

QUALITY DECLARED SEED

ADDRESSING CHALLENGES IN ACCESS TO
QUALITY SEED FOR SMALLHOLDER FARMERS

Learning from Farm Africa projects



Photo: Farm Africa /
Jjumba Martin



FARM AFRICA



INTRODUCTION

Crop productivity in many countries in sub-Saharan Africa remains low. Many crops produce yields below the global average. This is brought about by many factors, including small-scale farmers' low access to good quality seed. Less than 20% of farmed land in Africa is cultivated with improved seed due to its lack of accessibility and affordability. This results in farmers continuing to rely on traditional recycled seed and strengthens the need for Quality Declared Seed (QDS) systems.

The QDS system is an attempt to improve seed supply to farmers while reflecting and accommodating the diversity of farming systems, particularly in areas where organised seed systems do not function well. QDS is a relatively open scheme, which meets the needs of farmers in a flexible way but without compromising basic standards of seed quality.

Improving access to QDS, which is sold locally in small quantities where certified seed is not used or sold, is a good way to minimise the seed access gap and to improve the seed trade and food production in Africa.



TYPES OF SEED SYSTEMS IN EASTERN AFRICA

Seed is a key agricultural input of crop production but not equally accessible to all farmers. Seed systems are classified as formal (commercial), semi-formal and informal (farmer-led).

➤ **Formal seed systems** follow the pathways from plant breeding to seed bulking agencies to seed distributors and marketers (retailers). The actors in these pathways are either public or private. The role of certification and quality control is predominantly undertaken by public sector organisations. In formal seed systems, all parts of the seed production, processing and marketing chain are subject to regulation, inspection and certification. In formal seed systems, plant breeders are responsible for the breeder seed or pre-basic seed – this is usually in small quantities. The breeder seed is bulked up to foundation seed, which when bulked produces the certified seed or standard or quality declared seed that is retailed to farmers.

Certified seed and standard seed both have to meet the same quality standards: the difference is that certified seed is produced when formal varietal release has occurred while standard seed is produced when the regulatory agencies recognise that there is demand for the seed but a formal varietal release has not occurred. Standard seed is also used in emergency situations so that the most appropriate types of seed can be supplied, even if a varietal release has not occurred.

➤ **Semi-formal seed systems:** Quality declared seed (QDS) is an alternative system for seed quality assurance, developed for countries with limited resources. It is less demanding and less expensive than full seed certification systems yet promotes a satisfactory level of seed quality. Not all countries permit QDS: in eastern Africa, it is currently allowed in Tanzania, Uganda and Ethiopia (for some selected crops) and for vegetative propagated materials (VPG) in Kenya.

➤ **Informal seed systems** are made up of groups of farmers who produce both traditional (landrace) and improved varieties with no regulatory body providing the oversight for quality control processes. The farmers select the healthiest crop out of the harvest, process the seed and store it for planting purposes. The seed can be traded, shared with neighbours or relatives (gifts) or exchanged for other goods.

The benefits of informal seed systems are that they support the management and conservation of local agrobiodiversity, and make seeds of locally valued landraces and varieties available close by and when needed. The disadvantages are that seed will not be available after droughts and other causes of crop failure; storage facilities can be lacking; and seed quality can be very variable, often poor. Informal systems are best suited to remote areas where seed distributors find access difficult and farmers cannot easily reach seed and output markets; and in narrow agro-ecological zones where the specific seed type adaptation is difficult.

QUALITY DECLARED SEEDS (QDS)

The QDS system is a seed-producer implemented system for production of seed that meets at least a minimum standard of quality but does not entail formal inspection by the official seed certification system. The intent behind the QDS system is to provide farmers with the assurance of seed quality while reducing the burden on government agencies responsible for seed certification. This scheme is not designed to compete with the existing conventional quality control system, but rather complement it and ensure farmers have greater access to quality seed.

Why quality declared seed

Quality seed is a strategic input for improving crop production. In many rural and remote areas of Africa, there are gaps in seed supply and availability. There is a need for more secure seed supply systems that deliver good quality seed to farmers. As a result of rigorous seed control systems and heavy government influence on formal seed systems, the quantity of seed supplied to farmers has remained low. This calls for the need for less stringent seed production systems that improve farmers' access to good quality seed and cut down the long processes that delay the availability to farmers.

Recently, there have been concerns about the use of genetic resources and the conservation of agrobiodiversity that further encourage promotion of traditional seed systems and quality declared seed. A strong genetic resource base is important due to the fact that a lack of genetic diversity in farmers' fields, if severe, may increase the risk of pest or disease epidemics. Although plant breeding is beneficial for attributes such as pests and diseases, and tolerance to non-biological stresses such as drought and yield improvement, pests and diseases evolve over time and climate change is causing a change in adaptation hence the need to consider conservation of agrobiodiversity in the plant species.



Photo: Farm Africa / Jjumba Martin

SOURCES OF SEEDS FOR FARMERS ENGAGED BY FARM AFRICA

FORMAL SYSTEMS

- **Research institutes and government farmer training centres** are the primary sources of early generation seed and foundation seed for seed multipliers.
- **Seed companies** engage farmers (large and medium scale) for seed multiplication. Some of the seeds are imported. Seed companies distribute seeds through retailers such as agro dealers and cooperatives. Farmers can access the seeds through agents (wholesalers and village-based agents) and agro dealer outlets. Hybrid and Open-Pollinated Varieties (OPV) seeds are commonly supplied through the agents and agro dealers.
- **Relief seed.** This seed is usually distributed for relief and as an incentive for farmers to adopt improved seed and a food security strategy for communities affected by natural disasters or conflict. The seed is distributed by governments (Ministry of Agriculture) and NGOs.

INFORMAL SYSTEMS

- **Own seed.** Families select the produce that exhibits high vigour in terms of seed size, vigour of the plant, pest and disease tolerance and trueness to type and save it for the following season.
- **Family members** are a source of informal seeds. Family members give seeds to each other.
- **Neighbours** are a source of informal seeds. The seeds are given as gifts or exchanged through barter trade.
- **Local market:** The seed sold is mainly recycled seed or grain of popular varieties. This seed is sometimes packaged to mimic hybrid and OPV varieties. The term used to define these seeds is fake seeds.

Seeds of vegetative propagated materials (VPG) are nearly 100% sourced informally.

ROLE OF GOVERNMENT IN FACILITATING SEED ACCESS

National seed laws can have a positive or negative impact on smallholder farmers and their seed systems. For example, they can set high standards (with related cost implications) for the registration, quality control, certification and sale of all types or certain types of seeds, effectively restricting access to and availability of those seeds.¹

Governments need to set structures that simplify access to seed. When the rules governing the seed industry are stringent, the result is high standards, which on one hand is good for ensuring a high quality of seeds but on the other hand is detrimental to ensuring equal access to seed. This is reflective of the current formal seed scenario in many countries in Africa.

Women and men experience different levels of access to seeds from formal markets, government sources or other commercial sources. For women to benefit from a seed system, seed needs to be available locally. Formal seed systems tend to prioritise higher value cash crops whose production is dominated by men, whereas women are more concentrated in informal or community-based seed systems.

QDS schemes place the burden of responsibility for seed quality on producers and distributors but at the same time offer protection for farmers. Gender diversity is promoted in QDS systems where the principal design recognises user needs and preferences and devises appropriate delivery channels.

¹ Vernooy, R., (2016), Options for national governments to support farmer seed systems. The cases of Kenya, Tanzania and Uganda. *Hivos and Bioversity International*



POLICY CONTEXT AROUND QUALITY DECLARED SEED IN EASTERN AFRICA

Country	Seed Act/Laws	QDS applicable crops
Ethiopia	The official Proclamation on Seed (No 783/2013) recognises the category of 'quality declared seed' and the Ministry of Agriculture subsequently published a guide for implementing this system.	Legumes: cowpeas, common beans Oil seeds: groundnuts, soybean, sesame Grains: teff, wheat, barley, corn, sorghum, and millet Roots and tubers: cassava, potatoes, sweet potatoes
Uganda	The starting material for producing QDS is basic seed, which is generally produced by the National Agricultural Research Organization (NARO). QDS applies to self-pollinating and vegetative propagated crops, for which the formal seed sector has little or no interest.	Grains: Sorghum, finger millet, and rice Pulses: beans, pigeon peas, cowpeas, field peas and green grams (mung beans) Oil seeds: groundnut, soybean and sesame) Roots and tubers: cassava, sweet potato and solanum potato, indigenous vegetables and pastures
Tanzania	QDS was incorporated into the formal seed system in the national Seeds Act of 2003, along with its seed rules, regulations and procedures (2007) and guidelines for control (2007) for the QDS production. In Tanzania only OP varieties that are on the official national variety list can be produced under QDS and not F1 Hybrids.	Maize: open pollinated varieties Legumes: pigeon peas, common beans, cowpeas, field peas and green grams Grains: wheat, barley, corn, sorghum and millet Tubers: potatoes, sweet potatoes
Kenya	The formal seed system is thoroughly regulated and focuses on breeding, producing and selling certified seeds by registered seed companies. As the main regulatory body, or the National Designated Authority (NDA), KEPHIS manages these activities as well as the importation of seed.	Grains: maize, wheat, barley, sorghum, millet, oats Pulses: beans, peas, cowpeas, pigeon peas Oil seeds: sunflower, oil-seed rape, linseed, soya, sesame Grasses: setaria, Rhodes grass, Sudan grass, Congo signal, panicum Pasture legumes: Centro, Stylo, Desmodium, Clover, Lucerne, Siratro, lupins Root crops: potatoes, sweet potatoes, cassava

CASE STUDIES OF QDS



CASE STUDY 1: UGANDA

Value chain: African bird's eye (ABE) chillies

Location	Crops	Partners	Interventions
Lira District, Northern Uganda	African bird's eye chilli	North East Chilli Producers Association (NECPA)	Agronomy support Seed multiplication Market linkages

DESCRIPTION OF LOCAL SEED SYSTEMS CONTEXT

Farmers in Northern Uganda face challenges of poor production. Access to quality inputs especially seed is a hindrance to crop productivity.

Uganda supports a QDS system and policies have been set to enable multiplication of specific crops such as grains, legumes and tuber crops. The government extension service encourages farmers to engage in seed production and promotes quality seed production. Integrated Seed Sector Development (ISSD) is tasked with regulating QDS production systems with support by the government. There is one seed production zonal seed production and multiplication centre (zonal agricultural and research institute) for every four districts.

CONTEXT/ PROJECT RATIONALE

The demand for African bird's eye chilli is currently at hundreds of tonnes yet offtakers can hardly meet the demand. Farm Africa partnered with NECPA, an offtaker of African bird's eye chillies to improve production of chillies in Northern Uganda and provide linkages to local and international markets. Only 28% of farmers had access to improved seed in the target regions.

OUR INTERVENTIONS

The project mobilised and selected 53 seed multipliers who were trained and contracted by NECPA to produce African bird's eye chillies. The target was to directly reach 17,000 farmers. The farmers were divided into clusters to ensure seed production in all seasons.

Farm Africa's interventions included agronomy and business support for NECPA and the farmers, capacity building of agriculture extension officers in production dynamics, and facilitating linkages to regional and global chilli markets.

At the start of the project, 13 seed multipliers supplied Quality Declared Seed to NECPA. The low number was due to poor seed market dynamics where seed for food was priced higher than seed for planting at the farm gate. Challenges faced by seed multipliers include access to foundation/early generation seed, low viability of the foundation seed, unpredictable rainfall patterns and unpredictable market fluctuations.

RESULTS AND LESSONS

➤ Seasonal seed demand projected by NECPA during Phase II of the project was 50 kg. One acre of land is planted with 100grams of seed. 43.4% of seed demand was met through the 21.5 kg seed was produced.

➤ Chilli seed production on small areas of land is uncompetitive and unprofitable. Crops grown using rain-fed farming systems bear low seed volumes characterised by low seed weight, low viability and few seeds per pod. The market price for dried chilli seed is uncompetitive and often lower than the price of dried pepper. This results in farmers diverting pepper pods cultivated for seed into the food market.

➤ Free seeds distributed by the government and NGOs distort the market supply system and affect the smallholder producer production dynamics. Brokers (middlemen) affect seed supply systems. Seed sales were affected by government-led relief schemes in neighbouring districts where free seed was distributed: farmers receiving free seed later sold it to chilli farmers or shared it with relatives for free or through barter exchange. This affected the seed sales projections for producer farmers and NECPA.

➤ Low QDS seed quality affects the adoption of QDS seed. Farmers have limited knowledge on the long-term benefits of improved seed such as tolerance to drought, pests and diseases. When the viability of QDS seed is low, this negatively affects the adoption of improved seeds. The low quality seeds emanates from low quality basic seed (impure seed) supplied by the multipliers and poor management practices coupled with poor rainfall hence low seed viability.

➤ Farmers are willing to pay for seed if the quality is assured. The price for QDS seed is UGX 5000/100grams for one acre of land. If the improved seed/QDS have assured returns driven by quality and quantity, farmers are willing to pay for seed. The farm saved seeds are free. QDS seed when well packaged attracts farmers.

➤ Low regulation of seed production: Access to government agricultural extension services is low. Seed production schemes for breeder and foundation seeds are dependent on non-government seed breeding programmes. When the support for these programmes is not available, this results in low volumes of basic seed, which in turn affects availability of seed to the multipliers.

CASE STUDY 2: TANZANIA

Value chain: Sesame

Location	Crops	Partners	Interventions
Babati, Manyara District, Tanzania	Sesame	Tanzania Official Seed Certification Institute (TOSCI) Agricultural Seed Agency (ASA) Agriculture Marketing Cooperative Society (AMCOS)	Agronomy Seed multiplication Market linkages

DESCRIPTION OF LOCAL SEED SYSTEMS CONTEXT

Tanzania is Africa's largest producer and the world's fifth largest producer of sesame. The country is also the continent's largest exporter of sesame. Sesame is the fourth leading edible oil in production in Tanzania, trailing others like sunflower, palm and groundnuts. Compared to other oils, sesame's local consumption is relatively low and those who invest in its production target the export market.

The dominant seed supply chains in Tanzania include farmer-saved, public-private (local seed businesses) and private businesses (international and local). The farmer-saved and public seed supply system accounts for the majority of seed volume. The informal seed system has an estimated 75% seed market share and dominates most crops in Tanzania.² Sesame seed production and certification is governed by the Seed Production Act 2003/2007, and regulated under the Ministry of Agriculture, Food Security and Cooperatives by Tanzania Official Multiplication Institute (TOSCI). Small-scale farmers are encouraged to produce quality declared seed.

² Tanzania Early Seed Generation Study, AGRA USAID 2016

CONTEXT/ PROJECT RATIONALE

Few players have invested in QDS production, resulting in a critical seed shortage during planting seasons. Many sesame farmers recycle their seed – 80% of seed demand is met through informal systems. The demand for seed during planting seasons results in grain being sold as seed. To tackle the challenge of low access to improved sesame seed, Farm Africa engaged producers in quality declared seed production and multiplication mechanisms. The expected outcome was to bridge the gap of access to high quality seed for farmers during planting seasons and introduce seed multiplication as an alternative income stream.

Farm Africa conducted an analysis of sesame value chain, which demonstrated that Tanzanian exporters are struggling to source the volumes of sesame to meet the growing demand – for example, the demand for seed from off-takers indicates the demand was more than 450,000MT, of which less than 10% was being met. There is potential for smallholder farmers in Tanzania to rapidly increase production of sesame and access lucrative markets. As sesame is a drought-tolerant crop it is well adapted to the semi-arid conditions of the target areas.

The majority of Tanzanian smallholder farmers are currently unable to effectively engage with the sesame value chain due to a number of constraints that the project worked to address to enable financial returns from the sale of sesame. Constraints included low yields caused by poor quality inputs, inefficient agronomic practices, lack of access to farm technology, vulnerability to climate shocks, infestation and disease, which lead to unreliability of supply, in turn affecting ability to engage with buyers, inability to produce sufficient volumes individually due to lack of land and low productivity; and lack of aggregation/bulking facilities to overcome this.

RESULTS AND LESSONS

- The demand for seed is driven by the cropping seasons: A total of two metric tonnes (MT) QDS seed was produced by 40 farmers. This seed was certified and sold to agricultural marketing cooperatives (AMCOs) during the 2016/2017 planting season. Farmer quality declared seed production led to an increased availability of sesame seed to farmers during the planting season.
- Low access to foundation seed affects seed multiplication, resulting in low availability of seed during planting seasons: QDS production was challenged by a lack of access to foundation seed from the breeders for multiplication, which is key for quality seed production. Seed breeding is dominated by public entities.
- Adoption of improved seed is influenced by the seed price: QDS seed is priced less than hybrid seed. QDS seed is priced at Tanzanian Shillings (TSh) 1,500/kg compared to TSh 12,000/kg. Market price fluctuations can tempt seed producers to sell QDS as grain. When demand rises, the cost of grain is higher than seed.
- Low mechanisation such as planters has contributed to low scaling of seed production. Sesame seed is small (about 3 to 4 mm long by 2 mm wide and 1 mm thick) and difficult to hand plant. Most QDS seed producers don't scale beyond three acres. Seed is mixed with sand in the ratio of 1kg seed to 12 kg sand.



Photo: Farm Africa / Jonathan Banks

CASE STUDY 3: ETHIOPIA

Value chains: Chickpeas and haricot beans

Location	Crops	Partners	Interventions
SNNPR, Ethiopia	Chickpeas Haricot beans	Ethiopia Seed Enterprise	Demo plots Seed multipliers Market linkages

DESCRIPTION OF LOCAL SEED SYSTEMS CONTEXT

Just 6% of the total land area in Ethiopia is cultivated with improved seed. Most farmers in Ethiopia have limited access to high quality, improved seed in convenient outlets, and many released varieties of different crops with superior traits have not still been widely disseminated.

Like many developing nations, the Ethiopian seed system is highly dominated by the informal sector (defined as farmers producing and exchanging their own seeds), along with an emerging intermediate sector consisting of community-based seed producers. Key actors in the formal sector include public institutions such as the Ethiopian Institute of Agricultural Research (EIAR), the Ethiopian Seed Enterprise (ESE), the Ministry of Agriculture and newly emerging private agricultural enterprises whereas farmers and NGOs are the key actors in the informal sector. 90% of the seed demand in Ethiopia is met by the informal sector.³

CONTEXT/ PROJECT RATIONALE

Despite the importance of chickpeas, the national average seed yield of these crops is low at 1.73 MT/hectares (ha) for chickpeas against the potential of 4 MT/ha using improved seed (CSA 2011/12). Distribution and utilisation of low quality seed, which is often untraceable, is common. This is a core cause of low productivity and in turn low economic returns from the crops, exacerbated by poor pre- and post-harvest agronomic practices. Chickpea growing farmers in most of the project woredas have no access to improved seeds and use seeds from unknown sources for planting.

The demand for haricot bean (*Phaseolus vulgaris*), both in domestic and export markets, has been increasing in the past decade. Farmers traditionally used red coloured varieties (Red Wolayita), mainly for home consumption. The yield is low at

824kg/ha (8.24qt/ha) against the potential of 1167kg/ha (11.67qt/ha), which is the national average yield. Shortage of high quality seed in the required quantities has inhibited many farmers from growing haricot beans.

The problem is further aggravated by the fact that farmers in the southern region do not keep or preserve seed stock until the next season due to the vulnerability of haricot bean seed to storage pests. Farmers are reliant on Ethiopia Seed Enterprise (ESE) for seed supply, however during the planting seasons the institute experiences a deficit of up to 79% less national demand (Ibid) for haricot beans. This underlines the fact that, given the infrastructural and resource limitation, the country cannot fully rely on the formal seed sector alone.

³ Spielman, David J. and Mekonnen, Dawit Kelemework. 2018. Seed demand and supply resources. In *The economics of teff: Exploring Ethiopia's biggest cash crop*. Chapter 4, Pp.71-96. Washington, DC: International Food Policy Research Institute (IFPRI). 10.2499/9780896292833_04

Farm Africa engaged 1,595 smallholder farmers in SNNPR for the Growth for the Future Project: Harnessing smallholder productivity, adapting to climate change and protecting the environment funded by Sida, in the Outcome 1 of Harnessing smallholder productivity. Among the various interventions – good agricultural practices, climate-smart agriculture and infrastructural support - Farm Africa engaged the farmers in QDS production with a target of bridging the seed gap among the target communities. A total of 95 demo plots were established as farmer training sites. To address the low access to quality seed, the project trained 998 (549 female) farmers on seed production and post-harvest handling techniques. Out of the farmers trained, 263 (including 119 women) were engaged in seed multiplication and harvested 93,982kg of haricot bean and 56,550kg of chickpea seed. The seed producers farmers are linked to a seed multiplication and marketing union, which agreed to pay the seed producers 15% more than the local price and will supply the improved seed to the local community.



RESULTS AND LESSONS

➤ Improved seed directly results in increased yields: The average yield of haricot beans per unit area (Qt/Ha) increased threefold from a baseline of 500kg/ha (5qt/ha) to 1,500kg/ha (15qt/ha). This led to a household income increase of 97%. The average yield per ha for chickpeas similarly increased by 28% (10qt/ha to 14qt/ha).

➤ The cluster approach was simulated in assuring quality of the seeds produced: The demo farm producing seed was surrounded by farmers who agreed to grow the same crop type and varieties to reduce incidences of cross-pollination, which is likely to affect the purity of the seed. The farmers are members of the cooperative unions that the seed will be supplied to. This resulted in pure seed of high quality.

➤ Public-private partnerships: The early engagement of the government seed producing institute and research organisation ie South Region Seed Enterprise ensured that seed multipliers had access to foundation seed during the planting seasons. The local governments engaged cooperatives and 50% of the

farmers in supplying seed to other areas not directly targeted by the project.

➤ Legume price fluctuations distort seed supply: When the market demand for grain (food) rises, the farmers are tempted to side sell seed as food. This affects the seed supply to the cooperatives whose volumes have been projected to the seasonal demand eg chickpea foundation seed is sold at 2,400 Ethiopian Birr per quintal then the farmers sold the produce at 1,800 Birr per quintal; when the demand for grain spikes, one quintal of chickpea grain is sold for 3500 Birr; middlemen (brokers) distort market supply.

➤ Climate change affects volume and the quality of seed produced: Smallholder seed multipliers are dependent on rainfall. When rainfall fails, the volumes of seed produced decrease and the crop dries up: this seed has low viability and when used for planting has low germination and purity. Some of the project areas experienced hailstorms and all the crops were destroyed. This affected seed availability for the following season.



Photo: Farm Africa / Hilary Duff



Quality declared seed increased farmer productivity in all three case studies

Sesame crops, Babati, Tanzania

LESSONS FROM THE FIELD

➤ **QDS increases farmer productivity as evidenced in the three case studies.**

Although formal seed systems are positioned to provide farmers with high yielding seeds with attributes such as pest/disease tolerance and drought tolerance and increased adaptation, access for the majority of farmers in Uganda, Ethiopia and Tanzania remains a challenge. QDS can bridge the access gap and provide great benefits in increased yields.

➤ **Foundational seed access is critical.** The role of prebasic/basic/foundation and breeder seeds needs to be de-franchised to include private entities and not limited to the government, NGOs and research agencies. The Ethiopia case study of partnerships between research institutes and cascading of the foundation seed production to community-based organisations improved access to seed for farmers during the planting seasons.

➤ **Competing incentives for marketing of seed vs produce.** In all the countries, pricing dynamics influenced the sale of seed as grain and vice versa. Incentives should be placed for seed producers to ensure high quality seed isn't repurposed as grain. When seed is sold as grain or consumed as food, the repercussions include food security for the next seasons.

➤ **Seed supply and quality is still an issue (rainfall dependent).** Seed production is capital intensive. Smallholder farmers are unsuitable for seed production especially if they are dependent on rainfall. As evidenced in Ethiopia, community-based organisations can pool resources to produce high quality seed.

➤ **Distribution / aggregation:** AMCOs and CBOs in Tanzania and Ethiopia proved efficient in aggregating QDS and distributing it to farmers. This promotes traceability and cuts out rogue dealers of low quality seed (grain labelled as seed). Contractual agreements between seed producers and CBOs/ AMCOs ensured a supply chain in which seed can be tracked back to the breeder (Research Institute) hence assuring high quality and available seed for farmers.



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