



Smallholder access to quality and diverse seed in Uganda: Implications for food security



Highlights

- Lagging food production in sub-Saharan Africa (SSA), due to smallholders' lack of access to quality seed suited to their agro-ecological conditions and weak seed production and distribution systems, affects incomes and food security.
- Ugandan bean and banana seed systems are predominantly informal, with 87 per cent of bean seeds and 83 per cent of banana cuttings used by farmers obtained through informal seed system channels.
- Low quality of seed in informal seed systems has driven expansion of the formal seed system in recent years but, due to high prices of seed in the formal system and cases of fake seed, farmer confidence in the formal seed system is low.
- In order to satisfy farmers' needs for high quality, diverse seed, an alternative category of seed known as quality declared seed (QDS) is recommended. This, supplied by local seed businesses, would strengthen seed networks and ensure smallholder access to the high quality, lower price diverse seeds required to boost productivity and food security.

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Introduction

Much of the lagging food production in sub-Saharan Africa (SSA) can be attributed to weak seed production and distribution systems, inadequate supply of quality seeds and inadequate implementation of seed policies [1]. Combined, such barriers have left many African farmers without access to high-quality seed of a wide range of crop varieties adapted to their agro-ecological conditions and responding to farmers' and consumers' preferences. Despite a number of new developments, including policy reforms and engagement of private sector actors and international development donor agencies in seed research and production, SSA has not benefited to the same degree as other regions from recent advances in seed sector development [1].

This lack of access to quality seed of a wide range of varieties has several effects on food production systems:

- (i) It limits choices for farmers and consequently limits their ability to cope with

shocks and risks related to climate change, pests and diseases or other biotic and abiotic stresses.

- (ii) It limits farmers' ability to fulfil diverse and changing market preferences.
- (iii) It restricts farmers' capacity to attain higher and more stable yields and incomes and can negatively affect food security [1, 2].

Since the 80s and 90s, a number of public policies have been adopted and implemented in Uganda with the objective of providing improved seed of higher quality in the market. They include a variety registration system and a quality control scheme inspired by European models and implemented by governmental agencies. While the spread of this formal seed system is slowly increasing, the informal systems of seed production and distribution still predominate for all crops and all geographical areas in Uganda (Table 1). The formal seed systems provide improved seed of higher quality, but the pri-

ce of seed is relatively high, and the diversity that it provides is limited and often lacks the varieties and traits preferred by farmers.

The goal of increasing farmers' access to quality seed has rapidly gained prominence in national and international policy debates [1] and has become a central focus of international aid programmes targeting agricultural productivity [3]. These policy debates have often perceived farmer seed systems, which are largely informal, as lacking quality and subsequently resulting in low productivity. As a result, the use of seed through the formal system has expanded in recent years. But seed from the formal system is costly for rural farmers, and thus inaccessible for many. Although the government of Uganda through its recent "Operation Wealth Creation" program has introduced subsidies of seed and other inputs, these have not been provided in time for the planting season and the subsidy program is not run consistently every year. The formal seed system in Uganda is also plagued by counterfeit seed, due to weak monitoring and enforcement in seed production and distribution processes. This further increases costs and risks to farmers newly participating in the formal seed system. Farmers' preferences and tastes also dictate the choices of seed, the varieties they plant and where they source these seeds. In light of these incentives and disincentives, farmers have often opted to use informal sources of seeds which, in spite of uncertain quality, meet household and market demand for desired agronomic and food qualities.

While the dichotomy between formality and informality in Uganda seed systems persists, more and more, seed systems in this country are a combination of formal and informal elements. For example, varieties that have been released through the formal system years ago have adapted to local conditions and become landraces available through informal seed networks. Another example is that of farmers multiplying seed that is then bought by small seed enterprises or civil society organizations which take care of seed certification processes and commercialization. This "hybridization" between formal and informal seed systems is taking place in many countries of sub-Saharan African and represents an opportunity for governments to promote national seed sectors that respond to the capacities and needs of their own seed producers and consumers.

This policy brief presents the results of a study which aimed to understand farmers' preferences in relation to seed and seed sources and why they prefer certain sources of seed to others. We conducted research to understand farmers' social networks for seed and recommend how to improve access to high quality, diverse seed.

We chose to focus on beans and bananas, partly because they have a large informal-to-formal ratio of supply (see Table 1), and partly because they are core to traditional Ugandan banana-based food systems. We also sought to understand factors that farmers consider when selecting preferred varieties, farmers' trait preferences and their sources of diversity.

Table 1:
Seed supply in the formal and informal systems in Uganda

Crop	Formal system seed supply (metric tonnes)	Informal system seed supply (metric tonnes)
Maize	7,200	9,100
Beans	730	57,700
Sorghum	400	1,900
Rice	400	5,600
Finger millet	75	1,525
Bananas*	38	2,035

Source: USTA. *MAAIF Estimates

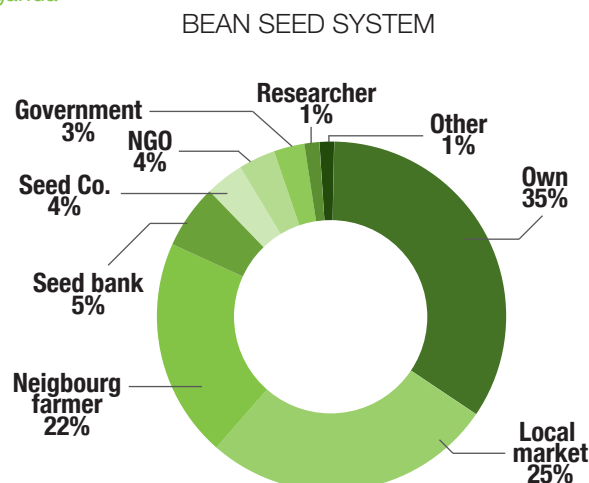
Methods

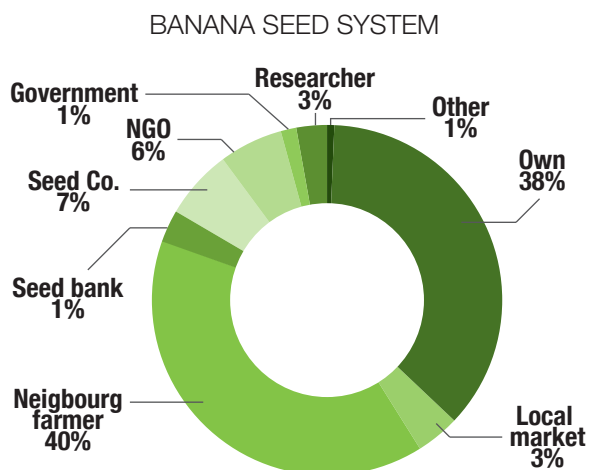
A survey of 268 households in three different bean and banana agro-ecosystems was undertaken in 2013 in the districts of Nakaseke, Sheema and Kabale, to understand the micro-social dynamics of seed systems and why farmers prefer certain sources and varieties over others. These agro-ecologies are all mixed bean and banana systems, and the three sample districts reflect lowland, medium and highland agro-ecologies respectively. Secondary data were also used to complement primary data and a literature review.

Findings

Seeds found in Ugandan bean and banana seed systems are highly diverse, with a total of 47 varieties of beans and 23 varieties of banana cultivated in the three districts. Most of the varieties grown are landraces. The top five varieties for beans are improved but were released more than 20 years ago and have adapted to particular local conditions. The top 5 varieties for bananas are all landraces continuously cultivated in Uganda for more than 25 years. As Table 1 and Figure 1 show, most farmers source bean seeds and banana planting materials largely from the informal system – from their own harvest, neighbours or local markets.

Figure 1: The structure of bean and banana seed systems in Uganda





Survey responses suggest that, contrary to popular perception, farmers perceive the seed they use from these informal sources to be of good quality and relatively easy to access. Another prominent factor influencing farmer preferences and choices of seed is the traits or characteristics of the varieties themselves. Yield, marketability and taste are the most important traits reported by farmers for both beans and banana germplasm (Table 2). Adaptability to climate change is also a factor that farmers consider when selecting germplasm.

Table 2: Farmer preferred traits when selecting bean and banana germplasm

Bean traits	Rank	% (n=250)	Banana traits	Rank	% (n=230)
High yields	1	33.2	Marketability	1	23.5
Marketable	2	32.8	High yields	2	22.6
Good taste	3	10.8	Good taste	3	13.0
Easy to cook	4	8	Easily adaptable to climate change	4	12.6
Maturity time	5	3.6	Easy to cook	5	7.8
Easily adaptable to climate change	6	3.6	Resistance to pests and diseases	6	6.5
Resistance to pests and diseases	7	2.8	Maturity time	7	6.5
Easily accessible	8	2.4	Nutrition benefits	8	5.2
Nutrition benefits	9	2	Easily accessible	9	1.7
Nature of planting material	10	0.4	Texture of planting material	10	0.4
Colour of planting material	10	0.4	Nature of planting material	11	0.0

When deciding where to source their germplasm, key factors that farmers consider are proximity to the farm and the ability of the seed source to provide the desired diversity of a high quality.

Finally, farmers' access to information is an important factor that influences not only choices of farming methods but also choices of varieties they use. This agricultural knowledge, passed down through kinship relations and through agricultural organizations, is related to crops and varieties and a suite of ecologically sound farming practices that include soil management and using diversity for resilience.

Informal seed systems provide farmers with the diversity they desire and help strengthen networks related to the use and exchange of genetic resources and indigenous knowledge in communities. The informal sector thus plays a critical role in the resilience of many farming systems.

Policy Implications

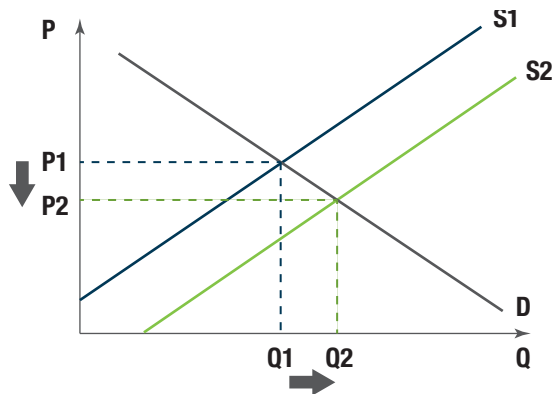
In order to ensure that quality seed is accessible, functional linkages between the formal and informal seed systems are needed that capitalize on the strengths of both systems. The formal seed sector is the primary source of new crop varieties, and is home to most of the capacity in 'scientific' plant breeding, extension services and credit. The informal sector, however, is the primary network through which seed and knowledge reach farmers. The formal seed sector is expected to provide quality and yield advantages over the informal sector, which, on the other hand, provides high genetic diversity with evolving functional traits for resilience to different and changing agro-ecological conditions across the country.

As stated by de Boeuf and Louwaars study in 20124 there is a need to develop a twin track approach where the formal and informal aspects of seed systems are improved and the best elements of both systems are combined in an intermediate system. This can be done through enabling local seed businesses or producer groups to produce Quality Declared Seed (QDS) via various forms of institutional support, including direct government funding as well as support from NGOs, community-based organizations or research organizations. QDS bridges the formal and informal sectors, allowing for diversity in the seed system while at the same time guaranteeing access to quality seed. Smallholder seed enterprises can play a key role in QDS if they have continuous access to improved varieties from public crop breeding programmes and to traditional and local varieties from national and community seedbanks.

Figure 2 illustrates the potential effects of QDS as an intervention that introduces a new category of seed but leads to both lowering the cost of producing quality seed and increasing seed availability. The result is a general

increase of quality seed traded in markets. Introducing or including QDS in the system increases the supply of quality seed (Q) and the supply curve shifts from S1 to S2 which leads to a drop in the equilibrium price (P).

Figure 2: Implications of QDS programmes and public/NGO investment in local seed systems for price and accessibility of seed.



P= Price; Q= Quantity, S1= Supply curve before intervention; S2= Supply curve after intervention; D= demand curve.

Recommendations

Uganda is currently in the process of developing a national seed policy. In line with the general recommendations provided by Boeuf and Louwaars as well as other scholars, this study recommends that the draft policy currently under discussion incorporate the following measures, in order to support the bridging of formal and informal seed systems for strengthened food security:

- (i) The inclusion of QDS as a class of seed.
- (ii) The recognition of, and support to local level seed producers, by exploring the possibility to put in place quality monitoring schemes that certify not only the seed but also the production standards of seed multipliers and the geographical provenance of the seed.
- (iii) The creation of district level seed verification and certification offices to extend and decentralize the state monitoring capacities and reduce transaction costs for seed companies and other producers.
- (iv) The strengthening of monitoring and enforcement mechanisms to reduce the level of counterfeit seed in the market and restore farmers' confidence in the formal sector.

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