



Bambara groundnut  
Credit: Bioversity International/G. Meldrum

## Research Brief: Value Chain and market potential of Bambara groundnut to strengthen climate resilience, food security and women's income in Mali

This value chain analysis was carried out by Charlie Mbosso in collaboration with Aminata Berthe Niang, Youssoufa Mohamadou, Stefano Padulosi, Amadou Sidibe, and Jennifer Meldrum as part of the project "Linking Value Chains of Agricultural Biodiversity to Adaptation to Climate Change and Nutrition: Empowering the Poor for Risk Management" funded by the International Fund for Agricultural Development (IFAD), the European Union (EU) and the Research Programs of CGIAR Centers on Climate Change, Agriculture and Security (CCAFS) and Agriculture for Nutrition and Health (A4NH).

Bambara groundnut (*Vigna subterranea*), known as *voandzou* in French and *Tiganikourou* in Bambara, is a seed legume grown mainly by women in rural areas in Africa. It is a drought tolerant and prosperous species in poor soils and low input agricultural systems. Its nutritional composition surpasses that of many other legume crops. Its protein and mineral content, in addition to its content of certain amino acids that are normally limited in many cereals makes Bambara groundnut an excellent and rare example of a complete food, which can be complementary to nutritional security. The cultivation and marketing of this product generates income for rural and urban households. However, in Mali, the promotion of this crop is not sufficiently developed and several shortcomings exist both in terms of cultivation and marketing.

An investigation was carried out in 2017 on the value chain of Bambara groundnut in Mali by Bioversity International and the Institute of Rural Economy (IER) to identify opportunities and constraints for the development of the Bambara groundnut market for the benefit of marginal producers and women in particular. The study used resource persons to collect data in Koutiala and Sikasso circles in Sikasso region and San and Tominian circles in Ségou region, as well as in Bamako district of Koulikoro region. A participatory method was used to collect qualitative data at the level of rural communities. Quantitative data were collected using semi-structured questionnaires for surveys of producers, traders and consumers.

### Production

The total production of Bambara groundnut in Mali in 2015 was 27,691 tons, which represented only 3.4% of the national production of pulses (Ministry of Agriculture 2016). The highest production of Bambara groundnut was recorded in the Ségou region, responsible for 50% of the national harvest. Mopti, Koulikoro and Kayes were responsible for 43% of production, while the Sikasso region accounted for 7%. Recordings since 1980 reveal a growing production and area of Bambara groundnut in Mali (FAOSTAT).

Bambara groundnut is one of the crops found in family plots and sometimes in the personal



Bambara groundnut harvest in Boumboro  
Credit: Bioversity International/G. Meldrum

plots of men and women. The mean surface area cultivated by the surveyed producers was 0.44 ha up to a maximum of 1 ha. Farmers prefer a big grain size. Other preferred qualities are good taste, good yield, and early maturation. A total of 29 varieties of Bambara groundnut were identified in the villages surveyed. Eight varieties were identified as having good yield (*Tiomafoua*, *Dawanou*, *Paratourou*, *Tianfin*, *black*, *Bouyiga*, *Kiamba* and *Boussadon*) and eight with good taste (*Tiomafoua*, *Dawanou*, *Alirinaro*, *Noudie*, *Yoroba*, *Boufigue*, *white* and *red*). Seven were identified as early maturing (*Lomapo*, *Lomatobo*, *Tiomafoua*, *Alirinaro*, *Paratourou*, *Tianfin* and *Boufigue*). The most common variety among producers surveyed in Sikasso region was *Boufigue/Bifigue* which is appreciated for its precocity, low cost, good taste, white color, adaptability to different soils, and seeds of average size. In Ségou region the most appreciated variety was *Soutrai*, which has large black seeds. Some varieties are of interest to processors because of their ease of processing (*Soutrai red*, *Tiamba* and *black*) and fast cooking (*white*). The producers recognize four

varieties for which buyers offer good prices (*Alirinaro*, *Paratourou*, *Boufigue* and *Boubogo*). All varieties are local because no improved variety of Bambara groundnut exists in Mali. The average yield of Bambara groundnut recorded at the national level is 625 kg/ha (Ministry of Agriculture 2016). Farmers interviewed had similar yields to the national level, but some also reported yields up to 1000-1200 kg/ha with the *Yoroba*, *Noudje* and *Noufin* varieties.

The Bambara groundnut production cycle consists of 11 steps: soil preparation, sowing, weeding, harvesting, drying, dehulling, winnowing, sorting, transport, packaging and storage. In the study area, sowing is done after the beginning of the rains (June/July) and the harvest is done about 120 days after sowing (September/October). One major constraint for the production of Bambara groundnut is the availability of labour to prepare the soil, sow, weed and harvest. In Sikasso the cotton harvest coincides with that of Bambara groundnut, and the priority for labour is given to cotton, which often causes the losses of seeds. Low rainfall affects the yield Bambara groundnut, especially

when the rains stop at flowering. Inadequate fertilizer also affects the yield, as producers do not have a subsidy for Bambara groundnut, as they do for other crops like cotton and maize. Producers estimated that they lose up to 30% of their Bambara groundnut production in the field, 60% during the harvest period, and 10% of harvested seeds are damaged by pests during storage. Producers do not know buyers who offer good prices and there is not a specific market for Bambara groundnut. Maintenance of the grains in storage is difficult. Some essential factors that allow and promote the production of Bambara groundnut are the availability of land and seeds, the availability of family labor and working materials (especially access to a multifunctional tractor for soil preparation).

## Marketing

Farmers estimated on average that 50% of their Bambara groundnut production is used for domestic consumption while 30% is used for sale. Most farmers sell their Bambara groundnut on the spot in the village. The value chain includes producers, input suppliers, processors, sellers,



Bambara groundnut harvest. Credit: Bioversity International/G. Meldrum



Woman pounding roasted Bambara groundnut.  
Credit: Bioversity International/G. Meldrum

consumers and support services. The first distribution channel of Bambara groundnut is a local network where farmers harvest and sell their produce directly to on-site collectors or consumers in the market of their village or neighboring village. The second chain consists of collectors who in turn supply traders (retailers and wholesalers) before they reach consumers and exporters.

In the nine markets where the survey took place in Sikasso (Kignan, Ourikela, Sikasso, Kimparana, Kouoro), Ségou (Somo, Yangasso) and Koulikoro (Niamakoro, Magnambougou), retailers were found selling raw and roasted Bambara groundnut in market stalls. In addition, semi-wholesalers were found selling roasted Bambara groundnut by the roadside. The sale of the roasted Bambara groundnut was seen to be a woman's activity. Some men were present in the sale of the raw grains, but not in the roasted product. The sale of Bambara groundnut is done all year long, but there is a shortage of seeds and roasted Bambara groundnut from May to August. The seeds found on the markets had three different sources: collectors, farmers and own production (78%, 11% and 11% respectively). Similar sources were noted for roasted Bambara groundnut but with the following proportions: 61%, 27% and 12% respectively.

Surveys with traders in the markets revealed that the small amount of Bambara groundnut produced at the village level is the main constraint for collectors. The main difficulties of the sale of the grilled Bambara groundnut in particular are weak capacity for quality processing and marketing, lack of consumers, slow pace of sale during the period of abundance (September to December), and high purchase price of the grains. There is competition in the sale of roasted Bambara groundnut because many women engage in this activity. Grilled Bambara groundnut is found in several rural markets, but it is surprising that this product is not commercialized by local and urban processing units. This indicates a gap in the communication between actors in the value chain.

An analysis of the profitability of Bambara groundnut for producers revealed that variable costs and fixed costs are higher in Sikasso region than in Ségou (122,296 FCFA vs 50,900 FCFA and 22,300 FCFA vs 8,750 FCFA respectively). As a result, net margins are higher in Ségou than in Sikasso (78,715 FCFA vs 27,258 FCFA). At the level of traders, margins for the sale of grilled Bambara groundnut are higher in periods of abundance. During periods of scarcity, the volume sold per month is estimated at 33 840 kg for seeds and 19 800 kg for roasted Bambara groundnut. Bambara groundnut is profitable for seed traders during periods of abundance (gross margin per month = 38,556 FCFA) and for producers in Ségou region (net margins = 78,715 FCFA). The weekly volumes sold of roasted Bambara groundnut during periods of abundance depend strongly on the size of the market and the place of purchase of the grains during periods of shortage.

## Consumption

All the producers surveyed appreciated the taste of Bambara groundnut and said that their children also like the taste. Boiled Bambara groundnut was the preferred recipe of most of the surveyed producers, but some preferred Bambara groundnut wafers. By contrast, the recipe preferred by most consumers surveyed in the markets was roasted Bambara groundnut. Consumers interviewed



Bambara groundnut in Finkoloni.  
Credit: Bioversity International/G. Meldrum

seek a well-prepared product, without sand, that is well cooked, with a large grain, and most often of a white variety. Bambara groundnut is eaten all year, but more often during the period of abundance, just after the harvest, when it costs less and is more generally available. Most consumers eat roasted Bambara groundnut several times a week, which shows the importance of this food as a snack. Only a quarter of consumers would eat it less often- once in a month or a year. Half of the consumers were interested to buy Bambara groundnut more often, if means allowed them. The other half, however, was not interested to buy more Bambara groundnut because the quantity consumed was already sufficient or because they did not appreciate it enough to consume more.

## The underutilized potential of Bambara groundnut

Bambara groundnut contributes to the diet of many households in Mali and in Africa in general. The advantage of Bambara groundnut over other leguminous seeds such as peanut and cowpea is at the level of its affordable price. Roasted Bambara groundnut is generally very affordable for consumers and has a high energy density. As such, it is very attractive to poor people who need to reduce their hunger between breakfast and lunch, as well as between lunch and dinner. A key element to enhance the snack market for Bambara groundnut would be investment in packaging and promotion in the city. Among the constraints that can limit the consumption of roasted Bambara groundnut are the purchase price (of the grains), the unavailability of the product and poor quality. Awareness is still needed to increase the level of consumption of this product because of this dietary value that is absent in other legumes.

Women have a monopoly on the processing of roasted Bambara groundnut, which represents an opportunity for them to generate income. However, this activity remains

limited at the family level with a lack of knowledge about appropriate processing techniques. Producers are not organized in groups around Bambara groundnut, which can be a reason for buyers to take the advantage of them. Several studies have shown that collective action has a significant effect on the marketing of agricultural products. Producers of Bambara groundnut sell their product individually, and each one decries the impossibility of negotiation or the imposition of the prices by the purchasers. Better than the producers, traders have mastery of all the workings of the market. Even if some costs (transport, taxes, security, etc.) are high for traders to be able to generate a substantial profit, awareness and support to these two categories of actors (producers and traders) is essential to reduce the gap between them.

Boiled Bambara groundnut was noted in our investigation as one of the products consumed locally. Studies in Nigeria and Ghana have shown the development of commercial industries in the manufacture of canned boiled Bambara groundnut to serve as a salad. Because boiled Bambara groundnut is a fairly perishable product, canning can be an alternative to enable its preservation. Transformation units at the city level can accommodate such an initiative if it is supported not only by appropriate training, but also by a survey in supermarkets showing demand. In addition to this product, Bambara groundnut flour products can also be welcome in processing units.

Considering the multitude of its qualities (availability, nutritional value, profitability), Bambara groundnut offers great opportunities in terms of food security, sustainability, income diversification, food diversification and product development. If the adoption and improvement of this crop is achieved, it can make an important contribution to improving food and nutrition security and reducing poverty in Mali and elsewhere in Africa.



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