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THE POTENTIALS OF BAMBARA GROUNDNUT *VOANDZEIA SUBTERRANEA* (L.) VERDC) IN ACHIEVING SUSTAINABLE FOOD SECURITY IN NIGERIA

***Mshelia, J. S[1]; Sajo, A. A.[2] and Simon, S. Y.[2]**
[1]Department of Agriculture, Coll. of Edu. Sci. & Technology, Borno State.
[2]Department of Crop Production and Horticulture School of Agric. & Agric. Technology
Modibbo Adama University of Technology, Yola
** jessesila@yahoo.com*

ABSTRACT
There is much concern about sustainable food security in Nigeria and the world over. The government is trying all means possible to meet up people's need in food supply. This paper, highlight the potentials of Bambara groundnuts (Voandzea subterranean (L) Verdc.) in achieving this objective. The crop has the ability to perform well on poor soils, with even less management, besides it is highly nutritive with good quality protein compared to other plant proteins. The paper identified areas of improvement needed as agronomic practices, breeding for higher yield, increased digestibility and processing qualities.
Keywords: *Bambara Groundnut, Sustainable, Food Security.*

INTRODUCTION
Food security refers to the availability of food and one's access to it (Wikkipedia 2012). This means that, the food must be available and people must have access to it. To have access to food, means that it must be affordable. Also the food must be of Correspondence Author: Dr. Jesse S. Mshelia Department of Agriculture, School of Vocational Education, C.O.E. S & T. P.M.B. 16, Bama, Borno state quality nutritionally as to meet the requirement of the body in terms of composition. Nutritionist has reported that the food we take should compose of carbohydrate, protein, fats and oils, minerals and vitamins. Plant proteins are mainly obtainable from pulses and legumes which bambara groundnut is one of them. The problem of food shortage has become a global issue, therefore, International Development Agencies have seen the need to invest in agricultural production. For instance, the United Nation (UN) has its International Development Strategy for Decades resolved that hunger and malnutrition must be eliminated as soon as possible and certainly by the year 2015. In addition, the World Food Summit convened by Food and Agricultural Organization (FAO) of the United Nation, held in Rome Italy in November, 1996, primarily focused on universal food availability and security (Musa, 2003). This is because food production is estimated to be below population growth in must countries of the world especially in Sub-Saharan Africa and the Carribeans (Spore, 2010). This means that the food should be available and sustainable, that is, on continuous bases. The Dictionary of Agriculture, defined sustainability as "the ability of a process (in this case food production) or human activity to meet present needs, but also maintain natural resources and leave the environment in good order for future generations (Bademan *et al* 2008). This implies that for there to be food security, the food supply must meet the people's need now and in future. Hence, this paper have been written to expose the potentials of Bambara groundnut in contributing to world food security.

Potentials of Bambara Groundnut

Bambara groundnut (*Voandzea subterranean* (L) Verdc.) is an indigenous African legume that constitutes the third most important pulse crop in the continent after groundnut and cowpea. In Nigeria, however it ranks fourth in importance after groundnut, cowpea and soybean. It is believed to have originated in areas between Jos Plateau and Yola which covers most part of North-Eastern Nigeria. It is not a prominent crop and is generally considered as a women's crop of less importance. However it has a great potential to enhance soil productivity. Bambara groundnut has greater ability to perform well on marginal soils and resists moisture stress during the growing season than most other legumes (Dakora, 1998; Brink *et al* 2006) about 45 – 50% of world production comes from Africa where it is the main secondary legume in some parts, however, there is poor record of its production and trade as most of the production ends in local consumption (Nnam, 2001 and Brink *et al* 2006). The seeds has an excellent nutritive value, with 18 – 26% protein content, which is very rich in lysine, a scarce amino acid in plant protein (Rowland, 1993). In addition it contains 4 – 9% fat, 50 – 65% carbohydrate and 3- 5% fibre. This makes the seed an exceptionally balanced food for human consumption (Brink *et al* 2006). It is these qualities of the Bambara groundnut, that this paper has been written to highlight and expose its potential for being a crop of hope for sustainable food security in Nigeria. The crop has high potential in meeting the need of poor resource farmers for increased food output in that it is reported to tolerate or even prefer poor soils hence, yield better than most pulses on poorer soils. Infact, it is reported that nitrogen rich soils are to be avoided as they stimulate the plant to produce too much leaf at the expenses of pods and seeds (Baudoin and Margeai, 2001), this alone means the crop can be grown better by most farmers. The crop also has a reputation for resisting pests and disease (Ajayi and Lale, 2001). The region have comparative advantage in Bambara production as the crop is indigenous to the area, being the centre of origin (Odeigah and Osanyinpeju 1998; Pasquet *et al;* 1999).

Being that it has ability to fix nitrogen like most other legumes (Kishinevesky *et al* 1997; Dakora, 1998), poor resource farmers can take advantage of it to grow it on large scale, which will also enrich their soil and make it suitable for production of cereals, like maize, sorghum and millet in mixtures or rotation. Besides, the crop yield is comparative to that of other pulses like groundnut, and cowpea given similar management and with growing interest in it as it is believed to be suitable for consumption by people with diabetes, its prices in the market is also close to pulses like cowpea, infact, sometimes it cost higher as its production is always limited and its demand is increasing. Although it is reported that Nigeria produces one third of total annual world production put at around 300,000 metric tonnes (Poulter, 1981) this is grossly inadequate to meet with world demand put at over 800,000 metric tonnes, hence the higher prospect for farmers in the region and indeed Nigeria to increase their production. Another attribute of the crop which makes it suitable for sustainable production is the availability of varieties with varying maturity period ranging from 3 -6 months which makes it suitable for production in even areas with low rainfall like the northern part of the region that have very short rainy season and low rainfall, also it can be harvested early or late with no serious yield losses (Rowland 1993, Mshelia, 2008). The crop also fits well into the cropping system predominantly practiced in the area, which is mixed cropping as it can be grown in

mixtures with maize, sorghum, millet and groundnut without much yield loss, although under such practices time of sowing is significant as it must not be delayed too much which may result in poor growth and yield of the Bambara groundnut as a result of high competition for growth resource (Misbalumnuir *et al* 1989; Tanimu, 1996 and Mshelia *et al* 2004).

Research need of Bambara

For these potentials of Bambara groundnut in achieving sustainable food security to be achieved however, there are areas that need further research to boost its production.
According to Baudoin and Mergeai (2001) little research has been done to date to improve Bambara groundnut, the work done in the field has been limited to mass selection of a few local varieties by farmers, followed by purification phase for the main agronomic characteristics, hence there is need for research in area of breeding for improvement in areas of yield, maturity period, taste and flavour. Pasquet *et al* 1999 also stated that although Bambara groundnut is an important crop in many countries of tropical Africa, little is known about the organization of its genetic diversity. Other areas of need are agronomic practices like sowing date, cropping systems, spacing (both intra and inter-row) proper crop mixtures in intercrop production. Brink *et al* (2006) also stated that Bambara groundnut is so important to the rural poor in most of Africa and potentially so important elsewhere in the tropics that the improvement of its germplasm (for high yield, protein and digestibility) and the agronomy of its production both deserve intensive study. Hence to achieve the potentials of Bambara in achieving food security, there is need for the following research to be done: -

i. Collecting and comparing Bambara groundnut germplasm from all over Africa where landraces are available for breeding work.
ii. To determine yield and the feasibility of commercial Bambara groundnut production, agronomists should conduct trails using superior cultivars in semiarid areas where groundnut yield poorly because of drought.
iii. Efforts should be made to improve the management of the crop in the field. Further trails using and adapting modern methods of intensive groundnut farming should be taken.
iv. Currently it is only cultivated on small plots, but it has high potential as a field crop. Investigation in areas of mechanized cultivation, harvesting, shelling and processing (especially canning as practiced in Ghana) and of its potentials as cash crop for processed foods and world trade is worth trying.
v. Another area of need is research to identify cultivars that resists its known diseases and pests, as well as for cultivars for highly effective Rhizobium, both from available lines and from rhizobia associated with the plant in its native habitat.
vi. Research into the Bambara groundnut's nutritional effectiveness as there are indications that the protein digestibility is inhibited by antinitritive factors in the seeds.

SUMMARY AND CONCLUSION

Food security is meeting the need of people in term of their food requirement in both quantity and quality. Therefore, there is need for all the essential components of food to be present in the food the people take vis-à-vis, carbohydrate, protein, facts and oil,

minerals vitamins and fibres. Not all people can afford enough animal protein, but some crop have high quality protein of which Bambara groundnut is one of them. The crop is high in protein which has been reported to be of high quality and it is indigenous to the north – east region, hence is highly adapted and if proper attention in given to the crop in terms of breeding and agronomic practices, it could be a good crop to contribute very much to food security in the region and the country as a whole.

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