# A Case for Support: Taking a Pragmatic Approach to Potato Seed in Africa

*Rethinking the rule book to empower farmers to produce quality seed for vegetatively propagated crops like potato could bring seed security, help farmers adapt to climate change, provide new rural employment opportunities and boost the livelihoods of millions of smallholder farming families. Yet trials at scale are needed to understand the true potential of this approach.*

## Context of why seed quality matters

Quality seed that is affordable and accessible is critical for smallholder farmer livelihoods. In sub-Saharan Africa, 90% of smallholder farmers access seeds from informal systems. This means that the seed they use is saved from earlier harvests or bought in local markets where quality control is limited or absent, rather than bought from commercial suppliers. This can lead to reduced production, for example, from seed and soilborne pest and disease outbreaks.

The UN Food and Agriculture Organization (FAO) estimates that 20-40% of crop yield is lost to pests and diseases annually. Improved seed quality can reduce these losses significantly, particularly when it comes to vegetatively propagated crops (VPC) like potato which are prone to seed degeneration via seed and soilborne pest and diseases. Late-potato-blight alone costs developing countries USD 10 billion every year in crop losses, a number expected to rise with climate change.

Yet despite efforts by development agencies over the last decades, adoption rates of improved crop varieties –including those that are resilient to pests, diseases, and climate change – remain low, particularly when it comes to vegetatively propagated crops like potato.

## Why potato

Potato is the **fourth most important staple food crop** in the world and key to deliver food security (FAO 2018) and to address many Sustainable Development Goals.

Potatoes produce **more food per unit of water** than any other major crop, are up to **seven times more efficient in water use** than cereals - one hectare of potato yields two to four times the food quantity of grain crops. This water efficiency makes potato a smart choice for farmers who are facing changing climates with erratic and lower-than-average rainfall.

In terms of nutrition, potatoes are **low in fat and full of complex carbohydrates, essential amino acids, protein and minerals.** They have **more vitamin C than oranges,** more potassium than a banana and more fiber than apples.

Potatoes are a pillar of food and nutrition security and a cornerstone of economic development.

## Challenge of farmer access to affordable quality seed

Many countries - including in Africa- are moving towards more formal policies and regulations for seed quality assurance to boost the productivity and resilience of smallholder farming systems. Yet while development agencies and public and private sector seed suppliers are investing in better seed quality for new and improved varieties, in particular, varieties of grains like maize and wheat, farmer adoption rates remain low. Reasons for this are varied ranging from a lack of suitable varieties that are locally adapted to meet farmers' needs, high costs, and bottlenecks in the systems caused by complicated certification systems.

When it comes to vegetatively propagated crops like potato, cassava, and sweetpotato, these barriers are even more challenging. VPCs are not well-served by either formal or informal seed supply systems, with many countries lacking specific potato seed quality certification standards and protocols, as well as the facilities, skilled personnel, and funding to carry out certification. A lack of investment in improved varieties of these crops is in part due to the specific challenges they face including:

- The vegetative parts used to multiply root and tuber crops carry diseases much more frequently than 'true' seed of grains, cereals, and pulses.
- Bulkiness as well as higher seed need per unit area for planting (seed rate for potato is 2 t/ha whereas for cereals it is 80-100 kg/ha), coupled with low multiplication rates require several generations of multiplication.
- Planting material is perishable, so has a short shelf life.

These constraints mean that commercial seed companies are not willing to invest in VPC seed, reducing the flow of affordable, quality-assured seed to farmers, particularly smallholders in less-developed countries who depend on these crops for food security and livelihoods. Instead, unregulated markets flourish. Farmers unable to access quality seed turn to the informal system of exchanging seed with neighbors, saving and reusing seed over several generations, or buying from local suppliers where there is little or no quality control.

## A pragmatic approach to certification to unblock bottlenecks in seed systems

This brief proposes that the middle ground between formal and informal seed quality assurance approaches, for example, through minimum seed quality assurance approaches to the lower seed classes into the seed regulatory framework. This can help to develop the sustainable seed system that could help generate large quantities of affordable pest and disease free VPCs planting materials to farmers within the shortest period of time. Devolving and simplifying quality control at lower seed class can also open up opportunities for farmers to become quality seed producers and marketers, increasing seed quality and volumes while keeping costs down and providing seeds that work within local contexts. For this approach to work, the supporting policy and regulatory framework needs to be inclusive and pragmatic.

| Formal Certification – commercially driven | Minimum Seed Quality Assurance or similar | Informal Markets – farmer driven |
|---|---|---|
| **Pros**<br>• A form of external seed quality assurance that distinguishes seed from informally multiplied, exchanged, and traded seed.<br>• Farmers pay a premium price for formally certified seed as it brings reduced risks of crop failure and better chances of higher yields.<br>• Seed suppliers can distinguish themselves from less trustworthy sources.<br>• Promotes cross boarder seed trade<br>• New and improved varieties can be released into the national and international market. | **Pros**<br>• Sets a minimum standard label that allows for a certain level of acceptable tolerance for regulated pests and pathogens – a 'pragmatic' approach.<br>• Inspections are carried out in the field rather than in laboratories, reducing costs and time.<br>• Increases the volumes of seed for local and regional markets.<br>• Reduces costs and bottlenecks in the seed supply system<br>• Is tailored specifically to VPCs.<br>• Seeds can be produced by farmers and SMEs generating new income opportunities, promoting inclusivity, and boosting quality seed stocks. | **Pros**<br>• Accessible and low-cost for farmers.<br>• Conservation and use of traditional diverse varieties including landraces that are adapted to local contexts.<br>• Locally adapted system. |
| **Cons**<br>• Rigid inspection procedures in the field and lab increase costs and create bottlenecks in supply.<br>• Systems are standardized around cereals and pulses, with requirements not aligned to the challenges relating to the production of VPC seed.<br>• Profit margins on crops such as cassava, legumes, and potatoes, are lower than for hybrid seed so not attractive to investors. | **Cons**<br>• Practical experiences of bringing these systems to scale and making them manageable and affordable are scarce.<br>• Requires investment in capacity building for local seed inspectors. | **Cons**<br>• Build up of diseases over generations of re-using planting material.<br>• Lack of investment and improvement in traditional farmers' varieties.<br>• Largely unregulated.<br>• Hampers the regional cross border seed trade |

## Two Case Studies

While currently there are no large-scale case studies of bringing farmer-led seed production enterprises like minimum seed quality standards for eg. QDS (Quality Declared Seed) systems to scale for VPCs in Africa, there are examples of the systems working on cereal crops or in different contexts which serve as valuable foundations to guide future research programs.

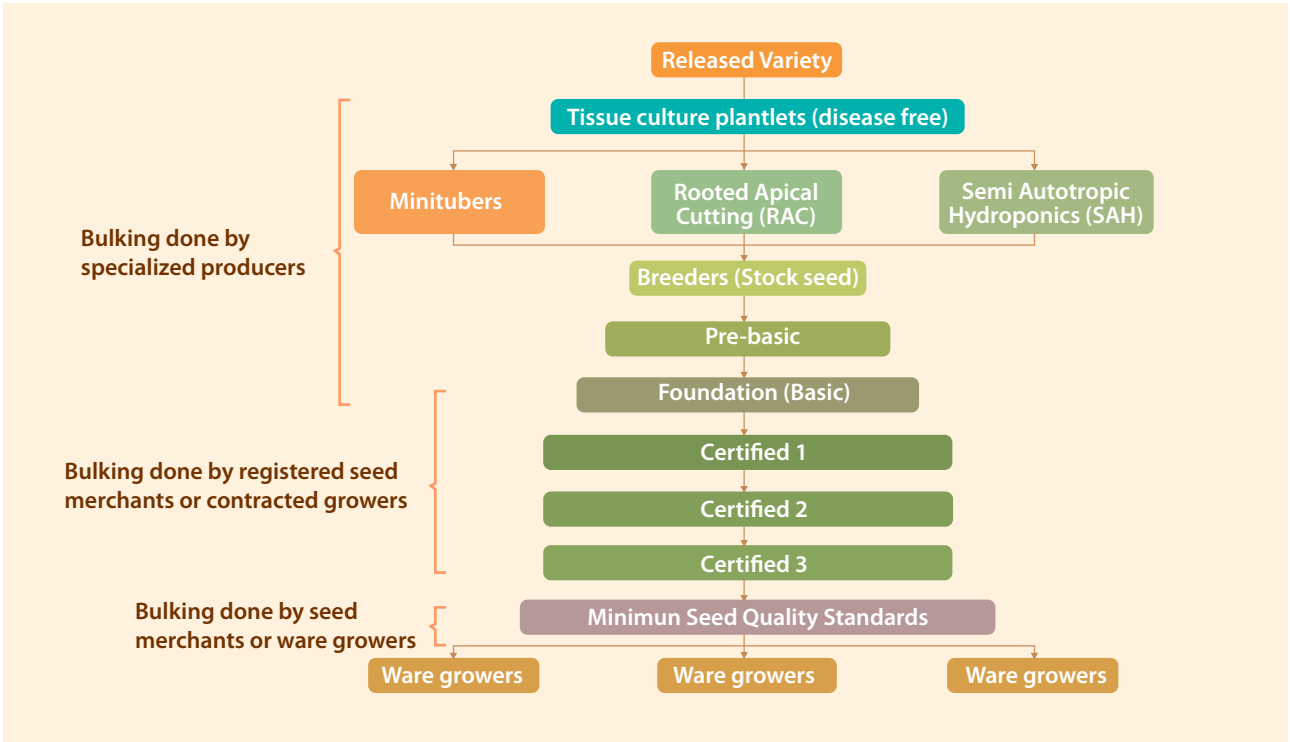
## Case Study: Quality Declared Seeds Builds Climate Resilience in Tanzania

Millet and sorghum farmers in the semi-arid areas of central Tanzania have limited access to quality seed to help them adapt to the effects of climate change. Tanzania, like many countries in Africa, is experiencing more frequent droughts and extreme weather events than ever before which is adversely affecting crop production in some of the country's poorest areas. To help farmers in these areas, a local seed production model (QDS) was introduced through a European Union project[1] as an alternative to the formal seed system to address the affordability and accessibility of improved seeds, particularly of locally adapted varieties. QDS is a recognized seed class in Tanzania and Zambia, offering an alternative to certified seed. Results show the model has potential for a majority of farmers who cannot afford to purchase certified seeds and that most seed-producing farmers can successfully produce QDS. Lessons learned during this project, could be adapted for vegetatively propagated crops like potato with the potential to create a seed regulatory framework that is a hybrid model which combines both the formal and the informal systems (Fig. 1). An example of this could be that early generation seed (upper seed class) is required to undergo formal certification while later generations are only required to meet minimum seed quality assurance standards (lower seed class).

## Case Study: Institutionalizing Quality Declared Seed in Uganda[2]

Integrated seed sector development acknowledges that multiple seed systems coexist, an approach adopted during a 4-year project to empower smallholder farmers to access quality seed of superior varieties in Uganda. To increase the availability of seeds for crops not covered by the private sector, the program worked with farmer-led enterprises to produce quality seed of mainly VPC crops including legumes, minor cereals, and roots and tubers – cassava, potato, and sweetpotato. A policy shift to move Uganda from an informal system towards a formal one, combined with a lack of capacity to produce or inspect quality seed, created bottlenecks in the system with farmers unable to access improved or preferred varieties creating an opening for QDS. The Local Seed Business (LSB) model was introduced in 2012 (Fig. 2). LSBs chosen were existing entrepreneurial smallholder farmer groups that had experience in seed production and good governance structures and are willing to invest in the seed business. The groups were given training in production, harvesting, and post-harvesting practices, as well as marketing and business. The model proved successful at drawing attention to the need for decentralization of inspection services, awareness and demand creation for quality seed, increasing the number of seed producers, and solving shortages of starter material.

**Figure 1.** Proposed pragmatic seed regulatory framework that combines both the formal and the minimum seed quality standards system into the seed potato multiplication




1 EcoACT is a project in Tanzania funded by the European Union, under the Global Climate Change Alliance Tanzania.
2 https://www.mdpi.com/2073-4395/11/8/1475

**Figure 2.** Local Seed Business Model


## Looking Ahead:

To build understanding at scale of the potential and constraints of using farmer-led seed production systems like QDS to boost quality assurance for VPC crops such as potato in Africa, we propose a large-scale pilot study in several African countries.

The study **Rethinking the Seed Regulatory Framework for Vegetatively Propagated Crops (VPCs) to Deliver Resilient, Inclusive and Sustainable Development will investigate:**

- What is the potential for farmer-led seed production systems for VPCs like potato in Africa particularly in the context of emerging challenges from climate changes, including novel diseases and increased pests as well as more extreme weather and more frequent drought periods?
- Why different countries in Africa are operating at different levels and within different systems of seed quality assurance – what are the opportunities and constraints?
- If a hybrid regulatory framework model that takes a pragmatic approach to quality assurance by combining formal and minimum seed quality assurance systems be successfully validated, piloted and scaled?
- Can farmer-led production of seed deliver on quality at an affordable cost and create inclusive rural employment and entrepreneurship opportunities for young people and women?

## Activities:

- Develop minimum seed quality standards with specific guidelines for seed inspection, disease testing, and certification.
- Engage stakeholders from the public and private sectors to develop an inclusive and pragmatic seed regulatory framework to accommodate minimum seed quality standards.
- Create awareness about the need for minimum seed quality standards.
- Generate evidence to demonstrate that farmer-led enterprises can generate and market affordable quality seed that adheres to guidelines that other farmers will adopt.

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