

From Poverty Food to Global Superfood: Can Fonio Escape the Quinoa Trap?

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ABSTRACT: This paper argues that the growing global demand for the West African NUS, fonio, presents both an opportunity and a risk for Northern Ghana. On one hand, fonio's drought tolerance, short growing cycle, and ability to thrive on marginal soils position it as a potentially important crop for climate adaptation, food security, and livelihood diversification in the region. On the other hand, previous experiences with quinoa and teff demonstrate that commercialization can reproduce unequal value chains in which external actors capture the majority of profits while smallholder farmers remain concentrated in low-value segments of production.

Introduction

Global food systems are structured around a narrow set of staple crops, primarily rice, maize, and wheat, which provide the majority of calories consumed worldwide.¹ Over time, investment, infrastructure, seed development, and processing technologies have become concentrated around these crops, reinforcing highly standardized and capital-intensive food systems. While this model has increased global food production, it has also reduced agricultural biodiversity and heightened vulnerability to climate shocks, geopolitical disruptions, and food price volatility.² These vulnerabilities are increasingly evident in regions already facing environmental stress and economic marginalization.

At the same time, growing concern over diet-related illnesses, micronutrient deficiencies, and the environmental sustainability of industrial agriculture has generated renewed global interest in neglected and underutilized species (NUS), including quinoa, amaranth, teff, and fonio.³ Many of these crops possess high nutritional value and deep cultural significance within the communities that have cultivated them for centuries. Their rising popularity among health-conscious consumers in wealthier countries has created new export opportunities and renewed attention from agribusiness firms and investors.⁴ However, the globalization of NUS raises important questions regarding ownership and uneven development.

This paper argues that the growing global demand for the West African NUS, fonio, presents both an opportunity and a risk for Northern Ghana. On one hand, fonio's drought tolerance, short growing cycle, and ability to thrive on marginal soils position it as a potentially important crop for climate adaptation, food security, and livelihood diversification in the region. On the other hand, previous experiences with quinoa and teff demonstrate that commercialization can reproduce unequal value chains in which external actors capture the majority of

profits while smallholder farmers remain concentrated in low-value segments of production.⁵

Ultimately, this paper contributes a political-economic analysis of an emerging topic within a region that remains underrepresented in the literature on neglected and underutilized species. Northern Ghana is increasingly affected by desertification and climate stress, making the proliferation and adoption of drought-tolerant indigenous crops such as fonio potentially important strategies for climate adaptation and food security. The paper therefore asks what anticipatory planning for the wider adoption of fonio within local cuisines and food systems might look like. This question is important because lessons from fonio commercialization may be replicated in efforts to reintroduce other indigenous crops, including sorghum and millet. My interest therefore extends beyond NUS commercialization to include the cultural reintroduction of indigenous crops and the broader implications for regional development, food sovereignty, and climate resilience.

Theoretical Framework: Political Ecology and Uneven Development

Political ecology provides a useful framework for understanding how environmental and economic transformations are embedded within broader power relations. This analysis is embedded within that lens and examines how ecological change is shaped by political and economic structures.⁶ Rather than treating environmental degradation or agricultural transformation as purely technical problems, political ecology emphasizes how unequal access to land, capital, and markets shapes development outcomes.

The globalization of NUS crops can also be understood through the lens of uneven development. Export booms are frequently associated with economic growth, yet their benefits are not automatically distributed evenly. Resource curse literature demonstrates that without effective governance structures, gains from export expansion are often concentrated among elites or external actors rather than broadly shared.⁷ Similar dynamics were strikingly evident during the quinoa boom. While the crop's 'discovery' by Western consumers initially raised farmer incomes, the benefits were highly stratified. Capital-intensive agribusinesses on the Peruvian coast used their access to technology to achieve yields significantly higher than traditional highland smallholders, eventually driving down global prices and leaving the original Andean farmers unable to compete in a market they had pioneered.⁸ This demonstrates that without protective governance, NUS commercialization can lead to a 'bust' that devastates local livelihoods while the most significant profits remain captured by downstream processors and international retailers.⁹

This framework is particularly relevant for Northern Ghana because the region has historically occupied a marginalized position within Ghana's national political economy. The emergence of fonio as a globally demanded crop therefore

raises important questions about whether commercialization will reinforce existing patterns of extraction or contribute to more inclusive regional development.

The Regional Context

Northern Ghana provides a particularly important site for examining these dynamics because the region sits at the intersection of climate vulnerability and historical marginalization. The region experiences high rates of poverty and food insecurity.¹⁰ Agriculture remains the dominant livelihood activity, yet production is largely rainfed and highly vulnerable to climate variability. At the same time, Northern Ghana possesses significant agroecological potential for resilient indigenous crops such as fonio, sorghum, millet, and shea. Due to the climatic conditions of the region, particularly increasing water stress and degraded soils, drought-tolerant crops are especially important for future agricultural adaptation. These contemporary vulnerabilities are deeply connected to historical patterns of uneven development.¹¹

To understand the potential of fonio, one must first address why Northern Ghana remains economically marginalized. During the colonial period, Northern Ghana was deliberately structured as a labor reserve for the southern cocoa economy, receiving limited infrastructural and industrial investment relative to southern regions.¹² These disparities continue today through weaker transportation networks, lower industrialization, limited access to capital, and reduced state investment.

Land tenure systems also shape the political economy of agricultural commercialization in the region. Much of Northern Ghana operates under customary land tenure systems in which chiefs and family lineages exercise significant authority over land allocation and use. However, the coexistence of customary and statutory land systems creates a precarious and often complicated process for determining land ownership and use rights, including whether land is state-owned, governed under customary authority, or held through long-term lease arrangements. As Emmanuel Frimpong Boamah et al. note, relationships between farmers, communities, and chiefs can at times become contentious; the authors document cases in which farmers reported threats and intimidation from representatives of chiefs over land access and control.¹³ This dual land regime can create uncertainty for smallholders and discourage long-term agricultural investment. As fonio gains commercial value, questions surrounding land governance and community ownership become increasingly significant.

This paper examines how the globalization of fonio may reshape food systems and regional development in Northern Ghana. Using quinoa and teff as comparative cases, it analyzes the political economy of NUS commercialization, paying particular attention to value-chain governance, processing infrastructure, gender dynamics, and food security. The paper further evaluates the emerging role of social enterprises and external investment, particularly U.S.A.I.D.'s 2024

investment in AMAATT's fonio processing facility in the Tamale region, as a concrete intervention shaping the region's emerging fonio economy.¹⁴

More specifically, this paper asks: under what conditions can fonio commercialization contribute to inclusive regional development rather than reproducing extractive patterns of uneven development? The paper argues that the answer depends not simply on fonio's agronomic potential, but on who controls processing infrastructure, market access, land, and value-added segments of the supply chain. Without deliberate governance mechanisms, there is a risk that Northern Ghana becomes primarily a site of raw material extraction while value-added processing and profits are captured elsewhere.

Neglected and Underutilized Species

Neglected and underutilized species (NUS) are crops that have historically received limited investment in research, infrastructure, and policy support despite their nutritional and ecological value.¹⁵ Unlike globally dominant staples, such as maize and rice, many NUS remain poorly integrated into industrial food systems and often rely on localized seed systems, traditional processing methods, and informal markets.

Recent scholarship argues that NUS may contribute to biodiversity preservation and dietary diversification, particularly in regions vulnerable to environmental stress.¹⁶ However, scholars have also warned that commercialization may transform these crops into export-oriented commodities disconnected from the communities that historically cultivated them.¹⁷ This tension between commercialization and local control forms the central puzzle of this paper.

Comparative Case Studies: Quinoa and Teff

Quinoa: From Indigenous Grain to Global Commodity

Quinoa has been cultivated in the Andean region for thousands of years and holds significant cultural and nutritional importance among Indigenous communities in Peru and Bolivia.¹⁸ Beginning in the early 2000s, global demand for quinoa increased dramatically due to its reputation as a nutritious 'superfood'.¹⁹ Research on quinoa demonstrates both the opportunities and risks associated with NUS commercialization.

Some studies found that rising export prices improved household welfare for producers in quinoa-growing regions.²⁰ However, commercialization also generated environmental pressures, including soil degradation and expansion into fragile lands.²¹ Perhaps most importantly, the quinoa boom illustrates how value capture shifted over time.²²

As production spread globally to over one hundred and twenty countries, including the U.S.A. and China, Andean producers faced increasing competition from mechanized, large-scale agribusinesses. This led to extreme price volatility; for instance, after prices peaked in 2013, they collapsed by nearly half by 2015 as global supply surged. Much of the long-term value generated by quinoa

commercialization accrued to downstream actors like Saco Foods or international food giants like General Mills, who capture high margins through processed products like ‘ready-to-eat’ pouches and branded snacks, while smallholder farmers remain tethered to the fluctuating price of the raw grain.

Teff: The Risk of External Control

Teff, Ethiopia’s staple grain, offers another important comparative case. Like quinoa and fonio, teff is nutritionally rich, gluten-free, and deeply embedded within local food systems.²³ Growing international demand for teff generated concerns regarding export pressures, domestic food security, and intellectual property rights.

The teff case is particularly important because commercialization became closely linked to control over processing technologies. Like fonio, teff requires labour-intensive post-harvest processing to remove the grain’s outer layers before consumption, which historically limited large-scale commercialization and export expansion. As global demand for teff increased, foreign firms developed mechanized processing technologies that promised greater efficiency and scalability. However, attempts by European companies to patent teff-processing methods raised concerns about external control over value-added stages of production and highlighted how intellectual property regimes can undermine producer-country sovereignty over indigenous crops.²⁴ Ethiopia responded by restricting raw teff exports in an effort to protect domestic supply and retain value-added processing activities within the country, although this also limited the extent to which domestic producers could fully benefit from expanding global markets.²⁵

For regions such as Northern Ghana, where processing capacity for fonio remains limited, the teff case highlights the risks of external control over value-added technologies before domestic systems are fully developed.

Fonio and Emerging Commercialization in Northern Ghana

Fonio is among West Africa’s oldest cultivated cereals, domesticated more than five thousand years ago.²⁶ It is highly drought tolerant and matures rapidly, making it particularly suitable for regions facing climate stress and declining soil fertility. Despite its resilience, fonio has historically remained largely a subsistence crop due to immense post-harvest processing challenges. Similar to teff, fonio requires labour-intensive processing to remove the grain’s outer husk before consumption, historically limiting its scalability and commercialization. Traditional processing methods often require multiple rounds of pounding and separation by hand, making production extremely time- and labor-intensive.²⁷

In Northern Ghana, fonio has historically remained underutilized despite agroecological conditions favourable to its cultivation. Like many indigenous West African grains, fonio has increasingly been displaced by maize and other globally integrated cereals that benefit from stronger infrastructure investment and market opportunities.²⁸ However, renewed global interest in climate-resilient grains is transforming fonio’s economic significance. International development

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organizations and agribusiness firms increasingly promote fonio as a ‘supergrain’ suited to gluten-free and health-conscious markets.

Emerging initiatives in Northern Ghana, including the social enterprise AMAATI and U.S.A.I.D. 's 2024 investment in fonio processing infrastructure in Tamale, are beginning to position the region as a potential hub for fonio production and processing within the wider Sahel. U.S.A.I.D. 's investment seeks to expand processing capacity from approximately three metric tons to ten metric tons per day, significantly increasing the region’s position among West African producers.

Fonio’s commercialization is constrained primarily by post-harvest processing challenges. Mechanization is technically complex due to the grain’s small size and the need for precise separation from debris. As a result, processing capacity remains limited across West Africa, and scaling production will require significant investment in specialized equipment.²⁹ Without local ownership of these technologies, there is a risk that foreign firms will dominate value-added stages of production, reinforcing patterns observed in other NUS markets.

Discussion and Potential Next Steps

Global food systems tend to prioritize efficiency, standardization, economies of scale, technological innovation, and capital accumulation. In practice, this often favours uniform crop varieties, mechanized processing systems, along with large-scale supply chains capable of delivering consistent products to global markets. In the case of neglected and underutilized species (NUS), these pressures frequently translate into control over improved seeds and proprietary processing technologies.³⁰ Evidence from quinoa and teff suggests that while smallholders may benefit from short-term price increases, they often remain price-takers within value chains where the highest returns accrue downstream to processors, exporters, retailers, and technology owners.³¹ For smallholder farmers in Northern Ghana, who already face structural constraints related to land tenure and market access, these dynamics could further entrench unequal participation in emerging fonio value chains. Early ‘winner’ countries also risk overdependence on a single commodity, exposing them to future price volatility as global production expands and new competitors enter the market.³²

As the quinoa and teff cases demonstrate, commercialization does not automatically ensure that producers retain the most profitable segments of the value chain. When external investors finance processing infrastructure, they can shape contract terms, such as fixed farmgate prices or exclusive purchasing agreements, in ways that prioritize returns on investment over farmer incomes or household food security.³³ In the quinoa sector, for example, downstream actors involved in processing and export captured a disproportionate share of long-term value, while many Andean producers remained concentrated in lower-value stages of production. In Northern Ghana, where access to capital is limited, the ownership structure of processing facilities will similarly be a critical determinant

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of whether value is retained locally. This raises concerns for fonio: if processing capacity is externally owned, local producers may become locked into unequal exchange relationships in which they supply raw grain while profits accrue elsewhere.

The teff case illustrates how control over processing technologies can become a mechanism of economic power. Although mechanized processing expanded teff's commercial potential, attempts by foreign firms to patent teff-processing methods generated concerns about external control over indigenous crops and value-added production. By contrast, quinoa benefited from a relatively open diffusion of processing knowledge and technologies. Similar risks exist for fonio; if proprietary technologies emerge around dehusking, polishing, or mechanized sorting, local firms may face significant barriers to entry, reinforcing dependency on foreign-owned processing systems and limiting the ability of northern Ghana to capture value-added benefits locally.

Utilizing fonio to revive these degraded lands offers a pathway to reverse the underdevelopment of Northern Ghana, particularly given its ability to grow on marginal soils with minimal inputs and to fit within existing smallholder farming systems. However, this outcome is not guaranteed. If the expansion of fonio follows patterns observed in other NUS markets, there is a risk that value-added processing and profits are captured outside of Northern Ghana.

Ensuring that infrastructure, particularly processing facilities remains under local and cooperative control will be critical to avoiding this outcome. Rather than reproducing extractive relationships, fonio commercialization has the potential to support more inclusive regional development, but only if questions of ownership and value distribution are addressed from the outset.

Anticipatory Planning

To ensure fonio's globalization leads to equitable development rather than a curse for Northern Ghana and other West African producing regions, there are several exciting emerging trends and policy interventions worth considering:

To prevent local food shortages or price spikes, governments can mandate that a portion of fonio production or processing output be reserved for domestic markets. School-feeding programs and public procurement can also create stable local demand while improving child nutrition.³⁴ Real-world examples already exist. School-feeding initiatives in Peru have incorporated native Andean crops such as quinoa and native potatoes, while programs in El Salvador have promoted climate-resilient sorghum products in school meals.³⁵ These examples demonstrate how public procurement systems can simultaneously support farmer livelihoods, preserve traditional crops, and improve food security.

Formalizing agreements between farmers and traditional authorities is essential. National policies should recognize and document community land allocations to prevent women from being dispossessed once land becomes commercially valuable. Ethiopia's rural land certification program offers an

important example: beginning in the early 2000s, low-cost land certification strengthened tenure security for smallholders, including women, and was associated with increased agricultural investment and improved food security outcomes.³⁶ Joint land certification for husbands and wives also improved women's claims to land and reduced vulnerability to dispossession following commercialization pressures.³⁷ Similar mechanisms could help protect women farmers involved in fonio cultivation in Northern Ghana, where customary land systems often provide use rights without formal ownership documentation.

Farmers should be encouraged to cultivate multiple local varieties of fonio and other neglected and underutilized species rather than relying on a single improved variety. Maintaining varietal diversity preserves genetic resilience and adaptive capacity under climate stress. One mechanism for encouraging this is through public procurement and local market earmarks. For example, Peru's public procurement and gastronomy initiatives created stable domestic demand for multiple native potato and quinoa varieties, incentivizing farmers to continue cultivating diverse landraces rather than abandoning them for commercial monocultures.³⁸ Brazil's National School Feeding Programme requires a share of school food purchases to come from local family farmers, creating institutional demand for traditional crops and regional food varieties.³⁹ Comparable policies in Northern Ghana could reserve a portion of fonio procurement for local markets, school-feeding programs, or regional food processors, thereby rewarding farmers who maintain diverse local strains instead of exclusively producing export-oriented varieties.

Farmers should not negotiate individually; contracts between buyers and farmers should be transparent and fair. Producer cooperatives can also strengthen bargaining power and enable farmers to access higher-value export markets collectively rather than individually. In Bolivia, quinoa cooperatives such as ANAPQUI helped producers secure organic and fair-trade certification, coordinate exports, and obtain significantly higher prices for certified quinoa compared to conventional grain.⁴⁰ These cooperatives also functioned as local governance institutions, linking smallholders to international buyers while helping regulate production practices and reduce exploitative market relations.

Furthermore, joint-venture schemes in which farmers hold equity shares in processing plants should be encouraged to ensure that producers benefit from value-added profits rather than only from raw grain sales. Cooperative ownership models have demonstrated success in other agricultural sectors; for example, India's dairy cooperative movement, particularly the Amul model, enabled smallholder farmers to collectively own processing and marketing systems while retaining a larger share of profits within rural communities.⁴¹ Similar cooperative or farmer-owned processing arrangements could help prevent unequal value capture within emerging fonio markets. In addition, training programs and small grants for local entrepreneurs, particularly women-led enterprises, could stimulate the growth of a localized fonio food sector encompassing processing, packaging, catering, and

retail activities. Evidence from women's agribusiness initiatives across sub-Saharan Africa suggests that targeted support for women entrepreneurs can improve household incomes, strengthen local food systems, and expand participation in value-added agricultural markets.⁴²

Governments should subsidize community-based mills and open-access processing infrastructure. Public investment in locally owned processing facilities has been used in multiple agricultural sectors to prevent value capture by external firms. In Mali and Guinea, development agencies helped introduce semi-mechanized fonio processing equipment to women's cooperatives, significantly reducing labour burdens and improving local commercialization opportunities.⁴³ Similarly, India's expansion of quinoa production benefited from publicly supported agricultural research and the relatively open diffusion of processing knowledge through agricultural universities and extension systems, rather than restrictive patent regimes.⁴⁴

By funding open-access technology through universities and public research institutes, governments and regional bodies can support the development of affordable fonio dehulling and polishing machines adapted to the grain's small seed size. This could help Northern Ghana avoid the 'teff scenario', where attempts to patent processing technologies in Europe generated concerns over external control of value-added production.⁴⁵ Publicly accessible technology transfer systems, combined with community-owned mills and cooperative processing facilities, would allow more value to remain within Northern Ghana and the Sahel.

Conclusion

The globalization of crops such as quinoa and teff demonstrates that agricultural commercialization can produce both opportunity and inequality. As fonio emerges within global food markets, Northern Ghana faces a critical moment in determining how the crop's commercialization will unfold.

This paper argues that fonio's future will depend not simply on market demand or agronomic potential, but on questions of ownership and value distribution.

Without deliberate institutional safeguards, fonio commercialization risks reproducing existing patterns of uneven development in which external actors capture the majority of benefits. However, if commercialization is structured through locally embedded institutions and inclusive processing systems, fonio could contribute to livelihood diversification and more inclusive regional development in Northern Ghana.

Notes

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