Topical Synthesis Paper

Enhancing seed quality assurance: Options for vegetatively propagated crops

CIP INTERNATIONAL POTATO CENTER
A CGIAR RESEARCH CENTER

IITA
Transforming African Agriculture

ISSD Africa

ISSD Africa Topical Synthesis Paper

Title: Enhancing seed quality assurance: Options for vegetatively propagated crops

Authors:
McEwan, Margaret, A., Kumar, Lava, Legg, James, Ogero, Kwame, Kakuhenzire, Rogers, Yabeja, Juma, Odum, Emmanuel, Tessema, Lemma.

1 International Potato Center and Seed Equal
2 International Institute of Tropical Agriculture and Seed Equal
3 International Institute of Tropical Agriculture and Plant Health Initiative
4 International Potato Center
5 International Institute of Tropical Agriculture
6 EIAR
7 Independent

This report synthesises learning from the action research and dialogue activities conducted under the Integrated Seed Sector Development in Africa (ISSD Africa) programme, 2019-2023.

More information: www.issdafrica.org

Under the ISSD Africa topic "Enhancing Seed Quality Assurance" the CIP, IITA and partners conducted activities in Ethiopia, Nigeria and Tanzania

Cover photo:
A group photo of Authorized Seed Inspectors, TOSCI staff and TARI staff who participated in a training on the use of Seed Tracker for cassava and sweetpotato e-certification. Misungwi district, Mwanza region, Tanzania.

Photo credit: Philemon Mwita.

1. Background

Problem: Across Africa, at most 4–5% of seed used for non-hybrid grain and vegetatively propagated crops (VPCs) has been certified. Certified seed is more expensive to produce and, if available, farmers may consider it too expensive, the associated transaction costs too high, and potential benefits too risky. Farmers need access to timely, affordable, quality seed of their preferred varieties

Why is this a bottleneck: Different types of farmers use various seed sources, depending on the crop and their own circumstances and preferences. Most seed used originates from farmers' own sources and local markets. However, the varietal provenance, identity, and health quality of this seed are often unknown. This may lead to sub-optimal and declining yields, jeopardising food, nutrition and livelihood security. Seed quality assurance (SQA) is a key component of seed production and marketing so that farmers can access new varieties and high-quality seed of existing improved varieties and landraces. In theory, many countries have fully-fledged seed certification systems. In practice, however, these systems face many challenges.

Impact on seed producers and users: Under many current national seed regulatory frameworks, it is illegal to sell seed that has not been certified. This threatens the livelihoods of male and female seed producers. if the regulatory process is inappropriate or ineffective, farmers are unable to reap the benefits from improved varieties and quality seed.

Actions taken: We developed an inventory of experiences with simplified, decentralised, and cost-effective mechanisms for vegetatively propagated crop seed quality assurance. We conducted in-depth case studies of decentralised quality assurance, e-certification approaches, and disease prevalence in seed potato in Tanzania, Nigeria and Ethiopia respectively. We are using these experiences to inform dialogue with different national seed system stakeholders on how SQA can be manageable and affordable at scale.

Further risks: climate change has already had an impact on the geographical distribution of pests and diseases – appropriate and cost effective seed quality assurance systems are required to forecast and minimize risk of plant disease outbreaks and ensure that the seed farmers use is disease free.

2. Approach and ambition of the topic

We had two questions: firstly, how can the efficiency of decentralized SQA mechanisms be enhanced, and secondly how can greater flexibility and options for decentralised SQA mechanisms, be promoted in the development of seed policies and regulations?

We carried out a literature review and interviews with regulatory bodies and seed experts in Ethiopia, Kenya, Malawi, Nigeria, Tanzania, Uganda, and Zambia. This captured existing and new data on decentralised SQA approaches with a focus on vegetatively propagated crops. The inventory reviewed experiences with (i) the use of third-party accredited inspectors; (ii) the use of novel tools for seed health testing (e.g., loop-mediated isothermal amplification (LAMP)); (iii) the use of e-certification platforms for SQA (e.g., Seed Tracker); and (iv) the involvement of seed producer groups and cooperatives for decentralized seed production, and role of seed producer associations.

We conducted in-depth studies in Ethiopia, Nigeria and Tanzania. In Ethiopia, working with EIAR and the regional Bureaus of Agriculture and Natural Resource Development, studies showed that six major potato viruses and bacterial wilt were found to be prevalent across all levels of the seed system in Ethiopia, but in-depth assessment of seed testing laboratories and seed inspection processes show limited resources and capabilities to implement SQA. In Tanzania, working with the Tanzania Official Seed Certification Institute (TOSCI) we worked to harmonize and validate a cross-crop protocol for a rapid, low-cost field-based diagnostic using LAMP to test for viruses on cassava and sweetpotato; and conducted a study which found that the cost of decentralized seed quality assurance can be met by inspection fee revenues and provides greater potential for sustainability than centralized inspection systems.

In Nigeria, working with the National Agricultural Seed Council (NASC) SeedTracker™, is in use for cassava seed quality assurance and value chain integration, and can be adapted for use by other crops and countries (e.g., for seed registration and certification of sweetpotato in Tanzania). But requires increased efforts to popularize and improved access to smart phones.

The findings are supporting seed regulatory bodies in Africa by making available experience and evidence from different countries to inform dialogue and rethink how SQA can be more appropriate and efficient for different crop types in low resource contexts.

3. Outcomes and lessons learned

The regulatory systems in all seven countries have some support mechanisms for decentralized seed production (e.g., QDS in Tanzania, Uganda, and Ethiopia and light-touch certification in Nigeria). In some countries, third-party inspectors (accredited seed inspectors in Tanzania or licensed seed inspectors (LSIs) in Nigeria) were piloted to position certifiers close to production systems to reduce the cost of SQA. There is evidence of the use of novel digital tools (e.g., Seed Tracker in Nigeria and Tanzania) to ensure compliance and reduce the cost of SQA and the application of low-cost diagnostics for seed health testing (e.g., LAMP-based virus diagnostics for sweetpotato, potato, and cassava in Ethiopia, Nigeria, Tanzania, and Uganda).

We found that countries are making strides to encourage decentralized VPC seed systems. However, several gaps exist in different countries, including legislation/regulations not specifically considering the SQA requirements of VPCs but were designed based on the experiences of grain crops (e.g., maize). In addition, there are shortages of trained inspectors and training materials, resources are insufficient at a local level, inspection equipment (e.g., vehicles), poor monitoring and administration capacity in farmers' cooperatives/associations, and inadequate consideration is given to gender empowerment.

National implementation is slow and fragmented due to limited investment and lack of a clear road map. To ensure the scalability and sustainability of piloted initiatives requires investments in (i) capacity development (training and training resources); (ii) infusion of adequate resources for implementation (competent personnel, funding, and the necessary technologies like ICT platforms); (iii) enact appropriate policy, legal and institutional framework that is implemented on the ground; (iv) achievements need to be promoted through regular communication and dialogue at all levels; (v) develop feedback loops to learn about the preferred traits for improved varieties and identify challenges to ensure that the stakeholders are aligned on the goals of SQA; and (vi) stakeholders need to implement and scale-up novel tools to reduce the burden and costs associated with manual and physical activities related to seed inspection and certification.

4. Conclusion and next steps

There are options available to ensure that seed quality assurance mechanisms are fit for purpose – i.e. appropriate and cost effective for crop type and context. Decentralized approaches to QDS quality control provide greater potential for sustainability than centralized systems. Digital tools have the potential to improve VPC QA. However, active awareness is required to popularize these (e.g. SeedTracker) and improve access to smartphones, a lack of which can slow the adoption of e-certification. Cross-crop protocol harmonization makes it easier to use low cost rapid field based diagnostics within a regulatory framework.

Emerging challenges include:

1. How country legislation/regulations can reflect specific characteristics of VPC seed & implications for SQA
2. Relevant dialogue on-going in Kenya
3. How to strengthen SQA monitoring and administration capacity in farmers' cooperatives/associations, with adequate gender considerations
4. How to demonstrate value proposition for investment in improvements to SQA for VPCs.

Decentralization of seed production has been driven by the critical requirement to accelerate access to new, improved varieties and replacement seed. This subsequently drives efforts to improve efficiency (timeliness and cost) of seed inspection and to assure seed quality. Staff shortages create a push for greater devolution, use of accredited or third-party seed inspectors.

Decentralization also provides opportunities for greater ownership of the seed inspection process and related capacity strengthening of seed quality control by seed producers and assurance agents. There is also increased government attention and public sector investment in the seed systems of crops where the business case is less attractive to the private sector. However, for decentralized seed quality assurance to be successful, there needs to be stronger coordination throughout the seed value chain, and alignment with the government decentralization policy in general.

5. Acknowledgements

This research was undertaken as part of, and funded by, the CGIAR Research Program on Roots, Tubers and Bananas (RTB) and the CGIAR Research Initiative on Seed Equal, and was supported by CGIAR Fund Donors. Additional funding support for this work was provide by: Bill and Melinda Gates Foundation through grant to SweetGAINS (ID: OPP121332) implemented by CIP; and the BASICS and BEST implemented by IITA and Gesellschaft für Internationale Zusammenarbeit (GIZ) Seeds for Change project implemented by CIP.

The views expressed in this working paper are those of the authors and do not necessarily reflect the views of the CGIAR, CIP, IITA or any of the organizations listed above. Any and all errors are the sole responsibility of the authors.

6. References

Sulle, E.; Pointer, R.; Kumar, L.; McEwan, M. 2022. Inventory of novel approaches to seed quality assurance mechanisms for vegetatively propagated crops (VPCs) in seven African countries. International Institute of Tropical Agriculture (IITA). International Potato Center (CIP). ISBN: 978-92-9060-654-3. 48 p. (Link)

ISSD Africa