



Whitepaper

**Ancient Grains:
Rediscovering traditional
crops for a resilient
global food future**

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Rediscovering traditional crops for a resilient global food future.

In a world grappling with climate change, supply chain disruptions, and mounting food insecurity, ancient grains—once sidelined by modern agriculture—are re-emerging as powerful tools for building sustainable, self-reliant food systems.

Cereal grains form the nutritional foundation for billions of people worldwide. Together, wheat, maize, and rice account for around 45 percent of all calories consumed. These grains are also indispensable as livestock feed, anchoring broader agricultural economies and global food supply chains.

Trade in cereal grains is extensive and essential. With their long shelf-life, high energy density, and ease of handling, these staple crops are transported across continents. Today, roughly 17 percent of global grain consumption depends on international trade. Most of this trade flows from high-income producers—such as North America, Europe, Russia, and Australia—to low- and middle-income importers across Africa, Latin America, and Asia.

However, this model is becoming increasingly fragile. By 2033, the UN Food and Agriculture Organization (FAO) projects that Africa will import nearly one-third of its grain consumption. This growing dependency on external supply sources is placing immense economic pressure on vulnerable economies and exposing them to price shocks and disruptions.

Supply Chain vulnerabilities

Recent history illustrates the precariousness of global grain markets. The war in Ukraine, a major grain exporter, led to dramatic price spikes in 2022 and 2023, reaching or exceeding the crisis levels of earlier decades. Although prices have since eased, the grain trade remains volatile, buffeted by geopolitical tensions, energy market instability, and climate-driven agricultural shocks.

Extreme weather events are becoming more frequent and severe. In 2021, Canada—one of the world's largest wheat exporters—experienced a 38.5 percent drop in wheat production due to drought and heatwaves. As disruptions become more common, the need for more resilient and diversified food systems grows increasingly urgent.

Food sovereignty through local production

Recognizing the risks of over-dependence on imported food, many developing nations are prioritizing food sovereignty, an approach that emphasizes domestic production and control over agricultural systems.

One prominent example is Ethiopia's Climate Resilient Wheat Value Chain Development (CREW) Project. This \$94 million initiative aims to transform Ethiopia from a wheat importer into a self-sufficient producer—and eventually, an exporter. Similarly, the Technologies for African Agricultural Transformation (TAAT), spearheaded by the African Development Bank, is a bold, continent-wide push to rapidly scale up access to proven farming innovations.

Yet even as these efforts ramp up production of mainstream crops like wheat, maize, and rice, another solution is quietly gaining traction: the revival of ancient grains.



Ancient grains such as millet, sorghum, teff, and fonio have been cultivated in Africa for thousands of years, serving as resilient, nutritious staples adapted to diverse climates.

What are Ancient Grains

“Ancient grains” refer to cereals and pseudocereals that have remained largely unchanged by modern selective breeding. These grains were once dietary staples across Africa, Asia, and the Americas. While many have been overshadowed by high-yield modern varieties, they offer a remarkable combination of hardiness, nutritional value, and cultural significance. Some key examples include:

- **Sorghum** – A drought-tolerant cereal with large bushy seed heads, rich in nutrients and ideal for semi-arid climates.
- **Teff** – Native to Ethiopia, this ultra-small grain is rich in iron, calcium, and protein, and is the core ingredient in the traditional Ethiopian flatbread injera.
- **Fonio** – A fast-growing, drought-resilient grain native to West Africa, prized for its nutty flavor and quick cooking time.
- **Millet** – A family of small-seeded grasses that grow well in marginal soils and are traditionally consumed across India, China, and sub-Saharan Africa.
- **Sunflower seeds** – Valued for their oil and high protein content, especially in temperate climates.
- **Quinoa** – Originally cultivated in the Andes, quinoa is now a global superfood, celebrated for being a complete protein, containing all nine amino acids that the body cannot produce on its own, as well as gluten-free, and rich in micronutrients.

These grains have fed generations in some of the world’s harshest environments. Their natural resistance to drought, heat, and poor soils makes them ideal candidates for a future shaped by climate uncertainty

Nutrition meets tradition

Beyond resilience, ancient grains bring significant nutritional benefits. Many are rich in essential amino acids, fiber, vitamins, and minerals. Several are naturally gluten-free, catering to consumers with dietary restrictions or preferences. Unlike heavily refined modern flours, ancient grains often retain more of their natural nutrients when minimally processed.

These grains also form the backbone of traditional cuisines. In Sudan and Chad, kiswa, a sorghum-based flatbread, is a daily staple. In Nigeria, gwole, a savory porridge made from fonio and vegetables, remains popular. In Ethiopia, injera continues to be a central component of nearly every meal.

These traditional foods not only provide essential calories and nutrients but also serve as cultural touchstones, reinforcing local food knowledge and culinary heritage.

From niche to mainstream

In recent years, ancient grains have begun moving beyond traditional food contexts. Food scientists and manufacturers are exploring their use in modern processed foods as partial substitutes for wheat, maize, or rice. These innovations promise multiple benefits: improved climate resilience, local supply chain security, and functional food enhancements.

At Bühler’s Food Creation Center in Uzwil, Switzerland, researchers have trialed the use of ancient grains in commercial food production. Replacing 10 to 25 percent of wheat flour with millet in sweet wafers led to improved crispness and shorter baking times without compromising flavor. In another test, substituting sorghum flour for up to 60 percent of the wheat flour in biscuits produced a product with excellent texture and taste.

Ancient grains also have the potential to play a larger role in the global grain trade, especially as an export from emerging economies. The nutritional profile of these products, such as their lack of gluten and high protein and micronutrient content, is appealing for consumers in many countries who are seeking alternatives to conventional refined grain products.

In the U.S., for example, Yolélé, founded by chef and restaurateur Pierre Thiam and entrepreneur Philip Teverow, is on a mission to promote West-African grown Fonio as a healthy and sustainable alternative. Working with more than 200 farmers, Yolélé has established a commercial fonio supply chain and is developing the infrastructure to mechanize processing of the crop. The company supplies flours for industrial uses, and has developed a range of fonio-based foods for consumers.



The Food Creation Center in Uzwil provides the latest technology for conducting product testing, production trials and training for muesli, nut bars, wafers, biscuits, chocolate, baked goods, snacks and more..

The infrastructure challenge

Despite their promise, ancient grains face formidable barriers to wider adoption. Most supply chains are small-scale, fragmented, and inefficient. Grain processing—cleaning, milling, sorting—is often performed using outdated, labor-intensive equipment. The result is high waste, poor product consistency, and food safety risks.

Scaling ancient grains into industrial food systems requires a dramatic upgrade in infrastructure. This means building facilities capable of handling large volumes, ensuring hygienic storage, and producing flour or meal at a consistent quality suitable for commercial use. Key challenges include:

- **Economic viability:** Investors need to determine the optimal scale and distribution of infrastructure. Regional processing hubs may offer a more feasible solution than large, centralized mills.
- **Technical innovation:** Ancient grains often have smaller seeds or tougher husks, requiring specialized machinery. Conventional wheat or rice mills must be reengineered to accommodate different grain characteristics.
- **Human capital:** A skilled workforce is essential to operate and maintain modern processing equipment. Training programs must be developed in parallel with infrastructure investment.

Innovation in action

Recognizing these needs, Bühler launched the Grain Processing Innovation Center (GPIC) in Kano, Nigeria in late 2024. The center serves as a hub for research, technology development, and hands-on training in areas such as the processing of ancient grains.

The GPIC enables food producers to trial individual machines or entire processing lines covering every step from grain cleaning



The Grain Processing Innovation Center (GPIC) drives research and development to unlock the potential of ancient grains for safe, affordable food in Africa and beyond."

and sorting to milling and sifting. More importantly, it offers a space for knowledge exchange, where millers, engineers, and entrepreneurs from across Africa can build the skills and confidence needed to scale up their operations.

Through its initiatives, Bühler is helping close the gap between traditional food systems and modern industrial supply chains—unlocking the full potential of ancient grains for the benefit of both local communities and global markets.

A Future rooted in the past

As the world faces unprecedented challenges to its food systems, ancient grains offer a compelling mix of resilience, nutrition, and cultural relevance. Their reintroduction—supported by modern technology and infrastructure—could play a transformative role in making food systems more diverse, robust, and self-sufficient.

By investing in these time-tested crops and the systems that support them, we not only preserve traditional agricultural wisdom but also build a more secure and equitable future for global food.

Curious about our Grain Processing Innovation Center (GPIC) in Kano, Nigeria? Scan the QR code to explore more and connect with us..



The GPIC team looks forward to supporting you with the right technology and extensive expertise to help you achieve your goals. (Photo from the GPIC opening with Bühler Management)

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