

Upgrading Grain Amaranth Value Chains in Africa

POLICY BRIEF



Photo: Brian Abook

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

The African continent is blessed with a rich diversity of food crops, most of which have received little attention in terms of research and development, policies and strategies. Grain amaranth (*Amaranthus* sp.) is one such neglected and underutilized species (NUS).

A pseudo-cereal, it is used much like cereal grains. It is among a small set of “super foods” due to its nutritional properties, and has a growing international market in the health food industry. Scientists have identified **amaranth as one of Africa’s priority NUS**, which warrants increased investment in its value chain development.

Compared to staple cereal crops, grain amaranth has **superior nutritional value**, is early maturing and demonstrates **resilience against pests, diseases and droughts**. The crop is often collected, cultivated and traded by women. It can make agricultural production systems more resilient to climate change and empower indigenous communities, particularly women and youth. The crop is viable under very small acreages with positive returns to investment. It fits very well into African smallholder farming systems.

In spite of such positive traits, **grain amaranth value chains face problems** related to cultivation, processing and marketing, constraining the crop’s agronomic and market potential. Inadequate seed availability and quality, sub-standard agronomic practices, poor post-harvest handling and processing, and weak farmer organization are key constraints. The commercialization of grain amaranth is also hampered by inadequate policy support, limited funding and a perception of being a ‘poor man’s crop’.

This policy brief suggests how current **constraints to grain amaranth value chains could be addressed, and how policies can help**.

Key messages

- Grain amaranth has significant nutritional and medicinal value and is a “super food” with expanding international market.
- Upgrading value chains of grain amaranth helps fight hunger, malnutrition and poor health, and contributes to poverty alleviation via high-value niche markets.
- Including grain amaranth in agricultural production systems can make them more resilient to climate change.
- Grain amaranth has a great potential to empower indigenous communities, particularly women and the youth.
- In Africa, grain amaranth needs more attention from research, economic activities and general policy support.

Grain amaranth value chains

Rapid agricultural, economic and demographic change in sub-Saharan Africa and a focus in business, policy, research and education on a small set of major crops have left many alternative, traditional crops behind.

Grain amaranth is one such crop. Its current value and future potential as a tool to fight poverty, hunger and malnutrition has recently gained attention in African countries, including in Benin, Kenya and Zimbabwe, as well as internationally. Its usefulness as a tool for farmers' adaptation to climate change is an added asset.

But the diversity of grain amaranth and other NUS crops, and the related traditional knowledge about their cultivation and use is being eroded at an alarming rate.

In view of this, the NUS Value Chain project organized a national stakeholder workshops in Nairobi, Kenya in 2014 in which a **value chain analysis of grain amaranth** as well as Bambara groundnut was undertaken. A **National Action Plan for upgrading the value chains** of these priority NUS was also developed.

Similar workshops also took place in Benin and Zimbabwe. Together, these project activities provided a picture of how current constraints to grain amaranth value chains, and other similar crops, could be addressed and how policies can help.



Amaranth seeds are tiny, affecting processing. Photo: Brian Abook.

Amaranth species

Amaranth is the collective name for species belonging to the genus *Amaranthus*, native to the Americas. This genus includes about 60 species, most of which are weeds.

Cultivated amaranth species can be used as leafy vegetables, food grain, forage and ornamentals.

The amaranth species commonly found in Africa are *A. dubius* and *A. hybridus*, grown as vegetable, *Amaranthus cruentus* grown for grain and *A. hypochondriacus* grown for both vegetable and grain.

The seed colours of varieties in these species are mostly white, gold, yellow, pink or black. Grain amaranth develops brilliant coloured grain heads. Seeds are tiny (about 2 million seeds per kilogram), making it difficult to make a

planter for them. Grain amaranth is an annual herbaceous plant, with a C4-photosynthetic pathway that contributes to its **broad adaptability to diverse ecologies.**

Importantly, amaranth is fast maturing and grows rapidly even under conditions of high temperatures and light intensities. It is **tolerant to the dry conditions of semi-arid areas** and can even produce a crop under drought conditions. Grain amaranth develops well at temperatures in the range of 16 - 33 °C.



Amaranth varieties grown in Nepal. Photo: Sajal Sthapit, LI-BIRD

Grain amaranth is highly nutritious and has potential health benefits. Its grain contains an average of 15% protein, which is highly digestible and rich in lysine, tryptophan and sulphur-containing amino acids. It has a balanced amino acid composition that is close to the optimum protein reference pattern in the human diet, according to FAO/WHO.

Grain amaranth is rich in calcium, zinc, iron, vitamins A, C, E and folic acid. It contains twice the level of calcium in milk, five times the level of iron in wheat and higher potassium, phosphorus and vitamins A, E, C and folic acid than cereal grains.

Seed oil from amaranth consists mainly of unsaturated fatty acids and significant amounts of squalene, an organic compound used in cosmetics and medicine. It is also a rich source of tocotrienol, of the vitamin E family, known to lower harmful LDL-cholesterol.



Flour blends with terere, the local name for amaranth, on sale in Kenya. Photo: Brian Abook.

Uses

Grain amaranth has **significant commercial potential**. Its seed can be cooked, germinated for sprouts, malted for beer production, fermented or can serve as a starchy material in spirit production. It can be popped or used in flour form as ingredients in different mixtures to make commercial products like bread, biscuits, pasta, crackers, pancakes, muffins, paste and breakfast cereal. Un-popped grain can be ground and mixed with ground fish or flour of other cereals such as maize, sorghum and millet to make thin porridge.

Grain amaranth is recognized as a gluten-free foodstuff suitable for incorporation into the diet for people with gluten intolerance. Increasingly, it is traded in the growing international health food market.

Constraints

An analysis of grain amaranth value chains, conducted at three multi-stakeholder workshops in Kenya, Benin and Zimbabwe in 2014, identified six areas of constraints that need attention if grain amaranth is to fulfil its market potential. In summary, these are:

- **Market access and consumer demand:** Consumers are the drivers of value chains but poor awareness of the nutritional and medicinal value of amaranth products limits demand. On the supply side, low volumes, inconsistent supply of amaranth products and low product quality are key issues. Limited knowledge of consumer preferences hampers product development and marketing.
- **Input supply:** Access to seed of good genetic and biological quality is a big constraint; amaranth seed systems are largely informal and certified seeds lacking. There is scarce knowledge and information on existing amaranth genotypes.
- **Agronomy, technology and product development:** Poor agronomic practices and high post-harvest losses are key issues. Inadequate knowledge on post-harvest handling, processing and product development of amaranth is common. Limited and inefficient use of fertilizers and pesticides was also reported.
- **Farmer organization:** Amaranth growers are poorly organized, making it hard to ensure adequate and consistent supply of the produce to the market. Poor agribusiness skills and lack of bargaining power affect prices they can achieve. There is also limited knowledge on value addition and processing operations.
- **Policy and regulation:** Policy makers have limited awareness of the potential of grain amaranth to improve food security and nutrition. The public sector support for research and development of amaranth is currently weak.
- **Finances:** While not specific to amaranth, a range of financial issues, such as access to credit constrain farmers' investment in this crop. Access to funding for research and technology transfer and dissemination is also an issue.

Recommendations

- **Increase market access and consumer demand:** Promote the consumption of grain amaranth products and inform about their nutritional benefits, e.g. through public awareness campaigns. The Kenyan successes in marketing African leafy vegetables in supermarkets can provide useful lessons.
- **Develop and strengthen seed systems:** Improve the diversity and quality of amaranth seed supply. This entails collecting, documenting and characterizing amaranth varieties, breeding new high-yielding varieties and building capacity of farmers' production of high quality seed.
- **Improve crop management and value addition:** Invest in agronomic, postharvest and product development research, and studies on consumer preferences for amaranth-based products. Improve equipment for harvesting, drying and processing and train farmers on quality standards during harvesting and processing
- **Improve organizational management:** Strengthen farmer's and farmer groups' participation in grain amaranth value chains. Build capacity to collectively engage in production, value addition and marketing and effectively link value chain stakeholders.
- **Improve the regulatory and policy environment:** Create an enabling institutional environment for developing value chains of NUS, including grain amaranth. Support public-private partnerships in grain amaranth value chains, facilitate access to credits and help grain amaranth farmers organize collectively.

Further reading

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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: Bioversity International, Italy

Partners:

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

Kenya: African Network for Agriculture, Agroforestry and Natural Resources Education (ANAPE); 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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