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Bambara groundnut: A promising food legume for dryland agriculture in India

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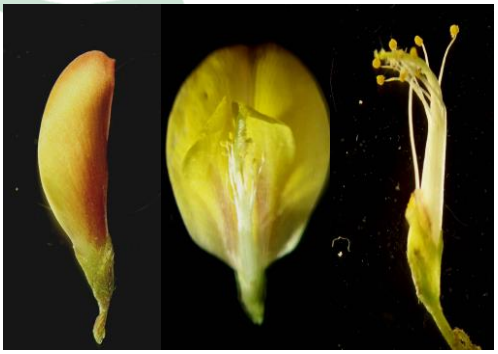
Introduction:

Bambara Groundnut, botanically known as *Vigna subterranea* (L) Verdc. is the nearest relative of cowpea. Bambara groundnut is a native of North Africa and the name of this African groundnut originated from Bambara, a district on the upper Niger. It is widely cultivated throughout tropical Africa. Bambara groundnut is the second most important food legume and the third preferred food crop after maize and groundnut. It has been found more profitable to grow this crop in environments where production of cereals and other food legumes are not economical.

Morphology:



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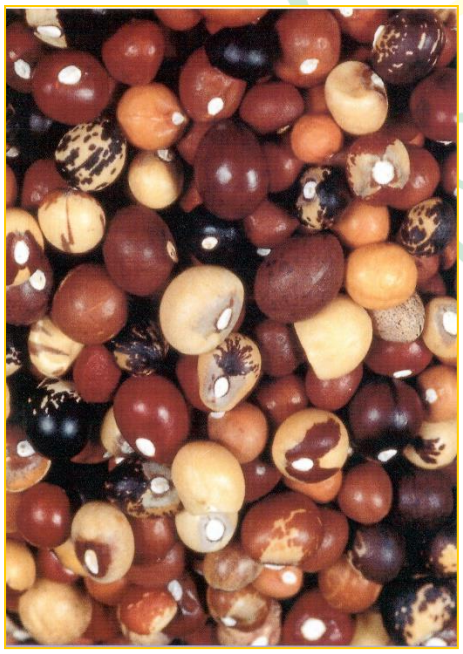
Bambara groundnut is an annual legume with a compact well developed tap root and many short lateral stems. The leaves are trifoliate and petiole is long. The flowers are typically papilionaceaous and are borne on a raceme on the long hairy peduncles, which arise from the nodes of the stem. Similar to groundnut, it forms pods on or just below the soil surface. The pod is small (1.5 cm long), round or slightly oval shaped with mostly one or sometimes two seeds.

Food Value:



Bambara groundnut is a rich source of Protein (16-25%), found superior to that of reported for Cowpea, groundnut and Pigeon pea in view if its high lysine and methionine (Brough and Azam-ali, 1992 and Rowland, 1993). Besides protein, it is rich in Iron (5-48 mg per 100 grams as compared to 2-10 mg for most of the food legumes). It also contains fat (5-7%), fibre (5-12%), ash (3-5%) and carbohydrate (51-70%) with energy value of 367-414 k Cal/100g. The gross energy value of Bambara groundnut seeds is greater than that of Pigeon pea, Cowpea and Lentil. The immature seeds are boiled and eaten as an early

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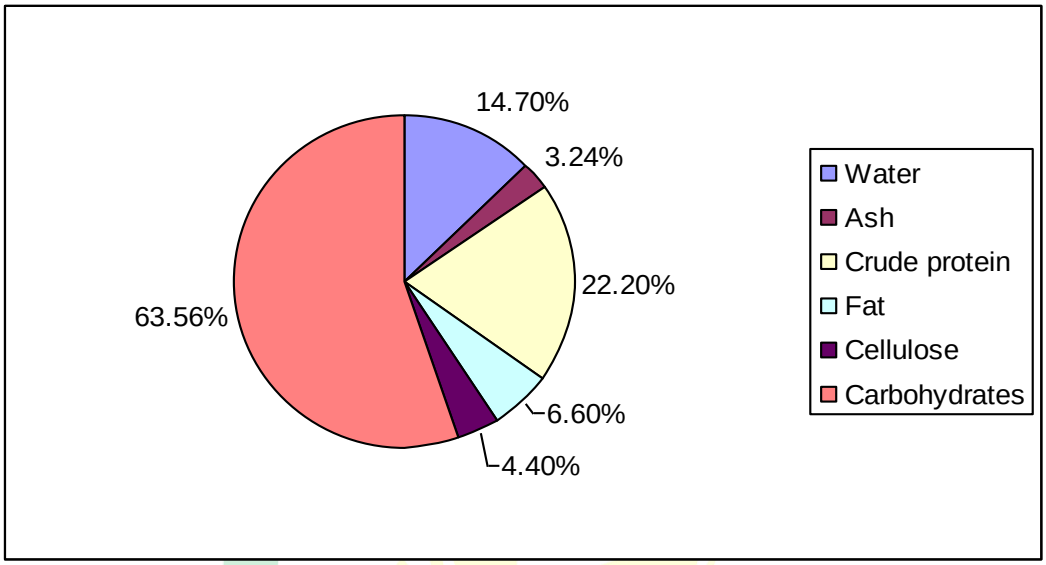
harvested source of food and fully matured seeds are cooked and made into flour. Bambara groundnut seeds can also be used to produce vegetable milk that is comparable to soya milk.



Food Uses:

Dry Bambara nuts are eaten in many ways; pressure cooked as rajma, peas, gram; splits as dal, flour, etc. Whereas, green/immature pods can be eaten as fresh, roasted, boiled and eaten with salt and pepper as snack food. In East Africa, the beans are roasted, pulverized and used in soup. Bambara groundnut flour is also used in preparation of bread and fortification of coarse cereals. Bambara groundnut shells and haulms are used as feed to livestock and poultry.

Is Bambara Hardier Than Groundnut?

The crop has a number of advantages over more favored species in terms of its tolerance to adverse environmental conditions. It can grow well even under meager rainfall areas and low fertility soils. Results from a range of soil water treatments confirmed that Bambara groundnut is more drought tolerant than Groundnut and can produce a reasonable yield (500-600 kg/ha) in a given environment where Groundnut may fail completely (Linnemann and Azam-ali, 1993).

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Impact on Soil Fertility:

Bambara groundnut fixes atmospheric nitrogen in symbiosis with *Bradyrhizobium* strain through nodulation process, quite similar to Groundnut crop. Bambara groundnut has a greater residual nitrogen effect than many other crops. In rainfed production system, there is no nitrogen requirement for Maize when it succeeds Bambara groundnut in rotation (Mukurumbira, 1985). Visualizing great potential of this crop in rainfed system either as sole crop or as intercrop, several Bambara groundnut cultivars/land races were introduced to ICAR Directorate of Groundnut Research (Erstwhile National Research Centre for Groundnut, NRCG) Junagadh through BPGR, New Delhi.

Primary Objectives:

a) Identify suitable agro-ecological regions and seasons for its cultivation commercially.
b) Identify potential of Bambara groundnut in different dryland production system as sole crop or as intercrop.
c) Identify stress genes and physiological mechanism imparting high degrees of resistance to biotic stresses.
d) Develop and recommend suitable varieties and their management practices to stabilize yields under rainfed conditions.
e) Study association of Bambara groundnut as intercrop with groundnut, moth bean, etc. for maximum output without recourse to costly inputs such as fertilizer, irrigation, etc.

Conclusion:

With this endeavour, it may be possible to introduce Bambara groundnut in such dryland/ harsh environment where no other cereals, pulses, oilseeds, etc. could be grown profitably. So also, in such hostile environment where groundnut productivity fluctuates violently (300-1000 Kg/ha) on year-to-year basis. Introduction of this crop is likely to mop up sizable additional production of food legume from the available unproductive fallows in one hand and stabilize groundnut production at higher level, on the other. Successful establishment of Bambara groundnut in target environments would certainly be a step forward towards food and nutritional security and empower the resource poor, small and marginal farmers, economically.

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The Initiative:

The author in his capacity of Director, NRCG (ICAR), Gujarat, introduced the crop hitherto unknown in India through a multi-country project on "Molecular, Environmental and Nutritional Evaluation of Bambara Groundnut for Food Production in Semi-arid Africa and India" to evaluate its potential as a nutritious and income generating crop for traditionally marginal farmers living in some of the most hostile environment in the tropics. Besides India, the other countries participated in the project were Botswana, Ghana, Namibia, and Tanzania (in Africa) and Denmark, Germany and United Kingdom (in Europe), funded by European Union and implemented by Tropical Crops Research Unit, University of Nottingham, UK.