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Mapping the Design and Implementation of Seed Sector Regulation

The Case of Uganda

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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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ABSTRACT

An enabling environment with clear, inclusive, and transparent seed laws, policies, regulations, and guidelines is the foundation for an efficient and effective seed sector. If well designed and implemented, the legal and regulatory framework can facilitate market diversification, supervision and quality control of seed and other forms of planting material, promotion of private sector participation, farmer access to improved seed varieties, reduced barriers for the movement of seeds across borders, and food security.

This study uses Regulatory Systems Maps (RSMs), a mapping tool for legal and regulatory processes and procedures, as a primary comparative method to assess the progress and dynamics in Uganda's seed system along four key dimensions of the seed systems regulatory value chain: (i) early generation seed (EGS) production and distribution, (ii) varietal registration and release processes, (iii) seed quality assurance systems, and (iv) seed trade. The RSMs document and illustrate the processes and procedures contained in Uganda's seed legal and regulatory systems, analytically isolating intervention points, proposed legal and regulatory changes, good practices and legal innovations, and systemic shifts over time, while also integrating important dimensions such as gender, inclusion, and flexibility that can address farmers' needs, reduce costs, and increase participation in seed systems. The data and information used to compile the Uganda RSMs were developed and validated through a series of consultations with an array of stakeholders spanning both the public and private sectors.

The findings of the RSMs showed that, despite the comprehensive nature of Uganda's seed rules and regulations and some notable innovations, implementation is a persistent challenge, and regulatory gaps and inconsistencies continue to exist. The RSMs indicate the need to take various measures to improve the enabling environment for seed trade in Uganda, including reviewing the current seed law, which is largely outdated; updating the existing seed regulations; adopting plant variety protection (PVP) regulations to implement the PVP Act; developing guidelines on agricultural research; and building capacity in both the public and private sectors.

Keywords: Regulatory Systems Maps, seed sector, agricultural regulation, seed regulation, regulatory design, Uganda.

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ACRONYMS

ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
COMESA	Common Market for Eastern and Southern Africa
COVID	Coronavirus Disease
DAO	District Agricultural Officer
DUS	Distinctness, Uniformity, and Stability
EAC	East African Community
ECAPAPA	Eastern and Central Africa Program for Agricultural Policy Analysis
EGS	Early generation seed
IFPRI	International Food Policy Research Institute
IPPC	International Plant Protection Convention
ISTA	International Seed Testing Association
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MaRCCI	Makerere University Regional Center for Crop Improvement
NARO	National Agricultural Research Organization
NML	New Markets Lab
NPT	National performance trials
NSCS	National Seed Certification Service
NVRC	National Variety Release Committee
OECD	Organisation for Economic Co-operation and Development
OIC	Orange ISTA Certificate
PRIs	Public research institutions
PVoC	Pre-export verification of conformity
PVP	Plant variety protection
QDS	Quality Declared Seed
RSMs	Regulatory Systems Maps
SPS	Sanitary and phytosanitary
STTS	Seed tracking and tracing system
TASAI	The African Seed Access Index
UNBS	Uganda National Bureau of Standards
UPHIA	Uganda Plant Health and Inspectorate Agency
UPOV	International Union for the Protection of New Varieties of Plants
USTA	Uganda Seed Traders' Association
VCU	Value for Cultivation and Use
WTO	World Trade Organization

1. LEGAL AND REGULATORY FRAMEWORKS FOR SEED SECTOR DEVELOPMENT

The foundation for a robust seed sector is an enabling environment with clear, inclusive, and transparent seed laws, policies, regulations, and guidelines. Such a legal and regulatory framework facilitates more effective implementation, including supervision and quality control of seed and other forms of planting material. When the seed regulatory system is well designed, it has the potential to improve the supply of seed through market and non-market channels, increase the quality of seed delivered through these channels, and reduce barriers to the movement of seed across borders (Kuhlmann, 2015). Effective seed regulatory systems can also encourage private sector participation in the development, commercialization, and distribution of new crop varieties, further supporting long-term investment in an industry that can contribute to food and nutrition security, employment, and economic growth.

Clear, efficient, and inclusive national seed laws and regulations provide transparency in procedures on varietal research and development, EGS production and distribution, variety release and registration, seed certification and quality assurance, registration requirements for seed producers and merchants, and international trade, with appropriate and efficient fees charged for services under each key regulatory dimension (Kuhlmann, 2015). These laws and regulations can be based on good regulatory practices and principles embedded in national, regional, and international regulatory instruments.

Uganda is an interesting case study in light of the considerable attention given to seed sector development in the country, including issues related to seed policy (Bagamba et al., 2023; Mastenbroek et al., 2015; Joughin, 2014), seed quality (Barriga and Fiala, 2020; Bold et al., 2017), quality assurance regulations (Mastenbroek et al., 2021) and, more generally, constraints to smallholder adoption of improved varieties and quality seed in Uganda (Diirro et al., 2023; Van Campenhout et al., 2021; Vandeveldel et al., 2021; Shiferaw et al., 2015).

Uganda's legal and regulatory framework governing the seed sector is quite comprehensive, with a number of relevant policy, legal, and regulatory instruments already in place (Table 1.1). The National Seed Policy

of 2018 establishes the guiding framework for the seed sector and was designed to support a vibrant, inclusive, and better regulated seed system.

The National Seed Policy is complemented by various laws and regulations. For example, for seed quality assurance, approaches include both mandatory seed certification for certain crops such as maize, where quality issues are particularly sensitive, and a more flexible system for quality-declared seed (QDS) class for crops such as beans, where farmer-based organizations can readily participate in local markets as seed producers and distributors.

To a large extent, these instruments are aligned with international and regional good practices, including rules and standards under the Common Market for Eastern and Southern Africa (COMESA), the Organisation for Economic Co-operation and Development (OECD), the International Union for the Protection of New Varieties of Plants (UPOV), and other international bodies and agreements. With respect to inclusion, Uganda is also one of the few countries in sub-Saharan Africa with relatively balanced gender representation in both the private and public sectors, including representation on the National Variety Release Committee (NVRC), among field inspectors, and in the ownership of small seed companies.

Uganda is also interesting given its regional and international obligations. Uganda is a member of COMESA, which has developed regional seed rules in the form of the COMESA Seed Trade Harmonisation Regulations of 2014 (COMESA, 2014), with which national seed regulations are to be aligned. Uganda is also a member of the East African Community (EAC), which currently has harmonized seed rules in draft form. At the international level, Uganda is also member of the World Trade Organization (WTO), through which member states have agreed upon a framework for sanitary and phytosanitary (SPS) measures and other aspects of cross-border trade. International guidelines also exist on variety evaluation and protection (i.e., plant breeders' rights) set by UPOV, and, although Uganda is not yet a member of UPOV, it has initiated the accession process (UPOV, 2022), for which alignment of national legislation with UPOV rules is a requirement.

Table 1.1: Legal and regulatory instruments governing Uganda’s seed sector

Instrument	Year	Primary contribution
<i>A. Public policies and strategies</i>		
National Seed Policy	2018	Provides a guiding framework upon which the seed regulatory framework is based.
Uganda National Seed Strategy	2018	Elaborates actions and plans that should be taken to achieve the Seed Policy objectives.
<i>B. Laws</i>		
The Plant Protection and Health Act	2015	Consolidates and reforms the law relating to protection of plants against destructive diseases, pests and weeds, to prevent the introduction and spread of harmful organisms.
The Plant Variety Protection Act	2014	Provides for the promotion of development of new plant varieties and their protection as a means of enhancing breeders’ innovations and rewards through granting of plant breeders’ rights.
Seeds and Plant Act	2006	Provides for the promotion, regulation and control of plant breeding and variety release, multiplication, conditioning, marketing, importing and quality assurance of seeds and other planting materials.
The National Agricultural Research Act	2005	Provides for the development of an agricultural research system for Uganda for the purpose of improving agricultural research services delivery, financing, and management.
National Agricultural Advisory Services Act	2001	Provides for functions and administration of the Organization responsible for providing guidance to farmers with regard to management of their farming enterprises.
<i>C. Regulations</i>		
Seeds and Plant (Quality Declared Seed) Regulations, No. 5 of 2020	2020	Provides guidance on implementation of the quality declared seed scheme.
Plant Protection and Health (Import and Export) Regulations, No. 4 of 2020	2020	Provides guidance on protection of plants against destructive diseases, pests and weeds during import and export.
Seeds and Plant Regulations, No. 14 of 2017	2017	Provides guidance on the implementation of the Seeds and Plant Act, 2007.
<i>D. Regional instruments</i>		
COMESA Seed Trade Harmonization Regulations	2014	Provides regional seed rules on variety registration and release, seed certification, and trade.

Source: Authors.

Uganda’s system also draws upon the rules, practices, and principles set forth by a number of international organizations active in seed sector development. These include: the seed schemes of the OECD; seed certification guidelines under the International Seed Testing Association (ISTA); rules on the exchange and use of genetic resources under the International Treaty on Plant Genetic Resources for food and Agriculture (ITPGRFA); and sanitary and phytosanitary standards under the International Plant Protection Convention

(IPPC), which is recognized as an international standard-setting body under the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). Alignment of national seed legal and regulatory instruments with these regional and international rules, practices, and principles helps ensure production of quality seed and gives legitimacy and acceptability to nationally produced seed, allowing it access to wider regional and international seed markets (Kuhlmann, 2015).

This study examines efforts by the Government of Uganda to improve the legal and regulatory enabling environment for seed trade in Uganda, existing regulatory gaps, and proposed interventions that could be taken to address challenges. The study is highlighted by the use of regulatory systems maps (RSMs), a legal and regulatory tool that visually depicts regulatory systems, processes, procedures, and their implementation in a step-by-step manner, emphasizing gaps, bottlenecks, and good practices found in law and practice (Kuhlmann, 2021; Kuhlmann and Dey, 2021, Kuhlmann et al., 2017).

The mapping process involves an analysis and comparison of legal and regulatory processes, including the institutional framework surrounding the key dimensions. For this study, this process helped highlight challenges faced in the implementation of the legal framework for seed, especially cases in which the rules in practice differ from what the law provides for on paper. The analytical process for developing RSMs also aids in identifying intervention points for making the system more efficient, effective, and inclusive; areas that require regulatory reform; and systemic shifts over time (Kuhlmann, 2021; Kuhlmann and Dey, 2021).

The data and information used in this study were developed and validated through desk research and consultations with an array of stakeholders spanning both the public and private sectors. The data and information were compiled and summarized into simplified visual representations, in order to ease users' comprehension of applicable rules across multiple legal instruments that could otherwise be complicated to understand. The RSMs were then used to analyze and compare multiple data points in a manner that can ease tracking of progress, identify specific challenges in the design and implementation of regulatory frameworks, and determine key areas for policy and advocacy intervention. Emphasis is placed on four key

dimensions of the seed systems regulatory value chain: (i) EGS production and distribution, (ii) varietal registration and release processes, (iii) seed quality assurance systems, and (iv) seed trade.

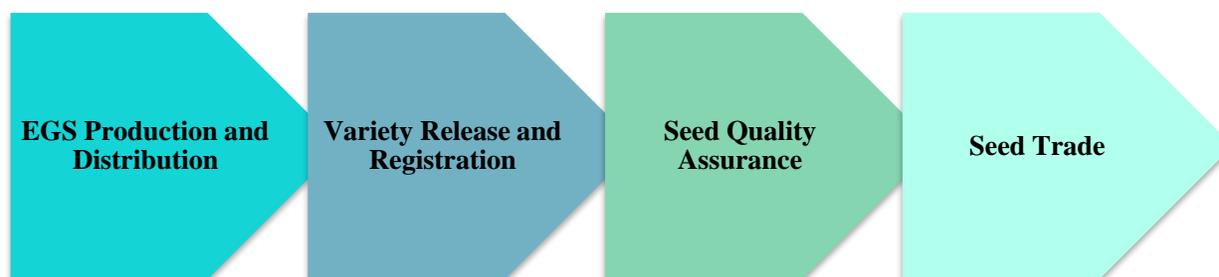
This paper continues as follows. Section B describes the RSM methodology, including a description of the systems approach, analysis of regulatory gaps, comparative assessment, consideration of inclusivity, and approach to formulation of recommendations. Section C discusses the background to Uganda's legal and regulatory framework governing the seed sector. Section D discusses the findings from the legal and regulatory assessment of Uganda's seed sector using RSMs focusing on the four key dimensions noted above, and highlighting good regulatory practices in Uganda, gaps in the seed rules, and implementation challenges. Section E proposes recommendations that can be pursued to address regulatory gaps and implementation challenges, followed by concluding remarks.

2. CONCEPTUAL AND METHODOLOGICAL APPROACH TO CONDUCTING LEGAL AND REGULATORY ASSESSMENTS

This study is based on a qualitative approach to assessing regulation of the seed sector in order to bridge the gap between the design of seed laws and regulations and their implementation. The approach hinges on the development and validation of RSMs to help visualize the complex regulatory steps in relation to key regulatory dimensions in a comprehensive yet simple manner, and to help to track changes in laws and regulations over time.

For Uganda, RSMs have been developed along four key dimensions of the seed systems regulatory value chain: (i) EGS production and distribution, (ii) varietal registration and release processes, (iii) seed quality assurance systems, and (iv) seed trade (Figure 2.1). Each is discussed in detail below. The data and information used to compile the Uganda RSMs were developed and validated through a series of consultations with an array of stakeholders spanning both the public and private sectors.

Figure 2.1: Four key regulatory dimensions of the Ugandan seed value chain



Source: Authors.

RSMs function as analytical instruments to depict the legal and regulatory system (including its implementation), intervention points, proposed legal and regulatory changes, good practices and legal innovations, and systemic shifts over time (Kuhlmann, K., et al. 2022). RSMs also encompass additional dimensions, including improvements in efficiency and effectiveness within the regulatory system, relevant costs, and links to relevant forms required by regulation. RSMs are particularly focused on how the legal and regulatory system can incorporate inclusion and flexibility, especially with regard to the needs of small farmers and women (Kuhlmann, 2021). Overall, RSMs serve as a research and practical tool to raise

awareness about policies, laws, and regulations that govern a regulatory domain and to facilitate dialogue and increase transparency amongst stakeholders.

The study's full approach encompasses several interconnected steps and is based on similar work by the New Markets Lab¹ that has been conducted in other countries (Kuhlmann, 2021; Kuhlmann and Dey, 2021). First, a systems approach is adapted and contextualized to the focus country and topic and frames the legal and regulatory review. As part of this, an assessment is conducted of all relevant laws in order to identify gaps in the current legal and regulatory system. Second, consultations are done with local stakeholders to understand priorities and concerns on the ground. Third, a comparison is made between the country's current system and regional and international rules and good practices, and, in some cases, other countries' national laws and regulations as well. Fourth, inclusivity is considered as a factor in order to specifically understand whether laws and regulations are designed and implemented in a way that accommodates underrepresented or vulnerable stakeholders' groups, including women, farmers, youth, and small businesses. Finally, a set of recommendations are formulated, validated, and communicated with stakeholders. Each step is explained in detail below.

Application of a Systems Approach to Study and RSM Development

The systems approach to legal and regulatory review is comprised of five interconnected steps with a focus on data collection, analysis, and vetting and validation of the RSMs (Figure 2). These steps are based on NML's methodology and scholarly work (Kuhlmann et al. 2016; Kuhlmann 2021). For this study, the application of this systems perspective was tailored to address the specific context of the Ugandan seed sector by involving engagement with stakeholders at every stage, as follows.

- a. *Systemic Legal and Regulatory Review:*** The mapping began with an assessment of relevant laws and regulations related to the four key dimensions: (i) EGS production and distribution; (ii) variety registration and release; (iii) seed quality assurance; and (iv) seed trade. Consistent with a systems

¹ Based in Washington, DC, New Markets Lab is a law and economic development center that applies a systems approach to the design and implementation of market rules. See <https://www.newmarketlab.org/> for additional details.

approach, the seed law and regulations are not the only instruments assessed; instead, other relevant rules, regulations, and standards at the national, regional, and international levels are also examined and reflected in the RSMs. Under the systems approach applied in this study, the law is viewed as ever-changing and evolving, with RSMs used in a dynamic manner to contribute to the transformation of the seed sector. Here, RSMs are used to pinpoint specific challenges and innovations in the design and implementation of seed law and regulation.

- b. *Consultation and Validation with Key Stakeholders to Understand Stakeholder Priorities and Innovation Gaps:*** Stakeholder consultations are key to development of the RSMs and are a critical factor in understanding how legal and regulatory systems actually function in practice. Between September 2022 and March 2023, key stakeholders from the Ugandan seed sector were consulted during one-on-one meetings, to understand the practical aspects of the seed laws and regulations, which often vary from legal and regulatory design. These stakeholders are positioned to convey good practices and challenges in the current framework, highlighting further areas for intervention. From the private sector, stakeholders consulted were from seed companies, the seed trader's association, the farmer's federation, the agro-input dealers' association, and development partners in the seed sector to gain an understanding of the challenges they face across the seed value chain. This information proved useful in consultations with public sector stakeholders, who provided further insight into policy, law, and regulatory issues. Public-sector stakeholders included breeders from public research institutions and regulators from the Ministry of Agriculture. A total of 24 stakeholders were consulted using a semi-structured interview guide that contained questions targeted to public and private sector respondents. The RSMs and this assessment also underwent a validation process with multiple stakeholders in the Ugandan seed sector in order to test the tools and highlight and reinforce stakeholder priorities and future intervention points.
- c. *Comparison with Regional and International Good Practices:*** The RSMs position domestic law in the context of regional and international good practices, adding an important comparative

element to the analysis and linking bottom-up, granular analysis with higher level law (Kuhlmann, 2021). In the case of Uganda, this included incorporation of COMESA, OECD, ISTA, and UPOV rules and standards. East African Community (EAC) regional seed rules are also being developed under the EAC Seed and Plant Variety Bill, which could also be integrated over time.

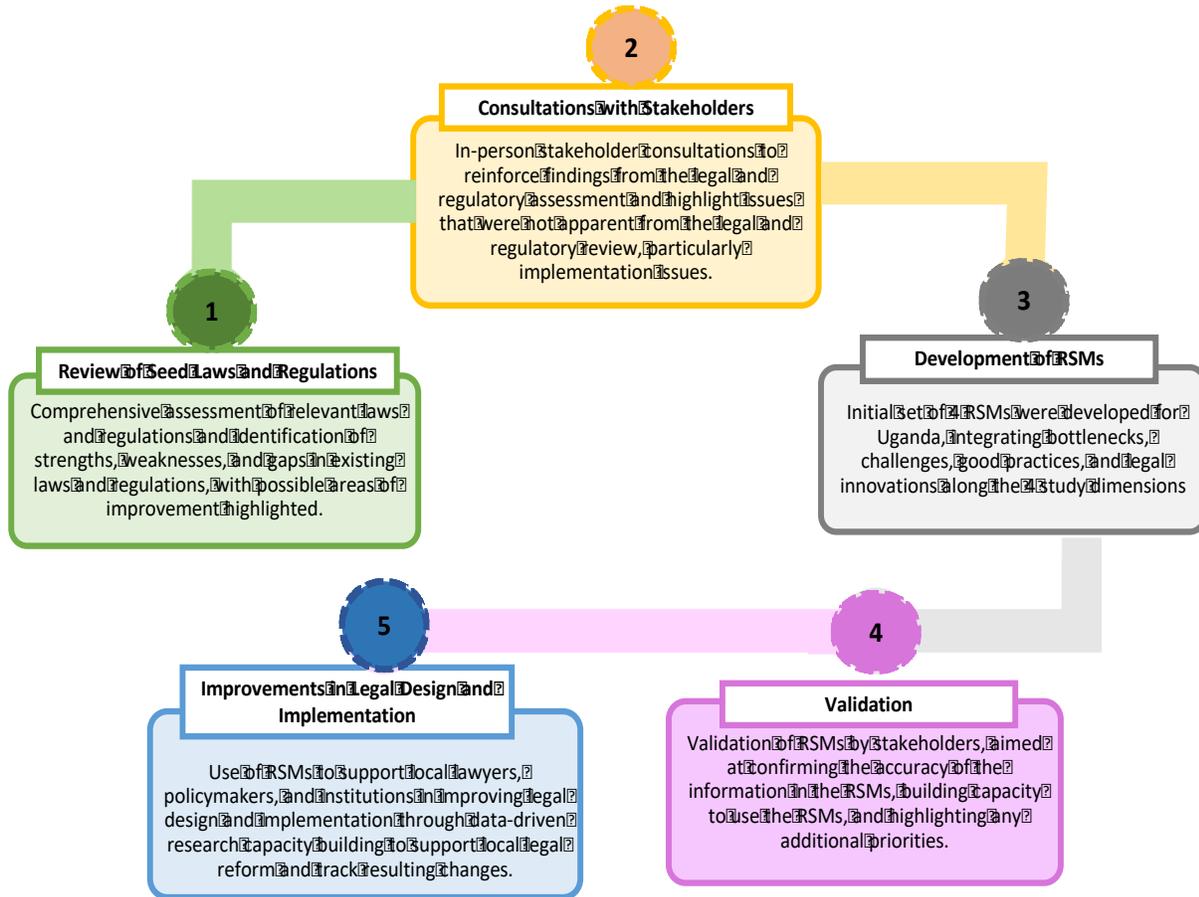
d. *Identification of Legal Innovations and Inclusive Legal and Regulatory Design Elements:*

Another central aspect of the systems approach is identifying intervention points through which the needs of vulnerable stakeholders' groups—including women, youth, farmers, and small businesses—are and can be incorporated into legal and regulatory systems (Kuhlmann, 2021). These are depicted in the RSMs at various stages, noting both where the current legal and regulatory system incorporates inclusive elements or other legal innovations and also highlighting where inclusive legal and regulatory design elements could be considered as rules and regulations are updated. The RSMs track other legal and regulatory innovations as well, such as flexibility and equity (Kuhlmann, 2021), as well as highlight challenges and regulatory options for integration of formal and informal seed stakeholders (Kuhlmann and Dey, 2021).

e. *Creation of Pathways for Improvements in Regulatory Design and Implementation:* Legal and regulatory systems constantly evolve and change, and the RSMs are designed to support local lawyers, policymakers, and institutions in improving legal design and implementation. Although there is no “one-size fits all” approach, and governments and stakeholders should be able to customize legal systems to suit their needs, data-driven research and training are needed to support local legal and regulatory reform and track change back up to the international level. In Uganda, recommendations identified when developing the RSMs were presented to regulators and key seed industry stakeholders, with some proposals considered and adopted during the evaluation of the country's seed sector strategy 2018/2023.

Based on these five elements of a systemic approach, RSMs were developed for Uganda in relation to the key study dimensions (Figure 2.2 outlines the approach for developing the RSMs; Figures 3–6 contain the RSMs).

Figure 2.2: Approach for developing RSMs



Source: Authors.

The RSMs visually map the various steps behind a legislative or regulatory process and highlight the implementation aspects of these processes, while also emphasizing challenges, interventions points, good practices, legal innovations, proposed changes, and incremental shifts in improving the legal and regulatory environment.

The process of developing RSMs highlights the evolving nature of law and regulation. In some cases, RSMs have led to legislative and systematic changes to create more inclusive seed systems (Kuhlmann, 2021). They have also been a positive exercise for building awareness of the good practices contained in

countries' systems. In this study, the RSMs incorporate this dynamic aspect and pinpoint specific instances in which the law is outdated, with intervention points for future change. They also show areas in which rules and regulations differ from experience in practice, highlighting important implementation aspects, and they showcase good practices and legal and regulatory innovations.

Formulation of Recommendations

The approach described above ultimately leads to the identification of specific recommendations on policy, legal, and regulatory interventions that may streamline the legal and regulatory system along the seed value chain. Recommendations resulting from this approach are divided between short-term (interventions that are already in the pipeline), medium-term (interventions that would require additional work to be undertaken), and, long-term (interventions that need to be initiated). Particular emphasis is placed on (a) intervention points to promote inclusion and flexibility and (b) decision points that public and private stakeholders in Uganda's seed system may consider.

Recommendations are further organized as follows.

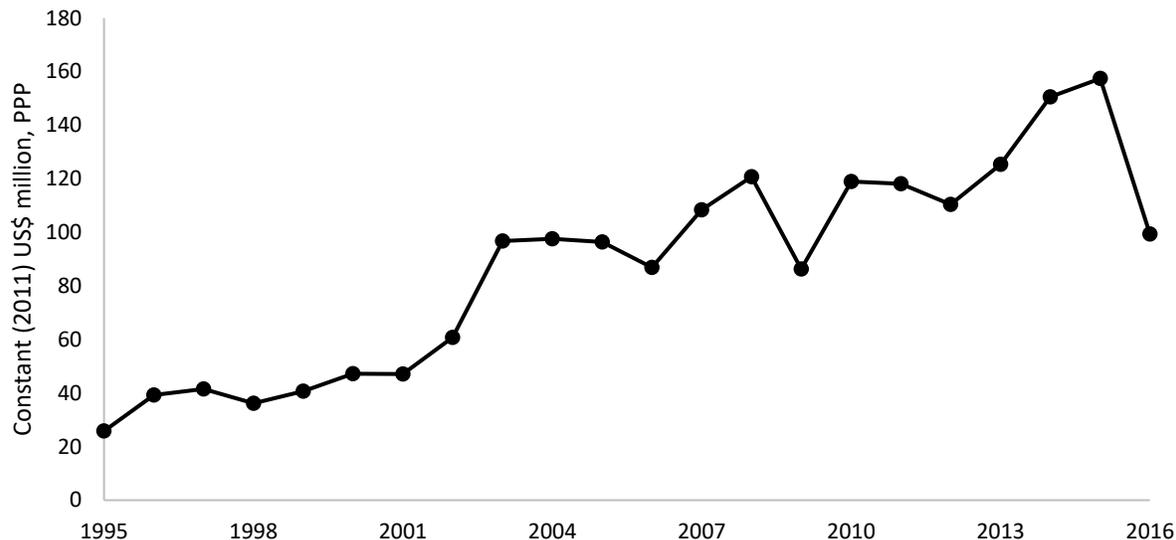
- *Areas that require more detailed regulations, directives, guidelines, etc. to become operational* given that some of the processes set out under relevant seed laws and regulations are unclear.
- *Areas in which what is written into law or regulation differs from stakeholder experience in practice* to call to attention the challenges faced by stakeholders in complying with regulatory processes set out under seed laws.
- *Areas in which good practices exist in the legal and regulatory framework and its implementation* to highlight innovative rules and practices that should be upheld.

3. FINDINGS: A LEGAL AND REGULATORY ASSESSMENT OF UGANDA'S SEED SECTOR USING RSMS

Despite the comprehensive nature of Uganda's seed rules and regulations, implementation has been challenging, and a few regulatory gaps and inconsistencies continue to exist (Otim et al., 2020). First, the main law governing the seed sector, the Seeds and Plant Act of 2006, is outdated and not aligned with all other subsequent legal instruments. For example, the Seed Policy passed in 2018 came with many reforms that set standards to address challenges in the seed sector. The Seeds and Plant Act was also passed before the enactment of the 2014 COMESA Seed Trade Harmonisation Regulations. Further changes also came with the Seeds and Plant Regulations, which were passed in 2017. Besides these gaps, there are also implementation challenges in relation to each of the key study dimensions.

Moreover, there are gaps under other seed regulatory instruments that affect the enabling environment for seed trade in Uganda. These include absence of PVP Regulations to implement the PVP Act, lack of a revised fees schedule for conducting variety evaluation tests, absence of guidelines on agricultural research, and lack of clear procedures relating lodging of appeals, among other things, which are discussed in detail in the following sections. Consultations also reported general capacity gaps with respect to the regulatory institutions, PRIs, and the private sector, which generally affect the development of the seed sector, resulting in low quality seed, low farmer adoption of improved varieties, and disengaged seed value chains starting from EGS production (Mastenbroek and Ntare, 2016). Gaps include an inadequate number of field inspectors; limited equipment in the form of vehicles and fuel; an under-equipped national laboratory that is not ISTA-accredited; an under-capacitated private sector that cannot, for instance, engage in breeding or private seed certification; and generally volatile spending on public agricultural R&D, as depicted in Figure 3.1 below.

Figure 3.1: Total agricultural R&D spending in Uganda



Note: Agricultural R&D spending in Figure 3.1 is assessed at purchasing power parity (PPP) exchanges rates.
Source: ASTI (2023).

These challenges cause gaps in the availability and accessibility of quality seed on the market, forcing farmers to continue relying on saved seed, local seed exchanges, and positive selection practices, with limited participation in the commercial formal seed market (Bagamba et al., 2023). The section below assesses legal and regulatory gaps, changes, and issues in Uganda’s seed sector as well as legal and regulatory innovations. The assessment focuses on the four study dimensions noted earlier: (i) EGS production and distribution, (ii) varietal registration and release processes, (iii) seed quality assurance systems, and (iv) seed trade. For each dimension, the RSMs illustrate relevant rules and procedures and amplify the findings from the assessment. Shading is used in each RSM to depict necessary changes to laws and regulations, areas in which stakeholder experiences differ from the rules and regulations on the books, and good practices in the design and implementation of laws and regulations.

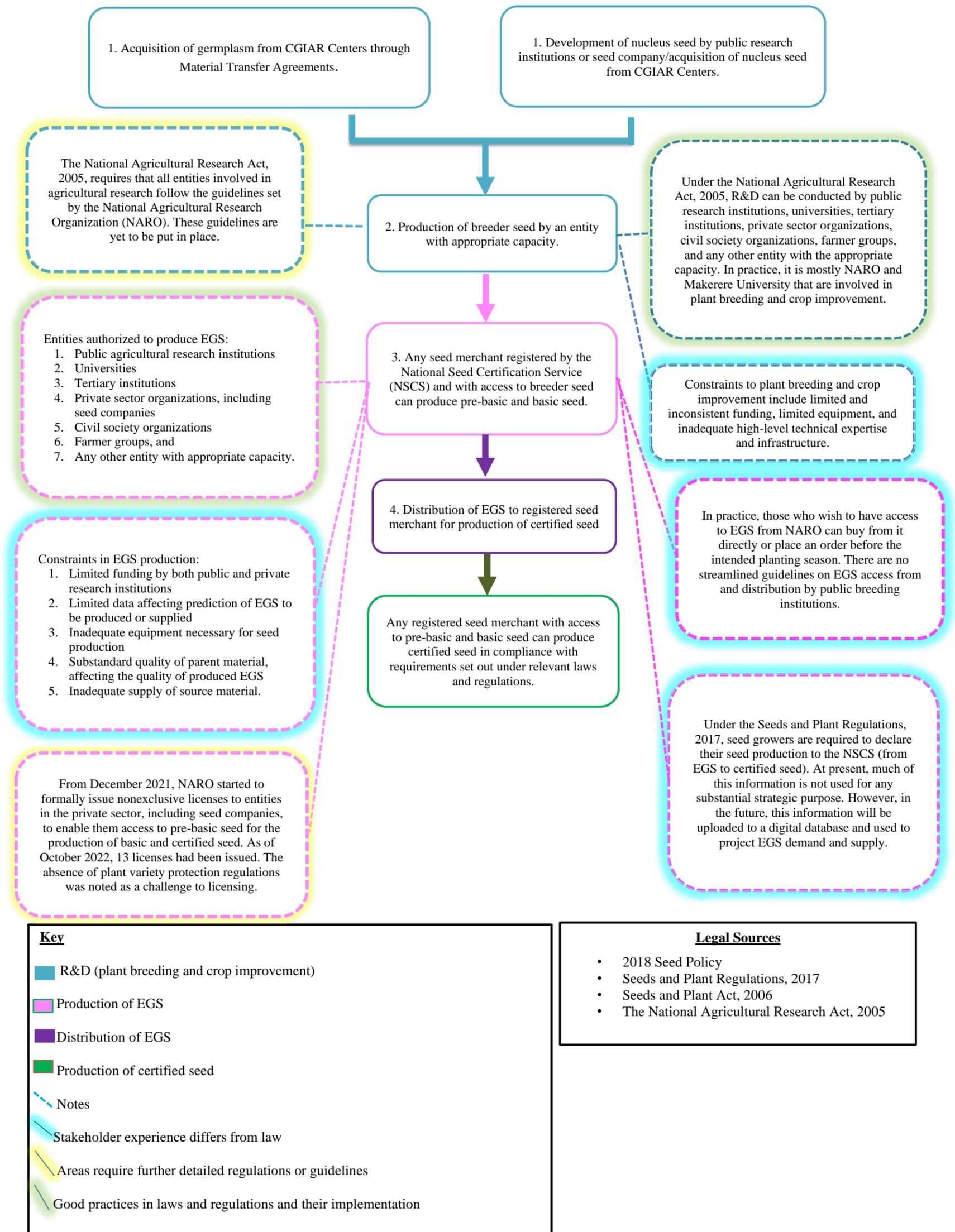
Dimension One: EGS Production and Distribution

Varietal research, development, and transfer constitute the earliest step in the seed value chain and one of the most fundamental aspects of a well-functioning seed regulatory system (Kuhlmann et al., 2021;

Heemskerk et al., 2017; Spielman and Smale, 2017; BMGF/USAID, 2015). The activities in this step have immense influence on the quality and quantity of seed that is made available in the market. Stakeholder consultations highlighted a widely-held view that access to EGS production and distribution is a pressing and urgent issue in Uganda. The RSM in Figure 3.2 depicts the current system for EGS production and distribution, illustrating varietal research, development, and transfer in Uganda and highlighting some of the key steps, issues, and decision points and their relationship to the main legal and regulatory instruments of interest: the 2018 Seed Policy; the Seeds and Plant Act, 2006; the Seeds and Plant Regulations, 2017; and the National Agricultural Research Act, 2005.

The most significant gaps and implementation challenges in the legal framework for EGS production and distribution are summarized as follows. First is the reported absence of streamlined guidelines on conducting agricultural R&D, contrary to the National Agricultural Research Act, 2005, which requires that all involved in agricultural research follow the guidelines set by NARO (see the yellow-shaded box attached to Figure 3.2, Step 2). Second is the finding that PRIs have limited financial and human resource capacity to adequately engage in breeding and rely mostly on project grants, which are unsustainable (blue-shaded box in Figure 3.2, Step 2). Third is the finding that there is limited availability of EGS (blue-shaded box in Figure 3.2, Step 3) resulting from limited funding, equipment, information, and source material. Finally, there is a reported absence of streamlined guidelines on access to EGS from public research institutes (blue-shaded box in Figure 3.2, Step 3). We further unpack these gaps and implementation challenges below.

Figure 3.2: Regulatory Systems Map of early generation seed production and distribution in Uganda



Source: Authors.

Crop improvement and plant breeding R&D. In general, public research institutes and seed companies conduct crop improvement R&D through several mechanisms: (i) by breeding new varieties with their own materials held by national breeding programs, national genebanks, or private collections; (ii) by breeding new varieties with germplasm obtained from CGIAR Centers and further developed in-house through, e.g., crosses with their own materials; or (iii) procuring nucleus seed from other public research institutes or CGIAR Centers to evaluate in national performance trials (Figure 3.2, Steps 1 and 2). Transfer of germplasm from CGIAR Centers to public institutes or seed companies is generally executed through a material transfer agreement, which is based on the terms and conditions set forth in the Standard Material Transfer Agreement, developed under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and recognized by countries that have acceded to the agreement. (Figure 3.2, Step 1).

In the case of Uganda, findings indicate that while many of these mechanisms exist, there is currently no formal process for accessing germplasm from the national genebank or from breeding programs. Instead, sharing of germplasm is done on the basis of individual relationships between the breeder in NARO and the requester. To streamline the process of accessing germplasm, NARO is currently developing guidelines on access and sharing of biological resources. These guidelines are in draft form and awaiting approval by the NARO Governing Council.

This issue is symptomatic of a larger problem related to conducting crop improvement R&D in Uganda. The legal framework set forth under the National Agricultural Research Act, 2005 allows any entity with appropriate capacity to engage in R&D, including plant breeding and crop improvement, as depicted in the green shaded dotted box off of Step 2 in Figure 3.2.² This is consistent with good practice. Notably, it allows R&D to be conducted by public institutes, universities, private sector organizations (including seed companies), farmer groups, civil society organizations, and any other entities with appropriate capacity.

² §21 of the National Agricultural Research Act, 2005.

In practice, however, agricultural R&D in Uganda is largely conducted by the country's two public agricultural research institutions, NARO and the Makerere University Regional Center for Crop Improvement (MaRCCI). Given that plant breeding and crop improvement are time-, resource-, and capital-intensive activities, private and public sector organizations beyond these two entities are significantly constrained by limited and inconsistent funding, insufficient materials and equipment, and inadequate technical expertise and infrastructure (left blue-shaded box off of Step 2, Figure 3.2). In fact, findings confirmed that only one private seed company is actively engaged in breeding, while the other companies that were previously engaged in breeding activities had become inactive due to the challenges mentioned above. This is consistent with an earlier study by Mabaye et al. (2020) that found no seed companies in Uganda with an active in-house breeder.

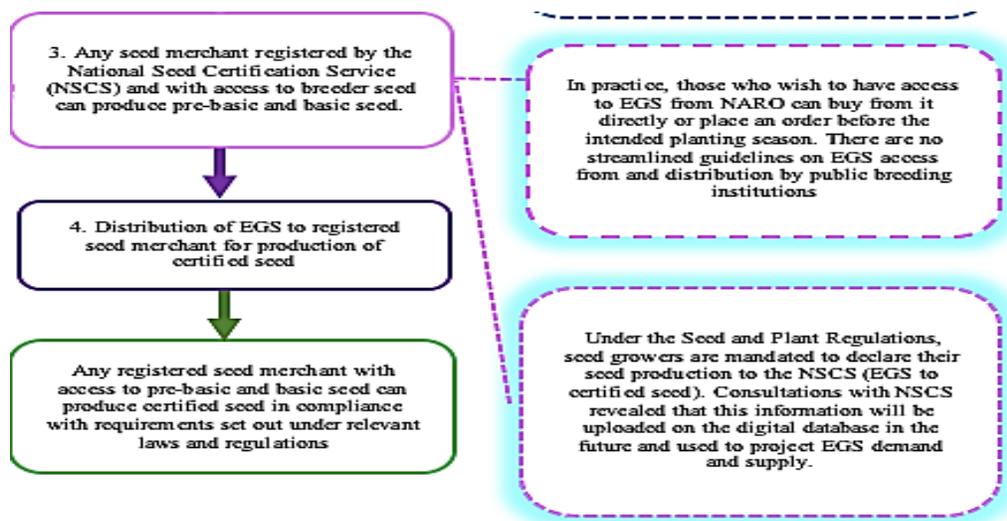
Findings further indicate that under the National Agricultural Research Act, 2005 all entities that are involved in agricultural R&D are meant to follow guidelines set by NARO.³ However, these guidelines are not yet in place, as shown in the yellow-shaded box off Step 2 in Figure 3.2. Moreover, seed companies noted that while the Plant Variety Protection Act of 2014 is in place, the absence of regulations to implement it has affected private sector investment in varietal breeding and research, as their innovations cannot be protected from third-party infringement (yellow-shaded box in Figure 3.2, Step 3). This is an example of how the RSMs allow for the identification of gaps in the legal and regulatory system that are sometimes otherwise difficult to discern.

Early generation seed production and distribution. Next, we examine the specific rules and procedures related to EGS production and distribution. Both public institutions and seed companies are permitted to produce basic seed as long as they are registered by the National Seed Certification Service (NSCS) as a seed merchant and have access to breeder and pre-basic seed (the green-shaded box off of Figure 3.2, Step 3). This is consistent with good practices in other countries.

³ §24 of the National Agricultural Research Act, 2005.

Perhaps not surprisingly, what actually occurs in Uganda’s seed sector is more limited in nature. Findings indicate that EGS is largely produced by public research institutes, while seed companies and farmer- or community-based seed businesses mostly depend on these institutes to source pre-basic and basic seed. This comes with its own challenges. In the absence of reasonable demand assessments and projections for EGS by MAAIF, and given the limited resources and capacity for EGS production, the quantity of EGS produced often falls short of demand from these companies and businesses, as illustrated in the final, blue-shaded box off of Step 3 in Figure 3.2 (as extracted in Figure 3.3 below). Moreover, there are no streamlined guidelines for the distribution of EGS from public institutes, as shown in the blue-shaded box to the right off of step 3 in Figure 3.2 (as extracted in Figure 3.3 below). These are two examples of where the RSMs allow us to identify a difference between rules and regulations on paper and the experience in practice.

Figure 3.3: Legal and regulatory gaps in EGS production rules (Extracted from Figure 3.2)



Source: Authors.

There are additional examples of instances in which practice differs from rules and regulations. For example, according to the rules, public and private entities that seek access to EGS from NARO can purchase from it directly or place an order before the intended planting season and pay 50 percent of the cost in advance. However, our findings indicate that those without “connections” in NARO are often considered last or denied access altogether, especially when there is limited EGS supply available.

This issue is exacerbated by a lack of coordination in collating information on EGS supply and demand. Ideally, and in accordance with the Seeds and Plant Regulations, 2017, seed growers are required to declare their seed production to NSCS,⁴ as shown in the final, blue-shaded box off of Step 3, Figure 3.2. This information can be used to estimate the supply of seed in different classes (pre-basic, basic, certified, QDS, other) and across seasons and years.

Findings indicate, however, that no such declarations are being made by any EGS producers. That said, they further indicate that mandatory provision of this data will be enforced by NSCS in the near future, while MAAIF is supporting the implementation of a digital seed tracking and tracing system (STTS) that can be used to upload production data, project EGS demand and supply, and book basic seed a season in advance. The STTS has yet to come into use.

Alongside these changes, in 2022 NARO put in place an EGS Working Group to monitor the quality and quantity of EGS and ensure it is produced in a timely manner and in the desired quantity. A key actor in this effort will be NARO Holdings Limited, an independent seed company that was created in 2016 and holds a memorandum of understanding with NARO to produce EGS of NARO varieties on a full cost-recovery basis. At present, NARO Holdings Ltd. is producing EGS with project funding, but the expectation is that it will become more self-sustaining in the future.

Stakeholder consultations also revealed challenges with the quality of EGS produced by both private and public-sector entities (see left blue-shaded box off of Step 3, Figure 3.2). While there are clear regulatory measures on EGS quality assurance under the Seeds and Plant Regulations, 2017, NSCS has limited resources, equipment, vehicles, and inspectors to efficiently inspect and test seed. There have been initiatives over the years to train and increase the number of inspectors, but large staffing gaps persist.

Licensing. Next, we examine issues pertaining to the management of genetic resources, namely the licensing of new varieties to EGS producers by NARO and other research institutes. Since December 2021, NARO began issuing nonexclusive licenses, to private sector entities to access pre-basic seed and produce

⁴ §21 of the Seeds and Plant Regulation, 2017.

EGS and certified seed, as shown in the yellow-shaded box off of Step 3, Figure 3.2. The standard licensing agreement used by NARO, among other things, requires that licensees place an order for EGS one season in advance and pay an advance of 50 percent of the purchase price. Licensing by NARO is conducted under the Plant Variety Protection Act, 2014, the 2018 Intellectual Property Policy, and the 2018 NARO Guidelines for Intellectual Property Management. As of March 2023, 13 licenses had been issued.

While the performance and impact of these licenses on EGS production and distribution is yet to be assessed, the introduction of a formal licensing procedure does represent a significant change in EGS policy in Uganda. Still, findings suggest that the non-exclusivity provision in these licensing arrangements may ultimately limit the participation of private companies in licensing arrangements, thus reducing the impact of licensing on EGS production and, ultimately, new variety commercialization and distribution. Uganda's PVP Act that could facilitate exclusive licensing arrangements is in place, but is not yet fully operational due to the absence of implementing regulations, which have been in draft form since 2019. These issues are captured in the yellow-shaded box off of Step 3 in Figure 3.2.

Dimension Two: Variety Registration and Release

In most African countries, including Uganda, new crop varieties must undergo a formal process of testing, evaluation, and registration before they can be registered on the national variety list and released for cultivation.⁵ This process is overseen by the NSCS, and it can delegate this role to any institution with sufficient capacity.⁶ The variety release process contains four interconnected steps: (a) application for variety release and registration, (b) testing of the new variety, (c) evaluation by the regulatory technical committee, and (d) regulatory determination and post-determination actions, as in Figure 3.4 below.

The entire variety release and registration process, however, contains significant gaps and ambiguities. First, due to resource limitations, NSCS delegated its role to conduct evaluation tests to NARO, which has a conflict of interest and charges higher fees than those prescribed in the regulations. (see right blue shaded

⁵ § 5(1) of the Seeds and Plant Regulations, 2017.

⁶ § 9(13) of the Seeds and Plant Act, 2006.

box off step 3 in Figure 3.4). To address the institutional capacity limitations NSCS, the 2018 Seed Policy proposes the establishment of the Uganda Plant Health and Inspectorate Agency (UPHIA), a semi-autonomous body, as a replacement for NSCS with responsibility for variety release. The UPHIA is, however, not yet in place (see left first yellow shaded box off step 3 in Figure 3.4), and consultations revealed that the public sector was adamant that it should be established. Secondly, the variety release and registration process in the Seeds and Plant Act, 2007 and its regulations is not fully aligned with the regional seed rules under COMESA Seed Trade Harmonisation Regulations of 2014.

Thirdly, the NVRC usually does not sit as often as scheduled due to limited resources (see left blue shaded box off step 5 in Figure 3.4), and the national variety list is not updated regularly, which affects seed sector access to approved improved varieties (see right blue shaded box off step 7 in Figure 3.4). Lastly, there are gaps in the appeals process, related to the absence of the Seeds and Plant Tribunal, which is the legal appeals body regarding decisions on variety evaluation and release. The Seeds and Plant Regulations are also unclear on the timelines, procedure, and form for lodging appeals (see yellow shaded box after step 7 in Figure 3.4). These gaps and implementation challenges are discussed in detail below, under each step of the variety release and registration process.

Figure 3.4: Regulatory Systems Map of the variety registration and release process in Uganda



Key

- Application
- Evaluation testing
- Application to the NVRC and consideration of technical data
- Approval for release
- Withdrawal and rejection
- - - Notes
- - - Stakeholder experience differs from law
- - - Areas require further detailed regulations, directives, or guidelines
- - - Good practices in the law and regulations and their implementation

Legal Sources

- 2018 Seed Policy
- Seeds and Plant Act, 2006
- Seeds and Plant Regulations 2017

Source: Authors.

Variety Testing is the first regulatory step in the variety release and registration process. Uganda's seed law mandates that NSCS evaluate new varieties for release, although it can delegate this function to any suitable organization.⁷ Stakeholders reported that, in practice, variety evaluation trials are conducted by NARO, with the oversight of the NSCS as depicted in the blue shaded box off of step 3 in Figure 3.4. Considering that the NSCS is not autonomous, all funds received by the institution go directly to the consolidated fund and are usually not reallocated back. As a result, in most cases the NSCS does not have the funds to conduct variety evaluations, even when the applicant has already paid for them. Private seed companies noted a conflict of interest with NARO conducting variety testing, since it also engages in varietal research and development and its varieties compete in the market with private seed companies. With NARO's interest to license its varieties to private seed companies in exchange for royalties, some companies questioned NARO's fairness in evaluating companies' new varieties when the result would be reduced reliance on NARO's varieties and a reduction or loss of income stream. Moreover, while the costs associated with relevant testing for evaluation are set out in the fourth schedule of the Seeds and Plant Regulations (DUS costs UGX 350,000, or approximately USD 100, and NPT costs UGX 800,000, or approximately USD 220), these fees differ from those reported by stakeholders. Since it is not the NSCS that conducts the tests, NARO, which does the evaluations, sets different charges that are higher than the regulatory fees (see blue shaded box off of step 3 in Figure 3.4). Stakeholder consultations revealed, for instance, that on average, NARO charges between USD 500 and 1,000 for each season of either DUS or NPT and that there are no clear and specific guidelines for setting the charges, nor are they consistently applied. In principle, the fees under the Seeds and Plant Regulation would apply; however, because the NSCS does not conduct evaluations or mandate NARO as its authorized testing organization to apply the regulatory fees, NARO sets its own fees, with which companies must comply. This is one of the aspects in the variety release and registration process where practice differs from the rules, as depicted in the blue shaded box attached to step 3 of Figure 3.4.

⁷ §9(13), Seeds and Plant Act.

While not under the seed law or regulations, Uganda has in practice a fast-track testing process for varieties that are registered in member countries of the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), a regional association of which Uganda is a member, subject to the Agreement under ASARECA and the Eastern and Central Africa Program for Agricultural Policy Analysis (ECAPAPA) (ASARECA-ECAPAPA Monograph, 2003). Such varieties are subject to one confirmation NPT season on multiple sites to assess the variety's compatibility with Uganda's agronomic conditions (see second yellow shaded box off of step 3 in Figure 3.4). This practice is, however, meant to be used when a variety has only been registered in one country, and COMESA has a similar process in place for registration in a second Member State. Under the COMESA rules, this confirmation process does not apply to varieties listed in the COMESA Variety Catalogue, which have been registered in two COMESA Member States. However, Uganda continues to apply confirmation testing for all varieties, including those listed in the COMESA Variety Catalogue, which is contrary to the COMESA Seed Trade Harmonisation Regulations of 2014 which require that a variety that is listed in the COMESA Variety Catalogue be exempted from further NPT and DUS testing. The variety release and registration process in both the Seeds and Plant Act and Regulations should be clarified in this regard and aligned with the regional seed rules.

Evaluation is the next step in the variety release and registration process, and Uganda's system has some notable good regulatory practices and implementation challenges that are examined below. Once the variety tests are completed and submitted to the NSCS, NSCS sends the trial results to the national variety release committee (NVRC) for evaluation.⁸ The inclusiveness of the NVRC, which ensures representation of women and both private and public-sector stakeholders, is a commendable good regulatory practice. However, there are some gaps that continue to exist between the rules and practice, such as the irregular meetings of the NVRC. While the seed law mandates the NVRC to sit at least twice a year,⁹ stakeholder

⁸ §5, Seed and Plants Regulations, 2017.

⁹ §6(6) of the Seeds and Plant Act, 2006.

consultations revealed that this does not happen, which sometimes delays the release of improved varieties (see blue shaded box off of step 5 in Figure 3.4). For instance, due to COVID-19 and limited resources, the NVRC only sat once in 2019, 2021, and 2022, and it did not sit at all in 2020.

Regulatory Determination is the last step in the variety release and registration process, and there are some implementation gaps in this part of the process too. After the NVRC considers the technical data by the breeder and technical report by the NSCS, it can reject or approve the variety for release (see step 6 in Figure 3.4). Varieties approved for release by the NVRC are registered in the National Variety List by the NSCS, published in the Gazette, and are eligible for seed multiplication and marketing (see Step 7 in Figure 3.4). The major gap identified here is the absence of an appeals body, which denies an aggrieved party redress. While the regulations provide for appeals to be lodged with the Seed and Plant Tribunal if the variety has been rejected by the NVRC (see yellow shaded red box after step 7 in Figure 3.4), stakeholder consultations revealed that such the Tribunal is not in place, and, if aggrieved, the applicant has no recourse. Moreover, the Seeds and Plant Regulations do not clarify the relevant procedures and form of appeal. Stakeholder consultations also revealed that the National Variety List is not updated regularly, which affects farmer knowledge and access to improved approved varieties (see blue shaded box off step 7 in Figure 3.4), which highlights an important gap between law and practice.

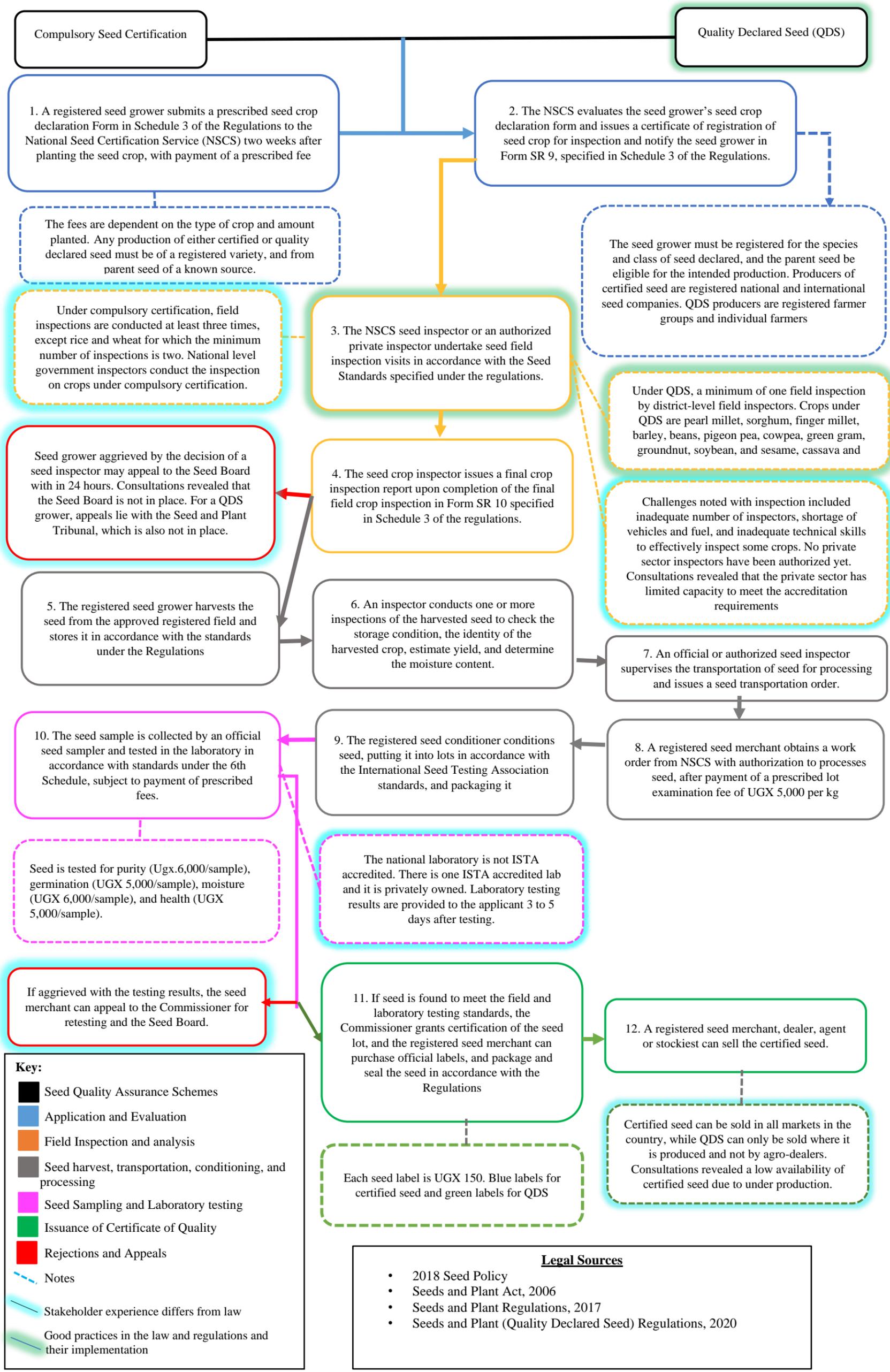
Dimension Three: Seed Quality Assurance

The current seed quality control system in Uganda is somewhat diverse and differentiated, encompassing both the formal and informal seed sectors. The Seeds and Plant Regulations recognize both compulsory seed certification and QDS quality assurance, both government-controlled processes. The Seeds and Plant (Quality Declared Seed) Regulations, 2020 were recently approved, providing clarity and procedural guidelines on QDS quality assurance processes. The recognition of the QDS seed scheme is a commendable good practice that can bridge the informal and formal seed sectors (Kuhlmann and Dey, 2021). The two schemes are meant to complement and not compete with each other (Mastenbroek et al., 2021). The other

good regulatory practice in Uganda's seed quality assurance system is the provision for authorization of private seed inspectors.

While significant efforts have been made to improve the regulatory framework for quality assurance, significant gaps continue to exist, including those highlighted in Figure 3.5 below. Firstly, the NSCS, which is the regulatory body responsible for quality assurance, has limited capacity to effectively conduct field inspections and laboratory tests (see blue shaded box off step 3 in Figure 3.5). Secondly, no private seed inspectors have ever been authorized, and companies are unaware of requirements (see right blue shaded box off of step 3 in Figure 3.5). Thirdly, the national seed laboratory does not have ISTA accreditation, which is called for under international seed testing standards and regional practices, and is limited in terms of finance, human resource, and infrastructure (see blue shaded box off of step 10 in Figure 3.5). Fourthly, the Seed Board, which is the appeals body under the Seeds and Plant Regulations, is not in place, and the regulations do not specify the procedure and form of lodging an appeal (see blue shaded red box off of step 4 in Figure 3.5). Lastly, there is inadequate and inconsistent production and supply of certified seed due to absence of seed demand projections (see blue shaded box off of step 12 in Figure 3.5).

Figure 3.5: Regulatory Systems Map on the seed quality assurance process in Uganda



Source: Authors.

With 90 percent of seed in Uganda produced in the informal sector (Mastenbroek et al., 2021), it is important that the legal framework on quality assurance integrates both the formal and informal sectors. The QDS requirements are less demanding than those for formal seed certification, and they are often viewed as being less cumbersome for local seed businesses and farmers, enabling their involvement in the seed sector (Mastenbroek et al., 2021). QDS focuses on prescribed crops under the second schedule of the QDS Regulations, particularly those for which the formal seed sector has less or little focus. This is a good regulatory practice (as depicted in the green-shaded dotted box off of step 3 in Figure 3.5) that enables farmer access to quality seed of varieties that may not have much commercial value yet play an integral role in national food and nutritional security.

MAAIF and NSCS, with the support of development partners, have been training registered farmers and farmer groups or cooperatives in the acceptable practices of producing QDS. Like certified seed, QDS is produced from basic seed, but, unlike certified seed, it is subject to less inspection and can only be marketed within the geographical region in which it was produced (or outside such region with the authorization of NSCS). Formal seed certification, on the other hand, focuses on particular crops (Kuhlmann et al., 2019) that are produced by registered multinational and local seed companies, subject to a minimum of three field inspections of all seed fields, inspected by NSCS inspectors, and sold by registered agro-dealers. All certified seed must meet the quality standards set by the NSCS based on ISTA standards, which are aligned with regional standards under COMESA. The key differences between certified and QDS schemes are elaborated further in Table 3.1 below.

Table 3.1: Key differences between certified and QDS schemes in Uganda

Quality Assurance Scheme	Compulsory Seed Certification	Quality Declared Seed
Crops	<ul style="list-style-type: none"> • Cereals: barley, finger millet, maize, pearl millet, rice, sorghum, and wheat • Pulses: beans, broad beans, chickpeas, pigeon peas, and cowpeas • Oil crops: groundnut, sunflower, soybean, and sesame • Fiber crops: cotton • Roots and tubers: Irish potatoes, cassava, and sweet potatoes • Beverages: coffee, tea, and cocoa • Fruits: pineapples, apples, mangoes, bananas, oranges, avocado, pawpaw, and passion fruit • Pasture seed: silver leaf desmodium, green leaf desmodium, siratro, and stylo 	<ul style="list-style-type: none"> • Cereals: pearl millet, sorghum, finger millet, and barley • Pulses: beans, pigeon pea, cowpea, and green gram • Oil crops: groundnut, soybean, and sesame • Roots and tubers: cassava and sweet potato
Type of Seed Grower	<ul style="list-style-type: none"> • Legally any qualifying seed grower registered to produce certified seed. In practice, it is the multinational and local seed companies 	<ul style="list-style-type: none"> • Individual farmers, farmer groups, associations, or cooperatives recognized by a district local government
Qualifications for Registration of Seed Grower	<ul style="list-style-type: none"> • The applicant has land that has not been used to cultivate other cultivars of the crop related to the crop the grower desires to grow the preceding season, adequate storage facilities, and labor. • Payment of a fee of UGX 1,000,000 (approximately USD 280) 	<ul style="list-style-type: none"> • Applicant has land accessible for inspection, technical knowledge and skills in seed production, access to appropriate post-harvest handling and storage facilities, and a recommendation indicating capability issued by a district agricultural officer. • Payment of a fee of UGX 1,000,000 (approx. USD 280)
Seed Produced From	Parent Material (Basic Seed)	Parent Material (Basic Seed)
Nature of Inspectors	NSCS Inspectors	NSCS Inspectors. In practice, NSCS has authorized private para-inspectors to conduct field inspections on their behalf.
No. of Inspections	Minimum of three field inspections of all seed fields	At least once during a growing season, on at least 10 percent of the total acreage declared
Seed Testing Standards Issued Label	Multiple seed lots, depending on volume Germination, genetic purity, moisture content, and seed health	One seed lot per variety, after bulking Same standards as certified seed
		
Marketing	Direct marketing through agro-dealer networks	Sold within communities where seed is produced or outside those communities with express authorization of the NSCS.

Source: Authors, based on the Seeds and Plant Regulations, 2017 and Seeds and Plant (QDS) Regulations, 2020.

Field Inspection, Analysis, and Laboratory Testing. This process is the core of seed quality assurance, and below we examine some of the good regulatory practices in Uganda’s system and key gaps and implementation challenges that ultimately affect the quality of seed. Seed must meet field and laboratory standards prior to certification.¹⁰ Field inspection is aimed at assessing genetic purity and ascertaining that contamination does not occur during any stage of production (Kuhlmann, K., et al., 2019). Seed that does not comply with the field and laboratory standards will be rejected. Sub-steps exist within the seed quality assessment process (including field inspection and seed processing, sampling, and laboratory testing), and there is a process for issuance of a certificate of quality, as well as rejection and appeal.

Stakeholder consultations and validation meetings revealed challenges in the current quality control process, particularly with respect to both field inspections and laboratory testing. Inadequate staffing was highlighted as an implementation issue, both in terms of number and capacity (see right blue shaded box off step 3 of Figure 3.5), even though NSCS has been increasing the number of its inspectors over the years. Consultations with NSCS revealed, for instance, that as of 2023, NSCS had 21 government field inspectors, up slightly from 19 in 2019. Seed companies noted, however, that the number of inspectors was still inadequate and that the new ones had insufficient skills and capacity, especially with regard to crops that are uncommon (see right blue shaded box off step 3 of Figure 3.5). Moreover, there are other challenges that affect the mobility of inspectors during field inspection, including shortage of vehicles and fuel, sometimes resulting in no inspections conducted, delays, or fewer inspections than required (Mabaya et al., 2021), which shows an important gap between law and practice. These issues affect the quality of seed produced (Kuhlmann et al., 2022), and some consulted farmers noted cases where they planted certified seed that did not germinate.

Another gap between law and practice is that no private sector seed inspectors have been authorized to conduct inspections under compulsory certification, although the Seeds and Plant Act and Regulations,

¹⁰ §22(1) of the Seeds and Plant Regulations, 2017.

2017 allow for such,¹¹ which would be a good practice if implemented, as depicted in the green shaded box in step 3 of Figure 3.5. NSCS reported that this was because none of the seed companies could meet the capacity requirements for private seed certification accreditation under the Seeds and Plant Regulations.¹² Seed companies noted that they were unaware of the required competences or that there were specific guidelines in place. Even though 104 private para-inspectors have been recruited and trained by NSCS to inspect seed under the QDS scheme, they are scheduled to begin inspections in 2023, so the effectiveness of their work is yet to be evaluated.

There are also challenges in laboratory testing, as the national seed laboratory lost accreditation and is now in the process of reacquiring it (see dotted box off step 10 of Figure 3.5). While the NSCS revealed that seed is tested in accordance with ISTA standards in tandem with the Seeds and Plant Regulations,¹³ the private sector revealed that the absence of a national ISTA-accredited laboratory affects the legitimacy and acceptance of certified seed in regional and international markets. Moreover, there is only one private ISTA-accredited laboratory (see dotted box off step 10 of Figure 3.5), and it charges high fees and is often overwhelmed with testing orders, so it usually has a long result return time.

Persons aggrieved with the findings of the seed inspector or analyst are allowed to lodge appeals with the Seed Board within 24 hours (see red shaded boxes off steps 4 and 10 in Figure 3.5).¹⁴ Seed companies noted, however, that the Seed Board is not in place, and the Seeds and Plant Regulations are unclear on the procedure for appeal and form, thus the blue shading off of steps 4 and 10 of Figure 3.5 to reflect stakeholder experience that differs from the regulations. This gap essentially deprives the seed industry of fairness and due process, which are key principles where administrative decisions are exercised (Kuhlmann et al., 2022).

¹¹ §49 of the Seeds and Plant Regulations, 2017.

¹² §50 of the Seeds and Plant Regulations describe the requirements to be met for accreditation to conduct seed certification, including for laboratory seed testing, seed sampling, field inspection, and seed labelling.

¹³ §33(1a) of the Seeds and Plant Regulations, 2017.

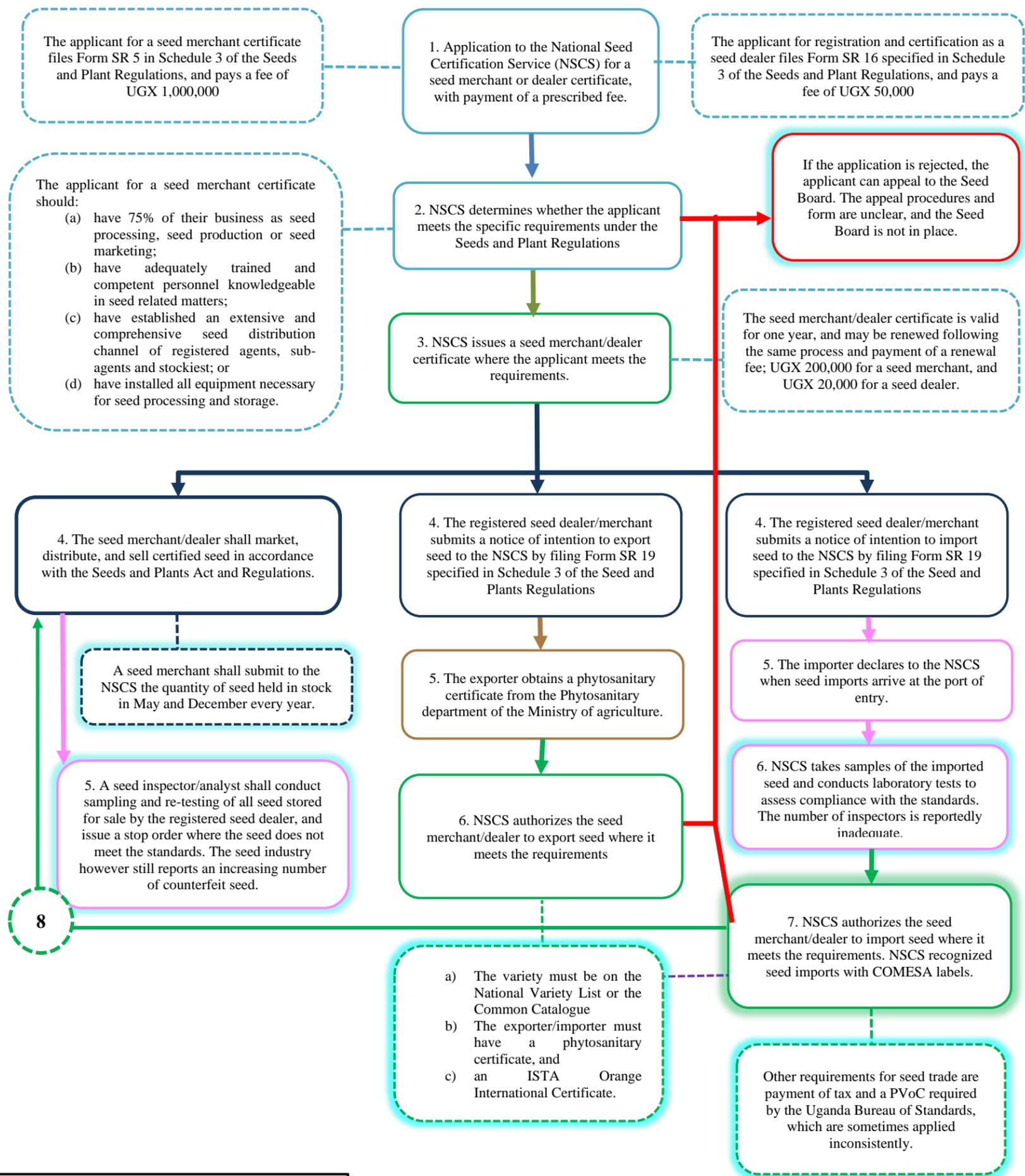
¹⁴ §55(1) of the Seeds and Plant Regulations, 2017.

Dimension Four: Seed Trade

Clear rules on seed trade are central to an enabling environment for vibrant local, regional, and international markets (Kuhlmann et al., 2022). Barriers to seed trade can negatively impact investment and delay farmers' access to improved seed varieties (Kuhlmann et al., 2022). In Uganda, stakeholder consultations revealed that most of the processes related to seed trade are quite clear, although a few implementation gaps and inconsistencies remain. Seed trade is regulated under various instruments, including the Seeds and Plant Act and its Regulations, the Plant Health and Protection Act and its Regulations, and the 2014 COMESA Seed Trade Harmonisation Regulations. Seed trade generally refers to the importation and exportation of seed with the following components: a) registration as a seed merchant or dealer, b) relevant import or export documentation, and c) authorizations and appeals.

Consultations revealed significant improvement in seed trade over the years, both through more streamlined rules and faster processes for obtaining import and export documentation. However, gaps do remain. First, the Seed Board does not exist in practice, pointing to the absence of an appeals body for administrative decisions related to seed trade (see blue-shaded box off steps 2, 6, and 7 of Figure 3.6). Second, the national laboratory is not ISTA-accredited, creating challenges for seed exports to wider regional and international markets when the importing country requires an OIC. Third, the Uganda National Bureau of Standards (UNBS) requires companies to present a pre-verification certificate of conformity (see blue shaded dotted box off step 7 of Figure 3.6), which seed companies stress adds no value to the quality of seed and results in a cost to farmers. Fourth, withholding tax payments are inconsistent, ranging between 1-6 percent. VAT may also be applied when there is a misclassification of seed as food during importation (see blue shaded dotted box off step 7 of Figure 3.6). Fifth, SPS measures for some crops, like vegetables, are reportedly not science-based. Sixth, counterfeit seed is prevalent, and there are no clear legal or regulatory procedures to report infringement to NSCS (see step 5 in far-left blue-shaded box of Figure 3.6). Lastly, NSCS inspectors to conduct border inspections and collect seed samples for testing are few (see step 6 in far-right, blue-shaded box of Figure 3.6). These issues are discussed in detail below.

Figure 3.6: Regulatory Systems Map on seed trade in Uganda



Source: Authors.

Registration as a Seed Merchant or Dealer is the first step of engaging in seed trade.¹⁵ Stakeholder consultations revealed that the process of getting certified as a merchant or dealer is not complicated in practice and can take a very short time, not exceeding one week, if the applicant meets all of the requirements. Seed companies also noted that the renewal process is quite clear and streamlined.

Obtaining Relevant Import/Export Documentation. Next, we examine the specific rules, gaps, and challenges related to importation and exportation of seeds. Seeds are generally considered to be high phytosanitary risk material, and their movement across borders require permits, certification documentation, pre-inspection or pre-clearance, designated entry ports, and post-entry quarantine (Kuhlmann et al., 2021; Jones, 2009). For seed importation into Uganda or exportation out of Uganda, one must obtain an import or export permit, respectively, from the NSCS, a phytosanitary certificate from the phytosanitary department in MAAIF, and an OIC from an importer or an exporter where required by an importing country (see step 4 of Figure 7).¹⁶ Consultations revealed that the procedures for acquiring these documents are quite clear and that importation or exportation can take up to two weeks when with all the required documentation is in place. In fact, stakeholders reported that Uganda recognizes seed imports with COMESA labels, indicating improved implementation of the COMESA Seed Trade Harmonisation Regulations. This is a notable good practice in Uganda's system, as depicted in the green shaded box in step 7 of Figure 3.6.

Challenges were only noted with regard to certain requirements that were considered by the industry to be unnecessary, yet with added cost, or applied inconsistently. First, the UNBS requires a PVoC for seed trade, something other countries like Kenya previously had and eliminated (in Kenya's case in 2019) (Mabaya, 2021). While USTA negotiated a waiver of the PVoC requirement with the UNBS for two seasons in 2022, seed companies noted that this requirement has been reinstated. Second, some companies were also concerned that some SPS measures relating to crops like vegetables were not science-based, including

¹⁵ §14 of the Seeds and Plant Regulations, 2017.

¹⁶ §45 and 46 of the Seeds and Plant Regulations, 2017.

requirements to test for diseases that either no longer pose a threat or do not exist in Uganda (Kuhlmann et al., 2023). Third, some seed companies were also unsure of the amount of tax they are supposed to pay, noting that withholding tax ranges between one and six percent and that sometimes VAT is charged where there is a misclassification of seed as food. This inconsistency in stakeholder experiences is highlighted in the blue shaded dotted box off step 7 of Figure 3.6.

The Seeds and Plant Regulations require that varieties that are imported are either on the national variety list or the Common Catalogue,¹⁷ which includes the COMESA Variety Catalogue. Consultations revealed, however, that in practice, the variety must be on the national variety list, and that varieties on the COMESA Variety Catalogue are still subject to one season of confirmation NPT testing prior to their inclusion on the national variety list, contrary to the COMESA seed rules, as depicted in the second yellow-shaded dotted box off step 3 of Figure 3.4. This could delay farmers' access to improved varieties in the COMESA Variety Catalogue and is contrary to the Seeds and Plant Regulations. Consultations with NSCS revealed that NSCS is working on knowledge building for the NVRC to recognize varieties on the COMESA Variety Catalogue and harmonization of the national variety list with the regional one.

Seed companies revealed that while all appeals in decisions related to authorizations of seed trade lie with the Seed Board, as depicted in the blue shaded red box off steps 2, 6, and 7 of Figure 3.6, in practice, the Board is not constituted, which is a challenge to transparency in making administrative decisions.

Quality Control During Seed Trade is another step under seed trade that is facing major challenges related to the increasing incidence of counterfeit seed. Under the Seeds and Plant Regulations,¹⁸ NSCS is to conduct random sampling of seed and issue stop orders where counterfeit seed exists, as depicted in see step 5 in far-left blue shaded pink box of Figure 3.6. Stakeholder consultations revealed, however, that this is not effective in practice, as most seed companies reported they had never been subject to such random checks, while others noted that the penalties are not punitive enough. MAAIF has agricultural officers who

¹⁷ §45(1)c) of the Seeds and Plant Regulations, 2017.

¹⁸ §41(6) of the Seeds and Plant Regulations, 2017.

do spot-checks and impound counterfeit seed. However, these practices were also reported to be ineffective, as they are stationed in Entebbe, while seed companies are mostly in Kampala and other areas of the country. Problematically, the Seeds and Plant Regulations do not include a procedure and form for reporting counterfeit cases to the relevant authorities (see blue-shaded red box off steps 2, 6, and 7 of Figure 3.6). As a result, many cases go unreported. The African Seed Access Index (TASAI) reported, for instance, that there were only three counterfeit cases reported to the government through the District Agricultural Officers (DAOs) in 2021, yet 65 cases were reported by seed companies to TASAI (Mabaya et al., 2021). In practice, counterfeit cases are reported to the DAO, who forwards them to the police for investigation. The police then forward a report to the Permanent Secretary in the MAAIF, which forwards it to the commissioner of NSCS, who assigns a seed inspector to the investigation (Mabaya et al., 2021). Consultations did not reveal whether any punitive action has been taken by NSCS against persons found to be in violation. Private sector stakeholders were also concerned that the government is at an advanced stage of starting a commercial public seed company to produce certified seed, which validation meetings identified as a market-distorting intervention.

4. RECOMMENDATIONS AND CONCLUSION

Even with Uganda’s comprehensive legal and regulatory framework for the seed sector, findings from this analysis indicate several challenges in the design and implementation of the seed rules. An outdated seed law, absence of clear appellate channels and bodies, and limited financial and human resource capacity to implement the seed regulatory environment all present challenges throughout the seed value chain. EGS is largely of poor quality and available on a limited basis due to lack of data on demand projections and a seed production plan, as well as absence of streamlined guidelines on access to EGS from PRIs and guidelines on conducting agricultural research. Under variety release and registration, challenges include a conflict of interest in relation to PRIs conducting variety evaluation trials, inconsistency in schedule of NVRC meetings, and infrequent updates to the national variety list. Seed quality assurance is affected by the lack of ISTA accreditation for the national laboratory and absence of authorized private seed inspectors. Seed exportation is made expensive by the inability of the national laboratory to issue an Orange ISTA Certificate (OIC), and seed importation is challenged by inconsistent application of the pre-export verification of conformity (PVoC) requirement, lack of harmonization between the national variety list and the regional COMESA Variety Catalogue, differing and inconsistent tax payments, and lack of scientific basis for SPS measures.

These challenges, however, present opportunities for interventions that can be categorized and prioritized as short-, medium-, and long-term. The recommendations—detailed below and summarized in Table 4.1 to Table 4.4—focus first on the short-term interventions that are already under development, followed by those that would require additional work to be undertaken, and, finally, those that would need to be initiated over the longer term. Across the recommendations, and as highlighted in the RSMs, opportunities arise for streamlining the seed policy, laws, and regulations; developing legal and regulatory capacity; and creating a more inclusive legal and regulatory system. Below are detailed proposals on addressing gaps under each regulatory dimension, categorized as short-, medium-, and long-term recommendations in the tables below.

Key Proposals to Improve EGS Production and Distribution

While the legal framework allows any entity to engage in agricultural research, relevant NARO guidelines are not yet in place, which affects the quality of parent material used in EGS production. NARO has now established an EGS Working Group to monitor the quality and quantity of EGS and ensure that it is produced in a timely manner and in the desired and demanded quantities. However, challenges of EGS quality continue to exist due to limited resources and capacity for production, as do challenges with projection of EGS demand. Moving forward, it will be important that NARO's capacity is improved to fund future EGS production. NARO Holdings Limited, an independent seed company, was created in 2016 and entered into a memorandum of understanding with NARO to produce EGS of NARO varieties on a cost-recovery basis. This is currently done under project funding and will need to become more self-sustaining in the future.

The digital STTS, which was developed by MAAIF to be used in the projection of EGS demand and placing of orders for basic seed by interested seed producers, is yet to be implemented in practice. This will have to be prioritized in order to improve adequate production of EGS and streamline the process of EGS demand and supply. Guidelines on EGS distribution will also have to be developed by NARO to streamline the process of EGS distribution.

The PVP framework is also relevant to including the private sector in varietal research and development and improving EGS availability through licensing of public varieties by the PRIs and possible sharing of genetic material. While the PVP Act is in place, it is not yet fully operational due to the absence of implementing regulations, which have been in draft form since 2019.

Key Proposals to Improve the Variety Registration and Release Process

The variety registration and release process remains one of the more challenging of the key regulatory dimensions. Issues include conflicts of interest with NARO conducting public testing, higher costs for variety testing in practice than established under law, unpredictable NVRC meetings, poor alignment with

regional seed rules, irregular updating of the national variety list, and an absence of an appeals body in practice, among other issues.

Key proposed interventions include establishing the Uganda Plant Health and Inspectorate Agency (UPHIA) with semi-autonomous and independent authority with oversight over the variety registration and release process. The Seeds and Plant Act and Regulations will also have to be reviewed and revised to align with the regional seed rules on variety release and registration under the COMESA Seed Trade Harmonisation Regulations of 2014 and include clear provisions on appeal procedures and forms. MAAIF could also consider revision of the Fees Schedule under the Seeds and Plant Regulations to include costs representative of Uganda's current economic situation, and support NSCS in mandating delegated variety testing institution(s) to adopt a fee structure. In order to ensure prompt release of improved varieties, MAAIF could facilitate regular sittings of the NVRC and implement the STTS to enable digital availability and regular updating of the national variety list. MAAIF could also constitute the Seed and Plant Tribunal, with adequate capacity to perform its roles of hearing appeals pertaining to variety release and registration decisions.

Key Proposals to Improve Seed Quality Assurance

In order for the seed sector to have confidence in seed quality, effective seed quality assurance measures have to be taken. The effect of this would be acceptance and legitimacy of produced seed in local, regional, and international markets. Within Uganda, over the years several measures have been taken to address gaps in seed quality maintenance, but several challenges continue to exist. A well- resourced quality assurance regulatory institution can have oversight regarding all issues related to ensuring high quality of produced certified seed and QDS. Under the Seed Policy,¹⁹ the UPHIA would be created as a semi-autonomous body with capacity to oversee activities related to seed certification and quality assurance. This body is not yet in place, and NSCS mentioned that it has challenges with effectively managing quality assurance due to

¹⁹ Clause 5.1.1 of the National Seed Policy, 2018.

budgetary constraints. Moving forward, the UPHIA could be put in place, and afforded enough capacity to implement its roles as they relate to quality assurance. Some consulted stakeholders proposed transformation of NSCS into UPHIA, with semi-autonomous authority and independence, which could improve its efficiency.

To alleviate some of the capacity stresses on NSCS, private seed inspectors could be accredited by NSCS to certify seed on its behalf, as provided for under the Seeds and Plant Regulations.²⁰ Consultations revealed that most seed companies engaged in local seed production still have limited capacity in terms of technical skills and resources. Companies noted though that they were unaware of the required expertise for accreditation by NSCS. MAAIF, with adequate support, could consider training private sector actors to meet the set criteria. MAAIF could also consider increasing the number of government inspectors and improving their technical and resource capacity to perform their roles. Consultations had noted, for instance, that most inspectors have experience in certifying staple crops like beans and maize, and, for some crops like Irish potatoes, there are no experienced government inspectors.

Due to the limited capacity of the NSCS seed inspectors, consultations revealed that there can be delays in inspections. MAAIF could consider prioritizing the implementation of the STTS so that field inspection results can be submitted in real time. This way, NSCS could have quick access to production data, which could be used in estimation of demand and address production inadequacies.

There also has to be a transparent and clear process of appeal in order for the seed sector to have trust in the efficiency of the certification and QDS quality assurance processes. Unfortunately, both the Seed Board and the Seed and Plant Tribunal that are meant to hear appeals of a field inspector's decision under compulsory certification and QDS are not constituted in practice. Companies mentioned that, if aggrieved, there is no recourse, and the appeal procedures regarding decisions related to seed quality assurance are generally unclear, lacking the mode and form of appeal. To address these gaps, MAAIF could consider revising the Seeds and Plant Regulations to include clear appeal procedures and properly constituting both

²⁰ Regulation 49 of the Seeds and Plant Regulations.

the Seed Board and Seed and Plant Tribunal. Some stakeholders also noted that the Seeds and Plant Act is quite outdated, having created bodies that essentially play no significant role in the modern seed industry. For instance, it is duplicative to have both a Seed Board and the Seed and Plant Tribunal hear appeals.

Key Proposals to Improve Seed Trade

Effective seed trade requires a streamlined regulatory framework at the national level. MAAIF has taken various initiatives to improve seed trade in Uganda, and more could be done. MAAIF should constitute the Seed Board, which is the appeals body for all administrative decisions made in relation to authorizations to engage in seed trade. MAAIF could also work to harmonise the national variety list with the COMESA Variety Catalogue and allow the importation of regionally registered varieties without requiring further varietal evaluation. MAAIF could further support USTA to negotiate with UNBS for elimination of the PVoC requirement.

MAAIF could also strengthen enforcement against the sale of counterfeit seed and revise the Seeds and Plant Act to include clear procedures and forms for reporting cases of trade in counterfeit seed. MAAIF could collaborate with the Ministry of Finance to revise taxes related to seed imports and build stakeholder knowledge of applicable rates. MAAIF could also implement the STTS to improve traceability of seed sold on the market. SPS measures, based on scientific evidence, should be better implemented.

Conclusion

Overall, Uganda is one of a few countries within sub-Saharan Africa with a very comprehensive legal and regulatory framework for seed. Commendably, some of the seed regulatory instruments are largely aligned with regional and international regulatory good practices and rules. However, despite the strength of the system overall, there remain a few regulatory gaps associated with the outdated seed law that does not align with all the other instruments that have been developed over the decade following its enactment, including the seed policy, strategy regulations, and regional seed rules. Moreover, implementation of these instruments also remains a considerable challenge. There are vast capacity and resource constraints both

within the public and private sectors, which ultimately impact private sector leverage of existing rules to invest in the seed sector and public sector enforcement of the rules. These regulatory and implementation gaps have affected farmer access to improved seed varieties and the quantity and quality of produced seed, negatively impacting the country’s food and nutritional security.

Table 4.1: EGS production and distribution

EGS production and distribution	
Existing issues	Recommendations
<i>Short-term recommendations</i>	
PRIs have limited financial and human resource capacity to adequately engage in breeding and varietal development.	Enhance financial and human resource capacity across PRIs.
Limited private sector engagement in variety acquisition, development, and research.	Prioritize the PVP Regulations to operationalize the PVP Act and encourage private sector investment in the seed industry.
<i>Medium-term recommendations</i>	
Absence of streamlined guidelines on conducting agricultural research.	Develop NARO guidelines on agricultural research in accordance with the National Agricultural Research Act.
Absence of streamlined guidelines on access to EGS from PRIs.	Develop NARO guidelines on EGS distribution to streamline the process of accessing EGS.
Poor quality and limited availability of EGS.	Further implement EGS quality assurance measures through the NSCS.
Absence of a seed production database to plan EGS production with seed market demand analysis, do forecasting and projections, set annual production targets, and identify intervention points to support market growth.	Prioritize implementation of the MAAIF digital seed tracking and tracing system (STTS) to streamline the process of EGS demand and projection.

Source: Authors.

Table 4.2: Summary of issues, relevant legal provisions, and recommendations for variety release and registration

Variety release and registration	
Existing issues	Recommendations
<i>Medium-term recommendations</i>	
Address conflict of interest in relation to PRIs conducting NPTs/VCU tests and DUS testing.	Create the Uganda Plant Health and Inspectorate Agency (UPHIA), a semi-autonomous and independent body called for under the 2018 Seed Policy to replace the NSCS as the entity responsible for variety release.
The NVRC usually does not sit as often as scheduled due to limited resources. The NVRC sat once in 2019, 2021, and 2022; but not at all in 2020. The NVRC is scheduled to sit once in 2023, instead of the two legally mandated annual sittings.	Prioritize regular meetings and adequate funding for the NVRC.
The national variety list is not updated regularly, which affects seed sector access to approved improved varieties.	Prioritize the implementation of the STTP to digitally house the national variety list and keep it regularly updated.
<i>Long-term recommendations</i>	
The Seeds and Plant Tribunal, which is the legal appeals body identified to hear decisions on variety evaluation and release, does not exist in practice, and the Seeds and Plant Regulations are unclear on the timelines, procedure, and form of lodging appeals.	Revise the Seeds and Plant Regulations to better define the appeals process and constitute the Seed and Plant Tribunal (MAAIF).
The Seeds and Plant Act of 2006 is outdated and not aligned with the COMESA Seed Trade Harmonisation Regulations, 2014.	Revise both the Seeds and Plant Act and Regulations to align the variety release and registration procedures with the regional seed rules under COMESA.
The variety release and registration process under the Seeds and Plant Regulations is not aligned with the COMESA Seed Trade Harmonisation Regulations, as it does not allow any flexibilities regarding release of varieties on the COMESA Variety Catalogue or registered in other COMESA Member States, contrary to COMESA regional seed rules.	Conduct ongoing capacity building for both stakeholders in the public and private sectors on regional seed rules and their impact on Uganda’s seed trade.
While not included in the Seed Act or Seed Regulations, in practice, varieties that are registered in a regional economic community of which Uganda is a member are subject to a confirmation NPT for one season, which is not aligned with regional seed rules under COMESA.	
NARO, which conducts variety evaluation on behalf of and under the oversight of NSCS, charges higher fees than those prescribed in the regulations and does not have a predictable set fees schedule.	Revise the Fees Schedule under the Seed Regulations to be reflective of current economic conditions, as proposed by stakeholders. Mandate authorized institutions to conduct evaluation tests on NSCS’ behalf to apply the legally mandated fees.

Source: Authors.

Table 4.3: Summary of issues, relevant legal provisions, and recommendations for seed quality assurance

Seed quality assurance	
Existing issues	Recommendations
<i>Short-term recommendations</i>	
Limited capacity of NSCS in terms of inadequate staffing, limited staff mobility due to few vehicles and limited availability of fuel, inconsistency in implementing testing, and limitation in seed tracking systems in relation to field inspection for seed quality assessments.	Implement the STTS to enable NSCS to monitor and oversee field inspections in real time, which would speed up the certification process. The STTS could also record production data, which can be used to project demand.
Consultations reported inadequate supply of certified seed due to absence of demand projections.	Support NSCS to recruit new inspectors and improve the capacity of existing ones, including providing them with the necessary equipment to perform their roles.
Limited private sector involvement in the seed quality assurance process, which causes delays for private seed companies and impedes farmers' access to seed.	Support MAAIF in conducting training and capacity building for the private sector actors to meet the required technical expertise for technical competence for accreditation.
No private seed inspectors of any seed company have ever been authorized to certify seed under mandatory certification, nor were private seed companies interviewed aware of the criteria for such accreditation. The 104 private inspectors trained and authorized by NSCS to inspect seed under QDS have not started operations yet.	
Both public and private sector stakeholders reported laboratory capacity gaps in terms of finance, human resources, and facilities. The national seed laboratory does not have ISTA accreditation, which is called for under international seed testing standards and regional practices.	Support MAAIF to build the resource, technical, and financial capacity of the national seed laboratory and prioritize the process for obtaining ISTA accreditation.
<i>Long-Term Recommendations</i>	
Appeals of decisions by a seed inspector under compulsory certification lie with the Seed Board and with the Seed and Plant Tribunal under QDS, but neither the Seed Board nor the Seed and Plant Tribunal is in place, and the procedures and form for lodging an appeal are not specified.	Revise the Seeds and Plant Act to include one body with appeal roles, and revise the Seeds and Plant Regulations to include clear provisions on appeal procedures and forms. MAAIF could constitute the Seed Board and Seed and Plant Tribunal and facilitate their operation as required.

Source: Authors.

Table 4.4: Summary of issues, relevant legal provisions, and recommendations for seed trade

Seed trade	
Existing issues	Recommendations
<i>Short-term recommendations</i>	
With the national laboratory lacking ISTA accreditation, seed exports to wider regional and international markets are a challenge for some companies where the importing country requires an Orange ISTA Certificate (OIC).	Enhance the resource, technical, and financial capacity of the national seed laboratory and prioritize ISTA accreditation.
USTA negotiated with UNBS for a waiver of the pre-export verification of conformity (PVoC) requirement, which seed companies assert adds no value to the quality of seed and adds a cost that is transferred to farmers, but it was unclear whether it would be reinstated.	USTA could negotiate with UNBS, with MAAIF's support, for permanent elimination of the PVoC requirement.
The Seed Board, which is the appeals body, does not exist in practice. Moreover, the process and form of appeal to the Seed Board is not clear under the Seeds and Plant Regulations.	MAAIF could constitute the Seed Board and revise the Seeds and Plant Regulations to include clear procedures and forms of appeal to the Board.
Varieties to be imported must be on the national variety list, yet the national variety list is not harmonized with the regional COMESA Variety Catalogue, nor is the variety release process aligned with COMESA seed rules.	Build NVRC capacity to recognize varieties on the COMESA Variety Catalogue, and support MAAIF to harmonize the national variety list with the COMESA Variety Catalogue.
Limited number of NSCS inspectors to conduct border inspections and collect seed samples for testing.	Border inspectors could be increased and equipped with the relevant technical, resource and financial support to conduct their duties.
<i>Long-term recommendations</i>	
Consultation with seed companies revealed differing and inconsistent tax payments, ranging from 1-6 percent, sometimes with VAT also applied when there is a misclassification of seed as food products during importation.	MAAIF could engage with the Ministry of Finance to revise taxes related to seed imports and build stakeholder knowledge about applicable tax rates.
For some crops, like vegetables, some seed companies noted that SPS measures are not science-based.	SPS measures should be science-based, consistent with WTO and regional trade rules.
There is an increasing incidence of counterfeit seed, without clear legal or regulatory procedures for enforcement by NSCS.	Support MAAIF to implement the STTS to improve traceability of seed sold on the market and strengthen enforcement against sale of counterfeit seed. Revisions to the Seed Act are also needed to include clear procedures and forms for reporting cases of trade in counterfeit seed.

Source: Authors.

REFERENCES

- ASTI (Agricultural Science and Technology Indicators), 2023. Uganda data download. [Database]. Washington, DC, IFPRI. <https://www.asti.cgiar.org/uganda?country=UGA>.
- Bagamba, F., P.R. Ntakyo, G. Otim, D.J. Spielman, and B. Van Campenhout, 2023. “Policy and Performance in Uganda’s Seed Sector: Opportunities and Challenges.” *Development Policy Review*, 41(3), e12665.
- Barriga, A. and N. Fiala, 2020. “The supply chain for seed in Uganda: Where does it go wrong?” *World Development*, 130, 104928.
- BMGF/USAID (Bill and Melinda Gates Foundation/United States Agency for International Development), 2015. “Early Generation Seed Study.” Seattle, WA and Washington, DC: BMGF and USAID. URL: <https://agriknowledge.org/downloads/dv13zt22g>.
- COMESA Seed Trade Harmonisation Regulations, 2014. URL. <https://www.aatf-africa.org/wp-content/uploads/2021/02/COMESA-Seed-Trade-Harmonisation-Regulations-English.pdf>.
- Diirro, G., D. Kawooya, T.J. Lybbert, and S. Wunsch-Vincent, 2023. “Upstream Innovation Leakage in Uganda’s coffee Planting Material Pipeline. *European Review of Agricultural Economics*, 50(3), 1013–1038.
- ECAPAPA (Eastern and Central Africa Program for Agricultural Policy Analysis), 2003. Variety Evaluation, Release and Registration, ECAPAPA Policy Brief no. 3. Entebbe: Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA).
- Government of Uganda. National Agricultural Research Act, 2005. URL: https://www.ulrc.go.ug/system/files/force/ulrc_resources/national-agricultural-research-act-2005.pdf.
- Heemskerk, W., I. Rwomushana, E. Asiedu, J. C. Rubyogo, F. Miti, S. Traore, H. Odame, C. Lungaho, E. Maereka, D. Kiambi, S. Tindimubona, S. Dagnoko, T. Abate, R. Vernooy, C. Fadda, and L. Sperling, 2017. “Access to Foundation Seed of Varieties in the Public Domain.” KIT Working Paper 2017-5. Amsterdam: KIT.
- ISSD (Integrated Seed Sector Development) Uganda. Early Generation Seed. URL: http://issduganda.org/our_projects/early-generation-seed/.
- Jones, J. 2009. “Phytosanitary Measures and the International Seed Trade.” *Responding to the Challenges of a Changing World: The Role of New Plant Varieties and High-quality Seed in Agriculture*, p 213. Proceedings of The Second World Conference. FAO Headquarters, Rome, September 8-10. URL: https://www.upov.int/edocs/pubdocs/en/upov_pub_354.pdf.
- Kuhlmann, K. 2021. “Mapping Inclusive Law and Regulation: A Comparative Agenda for Trade and Development.” *African Journal of International Economic Law* 2, 48–87.
- Kuhlmann, K., and B. Dey, 2021. “Using Regulatory Flexibility to Address Market Informality in Seed Systems: A Global Study.” *Agronomy*, 11(2), 377.
- Kuhlmann, K., B. Dey, M. Mekuria, A. Nagayi Nalinya, and T. Francis, 2022. “Development and Comparison of Seed Regulatory Systems Maps in Ethiopia.” Feed the Future Global Supporting Seed Systems for Development Activity Report. URL: https://pdf.usaid.gov/pdf_docs/PA00ZJ3Z.pdf.
- Kuhlmann, K., T. Francis, I. Thomas, and P. Schreinemachers, 2023. “Laws and Regulations Enabling and Restricting Africa’s Vegetable Seed Sector.” *International Journal of Agricultural Sustainability*, 21:1. URL: <https://doi.org/10.1080/14735903.2023.2210005>.

- Kuhlman, K., Z. Yuan, and S. Keating, 2019. “Seed Policy Harmonization in COMESA and SADC: The Case of Zambia.” Manuscript.
- Kuhlmann K. et al. 2016. “Legal Guide to Strengthen Tanzania’s Seed Input Market.” Report prepared by New Markets Lab with the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) Centre Ltd. for the Alliance for a Green Revolution in Africa (AGRA) and U.S. Agency for International Development (USAID), April. <https://data.landportal.info/file/27829/download>
- Kuhlmann, K. 2015. “Harmonizing Regional Seed Regulations in Sub-Saharan Africa: A Comparative Assessment.” Syngenta Foundation for Sustainable Agriculture Seeds2B Initiative [Report]. Basel: Syngenta Foundation for Sustainable Agriculture.
- Mastenbroek, A., and B. Ntare. 2016. “Uganda Early Generation Seed Study: Unlocking Pathways for Sustainable Provision of EGS for Food Crops in Uganda.” Wageningen UR Centre for Development Innovation Report no. CDI-16-030. Wageningen, Netherlands: Wageningen UR Centre for Development Innovation. URL: <https://edepot.wur.nl/395913>.
- Mastenbroek, A., G. Otim, and B.R. Ntare, 2021. “Institutionalizing Quality Declared Seed in Uganda.” *Agronomy*, 11, 1475. URL: <https://doi.org/10.3390/agronomy11081475>.
- Mabaye, E., M. Waithaka, K. Tihanyi, M. Mugoya, G. Kanyenji, R. Ssebuliba, and M. Kyotalimye, 2021. “Uganda 2020 Country Study.” The African Seed Access Index. URL: https://wp.tasai.org/wp-content/uploads/2022/06/uga_2020_en_country_report_apr2022_web.pdf.
- Otim, G., B. Ntare, and G. Arnab, 2020. “Assessment of The Performance of The Seed Subsector Regulatory and Institutional Framework in Uganda.” Integrated Seed Sector Development Uganda. URL: <http://issduganda.org/wp-content/uploads/2022/06/assessmentoftheperformanceoftheseedsubsectorregulatoryandinstitutionalframeworkinuganda.pdf>.
- Shiferaw, B., T. Kebede, M. Kassie, and M. Fisher, 2015. “Market Imperfections, Access to Information And Technology Adoption in Uganda: Challenges of Overcoming Multiple Constraints.” *Agricultural Economics*, 46(4), 475-488.
- Spielman, D.J., and M. Smale, 2017. “Policy Options to Accelerate Varietal Change among Smallholder Farmers in South Asia and Africa South of the Sahara.” IFPRI Discussion Paper no. 01666. Washington, DC: IFPRI.
- UPOV (International Union for the Protection of New Varieties of Plants). Status in Relation to the International Union for the Protection of New Varieties of Plants (UPOV), as of September 18, 2022. URL: <https://www.upov.int/export/sites/upov/members/en/pdf/status.pdf>
- Van Campenhout, B., D.J. Spielman, and E. Lecoutere, 2021. “Information and Communication Technologies to Provide Agricultural Advice to Smallholder Farmers: Experimental Evidence from Uganda.” *American Journal of Agricultural Economics*, 103(1), 317–337.

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