicine in some developed world, the leaves are haematinic, analgesia, and also used for treating burns. Traditionally, the pulp is used to relieve intestinal inflammation or enteritis, dyspepsia and stomach disorders (sentus and debjani 2007).The mature fruits, leaves, flowers and seeds of *Cucurbita maxima* D. are used fresh and in some locations dried for use during the off season, the mature fruit is peeled, cut into pieces and cooked until soft. In Zimbabwe and Nigeria it is made into a popular porridge. In Cameroon, Nigeria and other African countries, seeds are commonly roasted and salted, or ground into a thick paste that is mixed with vegetables in cooking. Pumpkin leaves are cooked and eaten as a vegetable in southeast cuisine. In the Middle East, they serve as a popular snack. The seed is rich in oil, which is sometimes extracted for kitchen use. It is used for making curry, pumpkin pie, and soup, chip muffins, pumpkin oil seed, Animal feed as well as for recreational purposes.

Salted pumpkin seeds

Pumpkin seed oil

Leaves

**Figure 2: different parts of pumpkin and their uses.**

**Health Benefits**

Pumpkin has a range of proven health benefits, including being one of the best known sources of carotene. Beta-carotene is a powerful antioxidant which gives orange vegetables and fruits their vibrant color. The body converts any ingested beta-carotene into vitamin A; consuming foods rich in beta-carotene reduce the risk of developing certain types of cancer, offer protection against asthma and heart diseases. *Cucurbita maxima* have some constituent that is responsible for memory enhancing activity, its seed contain many valuable functional components and have been traditionally used for herbal, therapeutic as well as clinical application, pumpkin seeds have been used as safe deworming and diuretic agents, and the seed oil as a nervine tonic. Pumpkin seed oil has a strong antioxidant property, and has been recognized for several health benefits such as prevention of the growth and reduction of the size of prostate, reduction of bladder and urethral pressure and improving bladder compliance, alleviation of diabetes by promoting hypoglycemic activity, and lowering level of gastric, breast, lung, and colorectal cancer. Burkill, 1985 suggested that eating more plant food such as pumpkin (*Cucurbita maxima*) decreases the risk of obesity, mortality rate, prevent diabetes and support heart health. The fruit has flavor; diuretic, tonic; allays thirst; cures indigestible; causes biliousness and loss of appetite (Kamboj, 2000). The seeds are used as a taenicide. The oil is prescribed as a nervine tonic. The pulp of the fruit is often used as poultice. The seeds are an old popular remedy for tapeworm Malta,generally considered as very effective and safe. The fruit is considered as sedative, emollient, and refrigerant. The pulp is applied to burns and scalds, inflammations, abscesses, and boils; it is also prescribed in migraine and neuralgia. The seeds are used as anthelminitics, more especially as taenicides (Kamboj, 2000 ) .

**Challenges and prospects of development and Utilization of Underutilized Pumpkin in Southeast Agroecology**

Lack of attention, neglect by research and absence of underutilized indigenous pumpkin in Nigeria educational curriculum have remained the three major constraints to the development and industrial utilization of underutilized pumpkin in southeast agroecology.

**Lack of attention**

The populace in southeast agroecology pay little or no attention to the value of cucurbita maxima, rather it is regarded as traditional food mainly for the low income earners, thus has not benefited from the same level of research attention given to other vegetable crops like cucumber (*Cucumis sativus* L.), fluted pumpkin(*Telfaira*

*occidentalis* H. ), Melon(*Cucumis melo* L.), Water melon( *Citrullus lanatus* L.), e.t.c. which are in the same cucurbitaceae family with pumpkin. This lack of attention has created a gap that may have discouraged high income earners and urban dwellers from making this crop a part of their diet, thus, place the underutilized pumpkin in danger of continued erosion and disappearance, apart from limiting access to its optimal utilization potential(Aruah *et al*.,2011).

**Neglect by Research:**
Had posed a serious threat in the utilization of pumpkin in southeast agroecology. Dansi *et al*., 2012 suggested that for promotion of underutilized pumpkin to be a reality in southeast, a large cadre of well trained and motivated agricultural scientists will have to play a critical role in providing the farmers with a steady flow of new technologies(improved farming practices, agronomic requirements and newly developed varieties) Lack of agronomic data on different indigenous foods; mitigate against the production and promotion of indigenous foods, adequate knowledge on improved production practices is essential to enhance utilization of indigenous vegetables such as (Cucurbita maxima L) pumpkin. Therefore, it is crucial to study and understand the agronomic requirements of indigenous vegetables including soil fertility, needs, water requirements and. optimum seasonal growing periods. An awareness of biotic constraints is needed to a avoid build-up of insect pests or pathogens to ensure compatibility with other crops in the production system (Ebert *et al*. 2012). Adequate pre-and post harvest handling techniques will reach markets and the end user such techniques will facilitate harvesting, minimize contamination with microorganisms and help the farmer deliver quality products to the market (Ebert *et al*. 2012).closely allied with research , is the need for prioritization. Priority should be given on the basis of extent or level of current development through Research and Development (R&D), uses / nutritional and health benefits, and of course its socio-economic contributions to Southeast populace. For example, different parts of pumpkin plant have been used as medicine in some developed world due to its role as plant with adequate nutritional potential and for its industrial utilization tendencies. Focus on the promotion and development of such a plant in the southeastern Nigeria will not only promote socio-economic development of communities where they are found, but, also substantially improve foreign exchange earnings locally in view of the global demand for pumpkin and its products. For the promotion of neglected and underutilized pumpkin, it will be important to put in place in every state in the southeastern Nigeria, a special research and development programme under the joint umbrella of the Ministry of Environment, Agriculture and Rural Development coupled with the Ministry of Science and Technology. All possible actors, including researches, developers, producers and finance institutions should be involved.

**Absence of Underutilized Indigenous Pumpkin in Nigeria Educational Curriculum**
Schools are an excellent place where government health practices can be taught and implemented to achieve behavioral changes at home (Bundy *et al*., 2006). School gardens are particularly effective way to advocate the production and consumption of indigenous vegetables such as pumpkin (Holmer and keatinge, 2012). Drescher, (2002) suggested that school garden programs can have multiplier effects by encouraging the establishment of indigenous vegetables garden at the home of pupils, students and those at the tertiary institutions that are studying courses under Agriculture or its relatives. For instance the "vegetable gardens in school" program of the Philippine Department of Agriculture endorses the establishment of indigenous vegetable gardens in all 42,076 public primary and secondary schools of the country to be complemented by home and community gardens (Department of Agriculture, 2011). Nigeria educational curriculum has no room for the promotion of underutilized indigenous vegetables, rather focuses on teaching students the well known utilized vegetables such as fluted pumpkin (*Telfaira occidentalis* H.) Thus, integrating the issues of underutilized indigenous pumpkin (*Cucurbita maxima* D) into the Nigeria educational curriculum will definitely promote the utilization and consumption of nutritious *Cucurbita maxima* D. including other indigenous underutilized vegetables.

**Strategies to promotion and development of underutilized pumpkin** some of the ways that will eventually promote the development of the underutilized pumpkin in southeast include; creating awareness on the value- addition of underutilized pumpkin to increase market share, creating awareness on the nutritive value of underutilized foods and information sharing, promotion of (Cucurbita maxima D.) at the family level, conservation of pumpkin (both insitu and exsitu) and organizing of local foods competitions/festivals in schools, participatory research and documentation of pumpkin species.

**Creating awareness on the value- addition of underutilized pumpkin to increase market share**
This is a major key consideration to increase the market share of indigenous pumpkin (*Cucurbita maxima* D.) since it has a short shelf life; its part (leaves, flowers, seed, fruit) can as well be processed to add value. Processing may include drying, salting, fermenting, pickling, juice production and canning, such as pumpkin pie (Figure 3). Processing moreover can increase farmers'

income. For example, the price of pickled Chinese mustard (*Brassica juncea*) was almost twice the price of fresh, unprocessed Chinese mustard (Thanh *et al*., 2002). An introduction of efficient processing equipment will help make this underutilized (Cucurbita maxima L) pumpkin commercially more profitable for the farmers. Canned pumpkin is often recommended by veterinarians as a dietary supplement for dogs and cats that are experiencing certain digestive ailments such as constipation, diarrhea, or hairballs. The high fiber content aids proper digestion *(Robinson and Decker-Walters,1997).* Biodiversity's long series of studies to improve the use of pumpkin in southeast agroecology and among very poor farmers would show multiple beneficial impacts in relation to yields, income, profits, the nutritional value of popular snack and breakfast foods, and female empowerment, all promoting the likely conservation of this crop and their biological diversity in farmers' fields, thus highlighting the importance of looking at the entire value chain of pumpkin from production to value addition, marketing and consumption in enhancing the economic advantage of the farm family (Bhag Mal *et a l*., 2010). The goals have been in reduction of drudgery, increased employment, strengthened food security and added income. The design and introduction of efficient processing equipment will help in making this underutilized pumpkin commercially more profitable for the farmers and increased possibilities of producing other products made with pumpkin such as pie, wafers, rolls, cookies and cakes (Bhag Mal *et al*. 2010). However, this end-to-end approach will be very effective in reinvigorating interest in underutilized and neglected crops.

A can of pureed pumpkin, typically used as the main ingredient in pumpkin pie

**Creating awareness on the nutritive value of underutilized foods and information sharing**;

Gotor and Irungu (2010) noted that production, consumption and marketing of leafy vegetables in African (such as cowpea, fluted pumpkin, amaranth) has increased between 1997 and 2007. The main notable positive reason for increased consumption was attributed to increased of leafy vegetable nutritive value, however, disseminating information on the nutritive value of (*Cucurbita maxima* D.) pumpkin through radio, television, seminars, workshops and news paper will increase rather than decrease its utilization and production (Gotor and Irungy 2010). AVRDC collected more than 150 species of indigenous vegetables from Asia and Africa and evaluated their nutritional value. Many species are high in either one or several micronutrients including vitamins A, C, E, folates, iron, calcium and antioxidants ( Yang and Keding 2009), and endowed with the potential to play a significant role in addressing several of the southeast agroecology food security issues, such as hunger and malnutrition, child and maternal health, poverty and loss of biodiversity. All such factors affect the quality of life of the resource-poor living in southeast agroecology parts of Nigeria. Unilever, (2012) suggested that the absence of breeding and 'crop improvement' might be the reason for the high nutritional value of mostly untouched local fruits and indigenous vegetables and this has inspired a scientific consortium to identify 'pre-domesticated' varieties of crops (mainly fruits and vegetables), which might contain significantly higher levels of nutrients than the varieties currently used for food production.

**Table 1: Nutrient content of *C. maxima* with some utilized vegetables in Southeast agroecology.**

| VEGETABLE | Dm (%) | Pro (g) | A (mg) | C (mg) | E (mg) | F (µg) | Ca (mg) | Fe(mg) | Zn (mg) |
|---|---|---|---|---|---|---|---|---|---|
| *Allium cepa* (onion) | 10.9 | 1.1 | 0.0 | 7 | 0.0 | 19 | 23 | 0.2 | 0.2 |
| *Cucumis melo* (Melon) | 6.3 | 0.9 | 0.0 | 14 | 0.1 | 9 | 0.7 | - | - |
| *Cucumis sativus* (Cucumber) | 4.8 | 0.7 | 0.0 | 3 | 0.0 | 7 | 16 | 0.3 | 0.2 |
| *Darcus carota* (Carrot) | 11.7 | 0.9 | 8.3 | 6 | 0.7 | 19 | 33 | 0.3 | 0.2 |
| *Abelmoschus esculentus* (Okra) | 8.9 | 1.8 | 0.4 | 37 | 0.5 | 32 | 44 | 0.9 | 0.0 |
| *Citrullus lanatus* (Watermelon) | 8.6 | 0.6 | 0.3 | 8 | 0.1 | 3 | 7 | 0.2 | 0.1 |
| *Cucurbita maxima* (pumpkin fruit) | 7.1 | 2.3 | 0.45 | 18 | 1.7 | 36 | 65 | 1.1 | 0.5 |
| *Cucurbita maxima* (pumpkin leaf) | 9.0 | 4.0 | 3.6 | 80 | - | 16 | 477 | 0.8 | - |
| *Cucurbita maxima* (seed) | 7.1 | 23.4 | - | - | 117.55 | - | 57 | 2.8 | - |

**Source**:PROTA(GrubbenandDenton,2004). Nutrient content value based on 100g fresh weight of edible portion; 0.0 = value below detective level; DM=Drymatter; Pro=protein;A=$^{\beta}$-carotene; C=vitamin C; E=$\propto$-tocopherol;F=folate

**Promotion of (Cucurbita maxima D.) at the family level**

Underutilized indigenous pumpkin consumption can as well be promoted greatly at the family level (particularly among children) through novel and more attractive recipes for cookies, cakes, juices and other products thereby extending the value chain and in order to broaden the impact of underutilized indigenous pumpkin beyond its pilot sites, there is a need to develop a strategy and approach for the involvement of national value chain actors from public and private sectors, research organizations, development projects and farmers association enhance its promotion (Jager *et al*., 2009).

**Insitu and Exsitu Conservation of Pumpkin**

Southeast agroecology is home to diverse tropical fruits and their wild relatives that are important sources of livelihoods. This rich diversity also plays a role in the stability of ecosystems by providing crucial ecosystem services. Like other crop species, (*Cucurbita maxima* D.) pumpkin is now underutilized in favor of more commercial fruits and varieties. Conservation of (*Cucurbita maxima* D.) both insitu and exsitu will form the basis upon which to characterize, develop or restore the plant. Research institutes having vegetable crops as part of their mandate must have economic incentives from the government to maintain or conserve underutilized indigenous vegetables such as pumpkin both insitu and exsitu (Jager *et al*., 2009). Home gardening that is traditionally practiced in many parts of southeast agroecology can serve as important micro-environments for in situ or on farm conservation of a wide range of plant genes and additionally provide essential sources of food, fodder, medicines, spices, construction materials and income for rural households. The biodiversity found in home gardens provides households with access to a large variety of nutritious foods thus providing opportunities for better nutrition, food security and income. Home gardens play an important role in contributing to food security, supplementing dietary intake and generating income. Most home gardens contain wild edible plant species that are sources of valuable micronutrients essential for human health, which has been undermined by the introduction of processed food over the last few decades. This has resulted in a plethora of non-communicable diseases. Thus home gardens can serve as nutritional gardens for human needs. They complement smallholder food production in southeast agroecology, provide a year-round supply of many food items that may not be available in local markets or, if available, may not be affordable. The immediate accessibility of food produced in home gardens and the gardens' capacity to produce a wide range of edible plants makes them a profoundly important investment for creating food security, this also improves nutritional status, conserves agrobiodiversity (Engels 2002; Schippers 2001) and provides a means for guaranteeing ready access to species which are becoming either scarcer locally or are no longer available and require time-consuming trips to gather as a result of the destruction of their traditional wild habitats through environmental degradation, agro-industrialization or urbanization. Home gardens therefore provide sites to cultivate and domesticate valuable crops for the future through the transplanting of micronutrient-rich, neglected and underutilized species from their wild habitats.

**Organizing of local foods competitions/festivals in schools**

Gotor and Irungy 2010, suggested that organizing of local food competition, food festivals, diversity fairs, food tasting using indigenous foods for secondary school students in the local government level and rewarding of the best cook, will go a long way in promoting of underutilized indigenous foods such as; African breadfruit (ukwa), local bean (ndudu), porridge cocoyam (ede mbieri),sago palm( agu ngwo), soup ( bitterleaf soup) etc. This will make students to be familiar with the local foods in southeastern Nigeria.

**Participatory Research**

GFAR (1999), noted that participatory research involving farmers, members of the local community, scientists and policy makers will eventually promote the development of underutilized pumpkin in southeastern Nigeria, this should be engendered and actively fostered among primary and secondary stakeholders.

**Documentation of pumpkin species**

Documentation of pumpkin species and dissemination of information to stakeholders would also play critical roles in the enhancement and utilization of the crop. Currently in Nigeria, there is no recent information on plant biodiversity of the country. The latest information obtained through a holistic and detailed study took place in the 1980's by the Federal Environmental protection agency (RMRDC,1991). Thus, there is urgent need for a detailed study of the plant biodiversity resources of the country especially as it has to do with indigenous plants. The most immediate step in the field of documentation is to take stock of available information on current activities and provide necessary information for the development of the crop for its proper utilization in southern Nigeria.

**CONCLUSION**

Utilization of a great majority of South-east indigenous vegetables is on the decline. Neglect of some species or varieties leads to loss of both the species and the associated knowledge. The emerging nutritional, use and health benefits of indigenous Pumpkin in Southeast agroecology as described above point to the need for strategic government and community based interventions that would help to improve food production, nutrition and health of populations. The promotion of pumpkin will assist Southeast population to navigate the problems it is currently facing in terms of food/ nutrition security, unemployment, poverty alleviation, underdevelopment, diversification in food consumption, reduction in intake of foreign and processed foods, reduces incidence of nutrition related chronic diseases and conditions. Promotion of underutilized pumpkin

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