

Bambara Groundnut, a Legume of Choice for Food Security and Industry

POLICY BRIEF



Sharing results of the project

Strengthening capacities and informing policies for developing value chains of neglected and underutilized crops in Africa

under the ACP-EU Science & Technology Programme (S&T II) 2014-2016

Background

In the developing world many farmers, especially in areas unsuited to high-yielding crop varieties, rely on a wide range of neglected and underutilized species (NUS) of crops, trees and animals for their livelihoods. Many of those NUS are highly nutritious and, when part of a diverse diet, help combat malnutrition, 'hidden hunger', overweight and obesity. Being well-adapted to local conditions, NUS have great potential as a tool for adaptation to climate change. Already lively traded in local markets, NUS products have great potential for wider commercialization, with the right support from science, the private sector and policy.

The 3rd International Conference on Neglected and Underutilized Species (NUS) held in September 2013 in Ghana, and other recent initiatives, observed that NUS can help to address critical development challenges – conservation of agricultural biodiversity; agricultural and rural development; climate change; food and nutrition security; and gender, culture and empowerment of women.

For this to happen, the development of value chains and small agribusinesses for priority NUS is essential, and consumers need to be enlightened concerning the benefits of NUS. Consequently, mainstreaming NUS into policies and programmes at national, regional and international levels is necessary.

This policy brief focuses one of the priority NUS: **Bambara groundnut** (*Vigna subterranea* (L.) Verdc), a protein-rich African legume grown in semi-arid regions of Africa. A drought resistant crop, it is grown by subsistence farmers under traditional low input agricultural systems. It is the third most important legume crop in semi-arid Africa, after peanut and cowpea.

Bambara groundnut could help alleviate nutritional and agricultural problems in these areas and elsewhere if properly promoted. It would help meeting a growing demand for high-quality, crop-based protein sources.

Key messages

- Africa has a great diversity of neglected and underutilized crop species (NUS) that can help reduce hunger, poverty, and malnutrition and help farmers adapt to climate change.
- Bambara groundnut, an indigenous African legume, is a priority NUS for which development of the value chain and small agribusinesses should be strongly supported.
- Raising consumer awareness of the value of Bambara groundnut is important, to drive demand for this crop.
- Bambara groundnut should be mainstreamed into policies and programmes at national, regional and international levels.

Bambara groundnut: 'old' plant but a crop for the future

In recent years scientists have observed the **potential of Bambara groundnut to contribute to increased food production in Africa**, and the need to improve the crop and its value chain. An international research network, BamNetwork, hosted at Crops For the Future, Malaysia, is already connecting researchers in Africa and Asia working on this crop. In spite of these efforts, the research effort is still relatively modest.

Bambara groundnut provides security for many farmers because of its **resistance to drought and pests and its ability to yield reasonably well when grown on poor soils**.

As a much desired property, it has a long storage life. A legume, Bambara groundnut is valuable for soil health as it fixes nitrogen, an ability that is important to resource-constrained farmers who may otherwise not be able to afford inorganic nitrogen fertilizers. Thus, it is highly useful in rotations with cereal crops.

In its production and consumption zone, Bambara groundnut has an important economic value. It is more expensive than rice at between 1 and 1.5 US\$ per kg. In Benin for instance, the crop is produced mostly by women in the northern regions which constitute marginal climate change-susceptible zones. To date, no **improved variety of Bambara groundnut is reported**. All cultivated genotypes are landraces from heterogeneous populations that have become adapted over time to unfavourable and stressful environments.

Bambara groundnut diversity

Scientists have collected Bambara groundnut landraces from different parts of Africa and beyond, but these **valuable genetic resources have not been fully exploited**. To improve yield and nutritive value in Bambara groundnut and select appropriate genotypes for distinct agroecological regions, breeders need to source genetic variants.

Morphological, biochemical and molecular analyses of some Bambara groundnut landraces revealed great genetic diversity between and within landraces that can **provide breeders with sources of genes for biotic and abiotic resistance, adaptability to different environments, good nutritional characteristics and yield potential**.

Some studies have shown that the crop can yield up to 3 tons per ha; such high yield potential could be exploited in breeding programmes. Although crop improvement work has been negligible so far, conservation of Bambara groundnut genetic resources looks promising. Apart from the resources conserved by farmers throughout sub-Saharan Africa, there is also an important collection of about 2000 accessions kept by IITA in Nigeria. This large reservoir of genetic variation may be exploited to develop varieties with high and stable yields across different environments. Considering the current context of climate change, Bambara groundnut is indeed a promising crop of the future, given its adaptation to difficult environments.



Bambara groundnut is typically sold in bulk in local markets. Photo: P.Rudebjer



Pre-cooked Bambara groundnut from Benin. Photo: P.Rudebjer

Bambara groundnut: legume of choice for the food industry

Protein-energy malnutrition is one of the most disturbing and prevalent nutritional problems in developing countries, for which solutions need to be found. At the same time, African consumers are demanding new food products that have health benefits coupled with high nutritional value. In view of this, Bambara groundnut is a crop to promote. It is a low-fat source of protein and rich in fibre, essential minerals and amino acids. It can certainly be said that with these attributes, **Bambara groundnut is a food for the health-conscious consumer.**

Very little effort has been undertaken to transform Bambara groundnut into value-added products, but some work is now in progress in Benin, among other countries. In the food industry, the seeds can be processed into flour, starch, bread, milk, yoghurt, stiff porridge, steamed gel, grits, protein and oil of good quality. Also, many other secondary food products can be produced such as *Gari* (a popular West African food) fortified with Bambara groundnut flour.

Unfortunately, **consumers are often unaware of Bambara groundnut's rich nutritional benefits** and it is not part of the national or international food baskets. Bambara groundnut has potential to contribute to food security through a diversity of products if efforts to commercialize the crop are stepped up.

Manufacturers willing to develop such products need to be identified. The commercialization will open up markets for Bambara groundnut and its products and, consequently, will elevate its status from an underutilized crop to a “legume of choice” in the food industries in both Africa and beyond.

Key messages

- Bambara groundnut is a promising crop of the future with regard to its **good agronomic attributes**: resistance to pests, tolerance to poor soil, long storage life, and its potential as a tool for adapting agriculture to climate change, especially drought.
- Bambara groundnut has an important role to play in **food security and poverty alleviation** – especially for women.
- Cultivated varieties are all **landraces and can be developed** into high performing genotypes through breeding.
- **Considerable genetic diversity exists** that can provide breeders with sources of desired genes. Therefore, this diversity needs to be preserved and fully exploited.
- Bambara groundnut is a low-fat source of protein and a good source of fibre, calcium, iron, and potassium and it is unusually high in lysine, methionine, and cysteine. **It can be used to fight protein-energy malnutrition in Africa.**
- A nutraceutical, it has **health benefits coupled with high nutritional value.**
- A legume of choice for the food industry as **it can be processed into various food products**: flour, starch, bread, milk, yoghurt, porridge, steamed gel, grits, protein, oil etc. Its milk and yogurt are lactose free.
- Bambara groundnut and its derivatives are highly **amenable to value chain addition and commercialization.**

Recommendations

The following key actions are recommended for upgrading the value chain of Bambara groundnut in Africa:

- **Mainstream Bambara groundnut** as a priority crop in national food and nutrition policies across Africa
- **Enhance research and development activities** linked to the collection, characterisation, evaluation and *ex situ* and *in situ* conservation of the existing Bambara groundnut diversity of in Africa
- Set up a strong breeding programme to **develop new varieties** adapted to farmers', consumers' and processors' needs
- Encourage and **facilitate innovation and disseminate modern technological packages** to improve the production of the crop
- **Upgrade the value chain of the crop** through involving food industries for product diversification and commercialisation.
- Enhance awareness of the **nutritional and nutraceutical** values of the crop
- Enhance **communication between value chain actors** and foster international scientific collaboration.

Further reading

BamNetwork. <http://bambaragroundnut.org/>

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www.nuscommunity.org/research/projects/acp-eu-value-chains/

NUS Value Chain project 2014-2016

Crops: Amaranth and Bambara groundnut

Countries: Benin, Kenya and Zimbabwe. Activities also target other countries in each sub-region.

Project coordinator: Bioersivity International, Italy

Partners:

Benin: Laboratory for Agricultural Bioersivity and Tropical Plant Breeding (LAAPT)

Kenya: African Network for Agriculture, Agroforestry and Natural Resources Education (ANAFE); University of Nairobi

Sweden: International Foundation for Science (IFS)

Zimbabwe: Africa University

Associates: ExcelHort Ltc, Uganda; Global Horticulture Initiative, Germany; CORAF/WECARD, Senegal

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