



Tropentag 2008
University of Hohenheim, October 7-9, 2008
Conference on International Research on Food Security, Natural
Resource Management and Rural Development

Future of the Nigerian under-exploited indigenous fruits and vegetables in the era of climate change: The Need for farmers Education

¹Adebooye O.Clement and O.Adedayo Ajayi²

¹Department of Crop Production and Protection

²Department of Agricultural Extension

Obafemi Awolowo University,

Ile-Ife, NIGERIA.

Email: oadeboo@oauife.edu.ng

Abstract

Indigenous fruits and vegetables are known to play major role in the nutritional livelihood of the Nigeria population especially in the rural areas where people cannot pay for meat, egg and milk. In the face of threats posed by climate change as exemplified by drastic changes in rainfall pattern, temperature, relative humidity, radiation, weeds-pests-diseases complex and general alterations in the trends of climatic elements, there is the need to discuss the future of the uncultivated but edible plant species which have served as basis of livelihood for the poor people over several years. Emerging evidence has shown that farmers in Nigeria are mostly illiterate and that they practise the cropping system inherited from their parents and are still caught up in the recent phenomenon of climate change. They are mostly not producing in large quantities and depend on rain for their crops. Most of the indigenous fruits and vegetables are still gathered from the wild and are not included in the research mandate of Nigerian agricultural research Institutes. In this era of climate change, it is important to discuss how these indigenous crops will not go into extinction since they are still good sources of food and possible sources of germplasm for crop improvement. The farmers therefore need to be educated on the importance of the crops and the danger of sending them into extinction in the wake of climatic change. This paper therefore discusses the diversity of indigenous fruits and vegetables in Southwest Nigeria by taking into account the available species, the uses, the mode of exploitation and the role that extension education can play in bringing these crops into cultivation, especially in this era of climate change in order to prevent them from extinction.

Keywords: Climate change, extension education, indigenous fruits, vegetables.

The Present Scenario:

Global temperatures have risen by 0.5 °C over the 140 years since records began. The decade 1990 - 2000 was the warmest for 300 years and 0.5 °C warmer than the mean for 1961 - 1990 climate. This temperature change may seem small but its consequences are massive on biota. It was predicted by the Hadley Centre for Climate Change, United Kingdom (2008) that temperature increases in parts of Africa could be double the global average increase. Indeed, for Africa, the Intergovernmental Panel on Climate Change (IPCC) (2008) predicted a rise of between 1.1 – 6.4 °C rise in temperature by the end of 21st century. For a period of 30 years, the most dramatic global shortage in rainfall has occurred in Africa with serious adverse consequences including dry periods during rainy season and floods with serious consequences for agriculture and human health.

It has been reported (Spore, 2008) that given the heavy dependence of Africa on Agriculture, the high proportion of low-input, rain-fed farming and existing stresses such as land degradation and population

pressure, the impact of climate change in Africa is likely to be the greatest. It has also been predicted that arid and semi-arid land area in Africa will increase by 5-8 % under a range of climate change scenarios. Some climate-induced changes according to IPCC (2007) are expected to be abrupt while others will involve gradual shifts in temperature and vegetation cover. Climate change will also trigger stresses which may include spread of diseases and pest, loss of biodiversity and increase of animal and human diseases. In fact research suggests that higher mean temperature will increase pest developmental rates and fecundity, the frequency of outbreaks, and lead to expansion in the range of insect pests, diseases and weed species. More worrisome is that fact that the United Nations World Health Organization (WHO) established a clear link between heavy rainfalls over much of eastern Africa (early in 2008) and major outbreak of malaria. An accompanying consequence of climate change will be hunger because, as predicted, a 3 °C rise in temperature would lead to famine for more than 150 million humans (Spore, 2008).

It is on the strength of the evidence above that this paper examines the future of the Nigerian indigenous/under-exploited fruits and vegetables in the era of climate change. This paper focuses on the diversity of indigenous fruits and vegetables in Southwest Nigeria by taking into account the available species, the uses, the mode of exploitation and the role that extension education can play in conserving the species, especially in this era of climate change.

The Diversity of Indigenous Fruits and Vegetables of Southwest Nigeria.

The indigenous leaf vegetables and fruits are usually gathered from the wild and indeed some of them are becoming scarce in the natural ecosystem in southwest Nigeria (Adebooye *et al.*, 2003) and are gathered with great drudgery. In some cases the vegetables are found in fallows, watercourses, field margins, disturbed fields, protected home gardens and refuse hills. Women are the custodians of the indigenous knowledge on the use, management, processing, preparation and sale of the indigenous leaf vegetables and fruits. Table 1 (adapted from Adebooye *et al.*, 2003) shows the diversity of 15 high premium indigenous species, the status and the food/traditional medicinal uses.

Table 1: Fifteen high premium indigenous leaf vegetables and fruits of Southwest Nigeria.

Species	Botanical family	Status	Food/Medicinal uses	Market availability
Leaf Vegetables species				
<i>Solanecio biafrae</i> (Olive & Heirne) C. Jeffry	Asteraceae	Wild.	Leaf vegetable. Leaf juice for treatment of sore eye. Leaf juice also used for stopping bleeding.	Sparingly available.
<i>Crasscocephalum crepidoides</i> (Olive & Herine) S. Moore	Asteraceae	Wild	Eaten as leaf vegetable. Useful in traditional medicine.	Sparingly available.
<i>Crasscocephalum togoense</i> L.	Asteraceae	Wild	Eaten as leaf vegetable. Useful in traditional medicine.	Sparingly available.
<i>Vernonia amygdalina</i> Del.	Asteraceae	Protected at backyard garden.	Eaten as vegetable. Leaf juice extract used for treating diarrhoea, dysentery and diabetes.	Available.
<i>Telfairia occidentalis</i> Hook	Cucurbitaceae	Cultivated	Eaten as leaf vegetable. Leaf	Available.

f.			juice extract used for managing sickle cell anaemia.
<i>Cerathotheca sesamoides</i> E. Mey	Pedaliaceae	Semi-cultivated	Eaten as leaf vegetable. Sparingly available.
<i>Launea taraxacifolia</i> (L.) Cars.	Asteraceae	Wild	Eaten as leaf vegetable. Leaf juice used as antidote to snake bite. Difficult to find.
<i>Ocimum gratissimum</i> L.	Asteraceae	Semi-cultivated	Eaten as leaf vegetable. Leaf juice used for treating pile, male impotency and female infertility. Available to some extent.
<i>Momordica charantia</i> L.	Cucurbitaceae	Wild	Eaten as leaf vegetable. Leaf juice used for treating pile, male impotency and female infertility. Difficult to find.
Fruit species			
<i>Trichosanthes cucumerina</i> L.	Cucurbitaceae	Semi-cultivated	Red fruit pulp is used as a substitute to solanaceous tomato. Available to some extent.
<i>Chrysophyllum albidum</i> G. Don	Sapotaceae	Wild	Fruit eaten as dessert. Available to some extent.
<i>Irvingia gabonensis</i> Aubry-LeComte ex O'Rorke) Baill.	Irvingiaceae	Wild	Fruit eaten as dessert. Seed used for a special traditional soup preparation. Available to some extent.
<i>Tetracarpidium conophorum</i> (Muell. Arg.) Hutch. & Dalziel	Euphorbiaceae	Wild	Fruit eaten as dessert. Seed extract used as antidote to snake venom. Difficult to gather.
<i>Synsepalum dulcificum</i> (Schumacher & Thonn.) Daniell	Sapotaceae	Wild	Fruit eaten as dessert and about 3000 times sweeter than sucrose. Difficult to gather.
<i>Cucurbita pepo</i> L.	Cucurbitaceae	Cultivated	Leaf eaten as vegetable. Seed used as condiment and source of oil. Available.

Educating farmers on the consequences of climate change:

Demographic studies have shown that the average age of a Nigerian farmer is about 43 years with about 47% not having any formal education (Ejembi *et al.*, 2006). There are over 40 research institutes in Nigeria and about 30 of them are agricultural. These research institutes have mandate crops on which they research but unfortunately no attention is given to under-exploited indigenous fruits and vegetables which are known to contribute immensely to rural food security. The lack of attention to under-exploited fruits and vegetables in the era of climate change could spell the danger of extinction and loss of good food and germplasm sources for future crop improvement.

Extension education could play a major role in checking the possible loss of the under-exploited fruits and vegetables in the wake of climatic change in the following ways:

- Educating the farmers on the meaning, causes, and consequences of climatic change on their vocation and the under-exploited fruits and vegetables.
- Extension education can work with other researchers and agencies to formulate local and regional policies/laws to limit the adverse effects of climate change on the under-exploited and uncultivated food plants.
- Extension education can champion dissemination of information on conservation agriculture which involves minimal soil disturbance, improved water use efficiency, organic farming and plant conservation.
- Extension can take advantage of vast indigenous knowledge (IK) of the farmers while educating them on climate change in relation to under-exploited fruits and vegetables because farmers possess a store of IK which science cannot underestimate. Who knows if any of the IK could assist in species conservation!!!

Conclusion:

Climate change is not just an environmental issue, it is indeed a development issue and if not tackled, could aggravate the degree of poverty, food insecurity, economic woes and ill-health, of our planet. Research must from now on account for the impacts of climate change on agriculture, disease patterns, and violent weather events, all of which particularly impact the poorest countries, most of which are in Africa.

Acknowledgement:

Dr Adebooye thanks the Alexander von Humboldt Foundation, Germany for providing the funds that made this work and conference attendance possible.

References:

Adebooye, O.C., F.M.D. Ogbe and J.F. Bamidele(2003) Ethnobotany of indigenous leaf vegetables of Southwest Nigeria. *Delpinoa* 45: 295-299.

Ejembi S. A., Ejembi E. P. and V. A. Okwoche (2006) "Problems of Effective Adoption Decision among Farmers in Makurdi, Benue State: The Relevance of Choice of Communication Methods" Proceeding of 11th Annual Conference of Agricultural Extension Society of Nigeria, Held between 3rd and 6th April, 2006. pp 235-241

IPCC-Intergovernmental Panel on Climate Change (2007) Climate Change 2007: Synthesis Report. www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf

IPCC (2008) Cited by Spore Magazine Special Issue of August 2008. <http://spore.cta.nl> Accessed September 18, 2008.

Spore Magazine (2008) Climate Change. <http://spore.cta.nl> Accessed September 18, 2008.