



Case Study on Regional Harmonization for Vegetable Crop Varieties

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Executive Summary

Improved vegetable seed varieties can contribute significantly to improved nutrition and food security. Within sub-Saharan Africa, the vegetable seed industry is relatively nascent, yet it holds considerable potential and currently employs a significant portion of the population in the agricultural sector, especially among small farmers. Although the market for vegetable seed is growing in Africa, to date, there has been little focus on the enabling environment for vegetable seed. Vegetable crops have different properties than grain crops, calling for different policy, legal, and regulatory approaches. Yet, based on analysis of national legal instruments and consultations with public and private sector stakeholders, policymakers reportedly often do not recognize distinctions between vegetable seed and other crops. This partly results from low capacity in some countries to regulate, with regulatory experience focused on other crops like maize, and it affects the development of the formal vegetable seed industry and opportunities for small farmers alike.

Regional regulatory harmonization initiatives for seed also do not address the unique nature of vegetable crops. With the exception of the Economic Community of West African States (ECOWAS), which includes tomatoes and onions as part of its eleven focus priority crops, no other Regional Economic Community (REC) includes vegetable crops among specific focus crops. This includes the Common Market for Eastern and Southern Africa (COMESA), the Southern African Development Community (SADC), and the East African Community (EAC), the latter of which has most recently developed new (draft) seed regulations. Stakeholders consulted by the New Markets Lab noted that there is very limited understanding of the rules applicable to vegetable crops at both the national and regional levels. This knowledge gap is exacerbated both by inconsistent implementation of national rules and because regional rules are largely silent on treatment of vegetable crops, with each country applying different rules at the national level. While these gaps may favor certain stakeholder in the short run, ultimately, they will affect the ability of stakeholders to benefit from the presence of a regulatory framework on vegetable seed, even where flexibilities exist.

While some countries have less stringent requirements for vegetable crops in regulatory areas such as variety registration and release, certification, trade, and plant variety protection (PVP) or plant breeders' rights (PBR), these approaches are not consistent either as written or as applied. These differences in national regulatory systems for vegetable seed raise questions as to whether there is a case to be made for regional harmonization of rules on vegetable seed. While regional harmonization is intended to streamline regulatory processes and establish common approaches and systems along the seed value chain, national seed systems play a primary role in regulation of seed systems and the implementation of regional rules.

This case study specifically focuses on the vegetable seed industry in four countries, all of which are focus countries under the Partnerships for Seed Technology Transfer in Africa (PASTTA) project and Seeds2B initiative, namely Kenya, Malawi, Nigeria, and Senegal, highlighting national regulatory approaches, challenges, and elements that may make the case for (or against) regional harmonization. While this case study focuses mainly on these four countries, it also references alternative vegetable seed regulatory approaches, regulatory flexibilities,² and good practices adopted by other countries. It also builds upon work that the New Markets Lab has done on vegetable seed regulation with the World Vegetable Center (WVC), which is a significant partner in vegetable seed systems across countries.

In each of the four focus countries, the processes of variety registration and release, certification, trade and PVP of vegetable seed are regulated differently, although there are some similarities. For instance, under variety registration and release, all four countries, with the exception of Kenya and Senegal, require two seasons of mandatory testing for both distinctness, uniformity, and stability (DUS) and value for cultivation and use (VCU) before a new variety can be released into the market. For vegetable seed, this goes against the good practice of exempting vegetable seed from VCU testing due to the considerable variability in these crops and diversity in consumer preference. However, even in Kenya and Senegal, where the VCU test is optional under Kenya and Senegal's seed laws, stakeholder consultations have revealed that it is still applied in practice.

Certification of seed is mandatory prior to commercialization in all of the four countries, without flexibilities or exemptions for vegetable seed. Again, this is inconsistent with good practices for vegetable seed, which is not subject to mandatory certification in a number of countries globally. Stakeholders consulted in all of the focus countries reported that they generally have no challenges certifying vegetable seed, except that some certifying authorities have limited capacity to inspect the fields and test vegetable seed. In Senegal for instance, private sector stakeholders noted that while certification of vegetable seed is mandatory, no certification is done in practice due to capacity constraints.

² See Katrin Kuhlmann, *Flexibility and Innovation in International Economic Law: Enhancing Rule of Law, Inclusivity and Resilience in the Time of COVID-19*, AFRONOMICSLAW SYMPOSIUM ON THE VULNERABILITY IN THE TRADE AND INVESTMENT REGIMES IN THE TIME OF COVID-19 2020, (August 10, 2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3694903; See also Katrin Kuhlmann and Bhramar Dey, *Using Regulatory Flexibility to Address Market Informality in Seed Systems: A Global Study*, *AGRONOMY* 11 (2) 377 (2021), <https://www.mdpi.com/2073-4395/11/2/377>

Besides Nigeria, vegetable seed is not considered a priority crop under any of the other focus countries' policy instruments, and, as a result, institutional and regulatory capacity do not yet fully exist to address issues related to vegetable crops as compared with field crops. To address the institutional capacity gaps in the public sector, Kenyan and Nigerian seed laws authorize private seed inspectors. Kenya also recognizes standard seed as a seed class for vegetable crops in tandem with the Organization for Economic Cooperation and Development (OECD) seed scheme for vegetable seed. The primary mandate of ensuring that standard grade vegetable seed meets the minimum standards rests with the seed producer, with oversight of the government certifying agency, which reduces the workload for the public sector and facilitates commercialization of vegetable crops. All focus countries require that seed varieties are listed in the national seed catalogue prior to sale and trade in the respective countries. Stakeholder consultations revealed that Malawi makes an exemption in practice for sale of imported vegetable seed that is not listed in the national catalogue, because the regulatory system has not yet developed to effectively cover vegetable seed. Malawi (with the exception of vegetable seed from COMESA and SADC)³ and Nigeria also require an International Seed Testing Association (ISTA) Orange certificate, which stakeholders have reported to be inappropriate for vegetable seed trade, again based on global good practices, and expensive. Stakeholders have noted that compliance with phytosanitary requirements can also be a problem in most countries. National authorities require testing for many pests and diseases, which includes testing for pests and diseases that are unnecessary in terms of risk for vegetable crops.

Within the focus countries, PVP/PBR laws only exist in Kenya and Malawi, although Nigeria has developed a draft PVP law that has advanced in the legislative process. Senegal does not have a PVP/PBR legal framework in place, despite its membership in the Organisation Africaine de la Propriété Intellectuelle (OAPI), which requires PBR protection region-wide. Stakeholders in Senegal and Nigeria noted that the absence of a legal framework to provide intellectual property protection for new vegetable varieties acts as a disincentive to investment in the sector, as breeders are concerned that their varieties could be used without adequate protection and recourse. Stakeholders in Kenya and Malawi revealed that even though PVP/PBR frameworks exist, they are loosely applied when it comes to vegetable seed, and effective implementation remains a challenge.

Consultations conducted by NML in 2020 have signaled that regulatory inconsistencies related to treatment of vegetable crops at the national level could give rise to the uncertain treatment of vegetable crops both nationally and in regional markets, highlighting that some sort of regional approach for vegetable seed might be desirable over the longer term in order to drive development of vegetable seed sectors and regional trade in vegetable seed. Regionally harmonized rules on seed variety registration and release, certification, and seed trade in the main RECs have focused mostly on cereals, grains, legumes, and vegetatively propagated crops, but most systems are silent on the treatment of vegetables. The following findings and recommendations, discussed in further detail in this case study, present options that could be considered in the context of harmonization of rules relating to vegetable seed.

³ New Markets Lab Consultations with Stakeholders, September/October 2020.

- At the national and regional levels, institutional and regulatory changes could be adopted to highlight the relevance of vegetable seed and streamline the processes of vegetable variety release and registration, certification, trade, and PVP.
 - Focus countries could prioritize vegetable seed in their seed policy instruments and establish a strategic implementation plan aimed at improving the institutional and regulatory framework for vegetable seed.
 - Vegetable crop should also be prioritized at the regional level, building upon the example set by ECOWAS.

Regional frameworks could consider vegetable seed regulatory flexibilities that appear at the national level. For variety registration and release these include:

- Incorporation of a regional exemption from VCU for vegetable crops and development of vegetable variety registration and release protocols for DUS, similar to what ECOWAS has done for tomato and onion under the 2008 ECOWAS Procedure Manual on Variety Release and Registration. This would allow vegetable seed producers to benefit from a wider market created by regional harmonization and expedite the variety registration process.
- With regard to variety registration and release in ECOWAS, the ECOWAS Procedure Manual on Variety Release and Registration should include protocols for more vegetable crops than just tomato and onion.
- With regard to certification, regional regulatory frameworks could address the unique nature of vegetable seed and integrate the informal sector, which forms the largest part of the seed system in the focus countries and which is where indigenous varieties are mostly traded. Flexibilities that could be adopted include:
 - Regional recognition of standard seed and QDS (building on the SADC model) as seed classes for vegetable seed. This could make the process of vegetable seed quality assurance more cost and time effective and address public sector institutional gaps in vegetable seed certification at the national level.
 - Regional recognition of authorization of private seed inspection and testing as a good practice that could be applied at the national level to make the certification process more time and cost effective.
 - RECs could develop standard operating procedures and harmonized minimum certification standards for vegetable seed for adoption at the country level to ensure that high quality standards are met. Minimum standards could be developed at the regional level that differ for exotic and traditional varieties, considering that they have developed differently in the market.
- For improved cross-border trade of vegetable seed, flexibilities could include:
 - Adoption of a regional pest list for vegetable crops that is risk-based and reflects regional quarantine and phytosanitary conditions.
 - Specific vegetable crop pest lists should be developed and adopted in all the focus countries. These could be harmonized with the regional pest list and quarantine and phytosanitary assessments should be risk-based.

- PVP/PBR regulatory frameworks could be referenced in regional seed rules, building upon the SADC and (draft) EAC models. Implementation could also be strengthened regionally and nationally to enable effective protection for vegetable varieties.
- At both the regional and national levels, knowledge building should be done to enable stakeholders to benefit from the regulatory provisions on vegetable variety registration and release, certification, trade and PVP.

Overview of National Regulatory Approaches Relating to Vegetable Varieties

The majority of improved vegetable varieties grown in Kenya, Malawi, Nigeria, and Senegal are imported (see Table 1 below), while the rest of vegetable seed trade consists of traditional vegetable varieties that are mainly produced in the informal sector. The vegetable industry employs a large portion of the population, because vegetable production in all of the focus countries is common among small farmers and is associated with more income per hectare of land cultivated as compared to staple crops.⁴ In Kenya for instance, production of vegetable crops assures the producer a profit of over 75 percent.⁵ This is because vegetables take less time to mature, and the market demand in the focus countries is readily available due to large populations⁶ and the nutritional value attached to consumption of vegetables.

Vegetables grown in Kenya include kale, tomatoes, onions, carrots, cabbage, French beans, and traditional vegetables (amaranth, aubergines, courgettes, pumpkin leaves, black nightshade, sun hemp, jute plant, pigweed, and spider plant). The export market for vegetables in Kenya is also growing steadily, and the value of vegetable exports has increased by 11.2 percent from US\$182 million in 2014 to USD 203 million in 2015.⁷ In Nigeria, vegetables grown include onion, tomato, okra, pepper, amaranth, carrot, corchorus

⁴ New Markets Lab and World Vegetable Center, Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa, forthcoming, May 2021. See also, Katrin Kuhlmann and Kimberly Flowers, The Human Face of Trade and Food Security: Lessons on the Enabling Environment from Kenya and India, Center for Strategic International Studies, A Report of the Global Food Security Project, 2017. Available at: https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/171206_Kuhlmann_HumanFaceFoodSecurity_Web.pdf.

⁵ P. Nekesa and B. Meso, Traditional African Vegetables in Kenya: Production, Marketing and Utilization, Organic Matter Management Network, Kenya. Available at: https://www.bioversityinternational.org/fileadmin/bioversity/publications/Web_version/500/ch14.htm. See also, Katrin Kuhlmann and Kimberly Flowers, The Human Face of Trade and Food Security: Lessons on the Enabling Environment from Kenya and India, Center for Strategic International Studies, A Report of the Global Food Security Project, 2017. Available at: https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/171206_Kuhlmann_HumanFaceFoodSecurity_Web.pdf.

⁶ Katrin Kuhlmann, The Human Face of Trade and Food Security: Lessons on the Enabling Environment from Kenya and India, Centre for Strategic and International Studies, 2017. Available at: https://csis-prod.s3.amazonaws.com/s3fs-public/publication/171206_Kuhlmann_HumanFaceFoodSecurity_Web.pdf?UIIn_uS4Z6IoUMSi727Q8OrUyHfGnehl

⁷ Horticulture Study: Mapping of Production of Fruits and Vegetables in Kenya, 2017. Available at: <https://www.agroberichtenbuitenland.nl/binaries/agroberichtenbuitenland/documenten/rapporten/2017/03/01/mapping-of-production-of-fruits-and-vegetables-in-kenya/Scoping-horticultural-study-Kenya-2017.pdf>.

olitorus (ewedu), Hibiscus sabdariffa (sobo), and baobab leaves.⁸ Significant quantities of vegetables are produced annually, which underscores the relevance of the industry. For instance, 16.4 million tonnes of vegetable were produced in 2018, an increase of 20.9 percent since 2014.⁹ Annual production for individual vegetable crops is also high, including 3.8 million tonnes of onions and 6 million tonnes of tomatoes produced annually.¹⁰ In Malawi,¹¹ carrots, cabbage, tomatoes, onion, garlic, and cucumber are the main vegetables grown, while in Senegal the main vegetables include green bean, onion, tomato, red pepper, jaxatu, potato, sweet potato, okra, and eggplant.¹² Stakeholder consultations indicated that the majority of improved vegetable varieties are imported, while in Malawi it was reported that the regulatory framework and institutional capacities have not yet developed and, as a result, all improved vegetable varieties are imported.¹³

Table 1: Volume and Cost of Vegetable Seed Imports in Focus Countries¹⁴

Importing Countries	2016		2017		2018		Top Exporting Countries
	Qty (MT)	Value (Mil USD)	Qty (MT)	Value (Mil USD)	Qty (kg)	Value (Mil USD)	
Kenya	N/A	N/A	444	12.17	481	13.16	USA, India, Japan and Italy
Malawi	48	0.98	39	0.78	N/A	N/A	South Africa and USA
Nigeria	N/A	N/A	0	2.16	126	1.9	France, USA and China

⁸ Okoli N. et al., Fruit and Vegetable Crop Production in Nigeria: The Gains, Challenges and The Way Forward, Journal of Biology, Agriculture and Healthcare, ISSN 2225-093X (Online) Vol.5, No.2, 2015. Available at: www.iiste.org.

⁹ See, <https://knoema.com/atlas/Nigeria/topics/Agriculture/Crops-Production-Quantity-tonnes/Vegetables-primary-production>.

¹⁰ Ibeawuchi I. et al., Fruit and Vegetable Crop Production in Nigeria: The Gains, Challenges and The Way Forward, Journal of Biology, Agriculture and Healthcare www.iiste.org ISSN 2224-3208 (Paper) ISSN 2225-093X (Online) Vol.5, No.2, 2015.

¹¹ Frank Joosten, Development of a Horticultural Fresh Produce Supply Chain in Malawi: Report on a Scoping Mission (September 2013). Available at: <https://edepot.wur.nl/292798>.

¹² Senegal National Variety Catalogue.

¹³ New Markets Lab Consultations with Stakeholders, September/October 2020.

¹⁴ *Product: Vegetable seeds, of a kind used for sowing (120991)*, AGRI EXCHANGE, <http://agriexchange.apeda.gov.in/Home.aspx>. See also, New Markets Lab and World Vegetable Center, Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa, forthcoming, May 2021.

Senegal	228	8.28	226	6.63	223	8.71	France, USA	Netherland,
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Vegetable seed breeding and production are unique from most agronomic crops. For example, vegetable crops have a large number of varieties, and consumer preferences vary widely in terms of shape, colour, size, yield and flavor, among other qualities, making it more difficult to standardize suitability within a geographic region.¹⁵ Vegetable seed breeding and production are sensitive to extreme weather conditions, and poor weather conditions can affect the vegetable yield, quality, flavor, and other important plant qualities.¹⁶ Climate change in most sub-Saharan African countries is producing increasingly erratic rainfall and, at times, severe temperatures, which has far-reaching impacts on vegetable production and breeding.¹⁷

As a result, most African countries lack a domestic research base and/or productive capacity and heavily rely on imports for much of their vegetable seed requirements. The limited capacity and public research on vegetable crops has an impact on the suitability of regulation as well, as a national system may not effectively regulate what it does not substantially understand. For instance, very few countries in sub-Saharan Africa have included vegetable seed as a priority focus crop at the national level or built regulatory flexibilities for vegetable seed into national seed laws (see Table 2 below on policy, legal and regulatory flexibilities for vegetable seed in selected sub-Saharan African countries, which is based on a comparative study done by the New Markets Lab with the World Vegetable Center).

The gap in national legislation with regard to vegetable seed also affects the suitability of regulation at the regional level, as national seed legislation shapes the focus of seed rules at the regional level. It thus follows that since tailored national regulation of vegetable seed is still at the nascent levels in some countries (or absent in others), the RECs in sub-Saharan Africa, with the exception of ECOWAS, have, to some extent, not focused regional seed rules on vegetable crops. This has resulted in overly restrictive rules and regulations related to vegetable seed at both the national and regional levels. Although, as stakeholder consultations indicated, this may not be of immediate consequence due to the prevalence of imports and inconsistent implementation of national law, over the long term it will likely be a significant factor that could impede the development of both national and regional

¹⁵ Food and Agriculture Organization of the United Nations, Seeds Toolkit: Seed Sector Regulatory Framework, 2018. Available at: <http://www.fao.org/3/ca1493en/CA1493EN.pdf>.

¹⁶ Williams, P. A., Crespo, O., & Abu, M. (2018a). Assessing vulnerability of horticultural smallholders to climate variability in Ghana: Applying the livelihood vulnerability approach. *Environment, Development and Sustainability*. <https://doi.org/10.1007/s10668-018-0292-y>.

¹⁷ Williams, P. A., Crespo, O., & Abu, M. (2018a). Assessing vulnerability of horticultural smallholders to climate variability in Ghana: Applying the livelihood vulnerability approach. *Environment, Development and Sustainability*. <https://doi.org/10.1007/s10668-018-0292-y>. See also, Olushola Fadaido, et al., Perceived Livelihood Impacts and Adaptation of Vegetables Farmers to Climate Variability and Change in Selected Sites From Ghana, Uganda, and Nigeria, *Environment, Development and Sustainability*, 2019. Available at: <https://link.springer.com/article/10.1007/s10668-019-00514-1#ref-CR45>.

vegetable systems. The following sections will examine how each of the focus countries regulates vegetable seed under the key issue areas that are also the focus of regional regulation (variety registration and release, certification, and cross border trade), benchmarking them against good practices adopted by other countries and highlighting options for regional focus.

Table 2: High-Level Findings from Legal and Regulatory Review Showing “Regulatory Flexibility” in Policy Instruments

<i>Countries</i>	Specific objectives for vegetable seed in seed policy	Specific rules/flexibilities for vegetable seed in seed law	Specific guidelines/regulations for vegetable seeds
<i>Benin</i>	N/A	✓	
<i>Burkina Faso</i>			
<i>Ethiopia*</i>		✓*	
<i>Ghana</i>			
<i>Kenya</i>		✓•	N/A
<i>Malawi</i>	✓		✓•*
<i>Mali</i>		✓•	N/A
<i>Nigeria</i>		✓•†	✓•
<i>Senegal</i>			N/A
<i>Tanzania</i>		✓•†	✓•
<i>Uganda</i>			✓•
<i>Zambia</i>	✓	✓	N/A
<i>Zimbabwe</i>		✓•†	N/A

•Rule or flexibilities exist in the testing procedures for variety release and registration

*Laws are currently under consideration and have not been implemented

†Flexibilities exist in field and lab testing standards for specific vegetable varieties

N/A: Information not available

Source: New Markets Lab and World Vegetable Center, “Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa” forthcoming, May 2021.

1. Variety Registration and Release of Vegetable Crops

Most countries in sub-Saharan Africa mandate that crops go through a regulatory process for variety registration and release before they can be commercialized and sold to farmers. The variety registration and release process, with the exception of a few countries, generally requires that government supervised tests be conducted to establish the efficacy of the seed and its likelihood to grow under the specific conditions in a particular country without changing its significant characteristics.¹⁸ These tests focus on distinctness, uniformity, and stability (DUS) as well as value for cultivation and use (VCU), also known as national performance trials (NPT). For vegetable crops, VCU and national performance tests can be problematic, since VCU/NPT testing are not well suited to vegetable crops.

¹⁸ Katrin Kuhlmann, et al., Seed Policy Harmonization in ECOWAS: The Case of Nigeria, 2018; see also, New Markets Lab and SFSA, Nigeria Guidebook on Regulatory Aspects of Dissemination of Public Varieties, 2019.

Accordingly, VCU/NPT tests are not common for vegetable crops in many parts of the world, even though DUS testing for vegetable crops is the norm.

A requirement for VCU testing of vegetable crop varieties places an immense burden on testing authorities and is of doubtful value due to the wide array of assessment criteria that may be required.¹⁹ Information of this kind would be better obtained from agronomic validation trials conducted by the breeder or importer. In some countries, the government maintains a list of crops that must be subject to variety registration and release before they can be entered into the national seed catalogue and commercialized.²⁰ If vegetable crops are not listed as priority crops, they may not be subject to mandatory variety testing and evaluation, which can be long and costly, but rather may be subject to automatic registration in the national seed catalogue, provided that the company has conducted its own testing and can provide relevant data. However, even where such a process exists, consultations have indicated that it is not applied consistently in practice.

The approach to variety registration and release for vegetable crops has not been uniform across countries in sub-Saharan Africa, leading to a wide spectrum of experiences across the region. Variety testing systems that were developed mainly for staple crops are being applied to vegetable seed in some countries; however, the regulatory framework must be sensitive to the important differences between crop varieties.²¹ Given the quick turnover of vegetables, in countries with slow testing systems, farmers may never access the latest vegetable varieties. In most sub-Saharan African countries, official testing institutions also suffer from weak capacity and limited resources.²² Regulations or subsidiary measures may need to be adjusted to reflect the particular characteristics of vegetable crops take into account their differences from cereals and other field crops, for which most national regulations were originally designed.²³ Examples of flexible variety registration and release processes for vegetable seed adopted by some countries are highlighted below.

(a) Varying Vegetable Variety Registration and Release Regulatory Approaches Across Countries and Regions

Adoption of flexible variety registration and release approaches for vegetable varieties could ensure that rules and regulations address the unique nature of vegetable crops. Flexible regulatory models also reduce the burden on official testing institutions, which might have to conduct endless tests for the many different traits in vegetable seed. Globally,

¹⁹ Food and Agriculture Organization of the United Nations, Status of Seed Legislation and Policies in the Asia-Pacific Region, Bangkok 2020. Available at: <https://doi.org/10.4060/CA7599EN>.

²⁰ Katrin Kuhlmann and Yuan Zhou, Seed Policy Harmonization in the EAC and COMESA: The Case of Kenya, 2015. Katrin Kuhlmann, et al., Seed Policy Harmonization in ECOWAS: The Case of Nigeria, 2018; New Markets Lab and SFSA, Nigeria Guidebook on Regulatory Aspects of Dissemination of Public Varieties, 2019.

²¹ Food and Agriculture Organization of the United Nations, Seeds Toolkit: Seed Sector Regulatory Framework, 2018. Available at: <http://www.fao.org/3/ca1493en/CA1493EN.pdf>.

²² Food and Agriculture Organization of the United Nations, Status of Seed Legislation and Policies in the Asia-Pacific Region, Bangkok 2020. Available at: <https://doi.org/10.4060/CA7599EN>.

²³ Food and Agriculture Organization of the United Nations, Status of Seed Legislation and Policies in the Asia-Pacific Region, Bangkok 2020. Available at: <https://doi.org/10.4060/CA7599EN>.

three main flexible approaches have been adopted in relation to variety registration and release for vegetable crops.

First, within some Asian and African nations and other countries, like the European Union, vegetable seed is only subject to DUS testing but not VCU testing, with DUS test results conducted from other countries accepted under the principle of mutual recognition.²⁴ This is perhaps the most important regulatory flexibility, as it recognizes differences inherent in vegetable crops with respect to testing requirements, which directly impacts commercialization of these crop varieties. As mentioned, conducting VCU tests for vegetable crops is an arduous requirement, since vegetable varieties are so numerous, and there are multiple traits to test for in each case. Most countries thus only require DUS testing of vegetable varieties prior to registration in the national catalogue.²⁵

Second, some countries have adopted differentiated national variety lists that are subdivided into groups according to testing and registration requirements considered appropriate for different types of crops. Examples include Peru, France, Italy, the Netherlands, Costa Rica, Benin, Nepal, Finland, Switzerland, Republic of Korea, and Ecuador.²⁶ In France, for example, there is an official Catalogue of Species and Varieties of Cultivated Crops, which includes four lists for vegetable seed each with different registration requirements. List A is for registration of vegetable varieties whose seeds can be certified as basic or certified seeds or controlled as standard seed and marketed in France; list B is for registration of vegetable varieties whose seeds can be controlled only as standard seeds and marketed in France and within the European Union; list C is for conservative vegetable varieties marketed in their regions of origin; and list D is for registration of vegetable varieties with no intrinsic value. There are specific laws creating each of these lists.²⁷

The third approach involves flexible evaluation requirements for traditional vegetable varieties and aligns with the differentiated testing approach noted above. In most sub-Saharan African countries, improved vegetable varieties are mainly imported, while traditional vegetable varieties are produced with farmer saved seed. Since these varieties vary through a natural process, it is not possible for them to meet the uniformity and stability tests, which means that they could not be registered and released in the national catalogue or be formally commercialized by extension. Flexible evaluation requirements, such as the “identifiability” test applied by Malaysia and practices in Peru, would allow for

²⁴ Council Directive 2002/55/EC of 13 June 2002 on the marketing of vegetable seed.

²⁵ There are several examples of such countries, including Tanzania, Uganda, Bangladesh, Philippines, France, and Kenya.

²⁶ Katrin Kuhlmann and Bhramar Dey, *Using Regulatory Flexibility to Address Market Informality in Seed Systems: A Global Study*, *AGRONOMY* 11 (2) 377 (2021), <https://www.mdpi.com/2073-4395/11/2/377>; *See also*, New Markets Lab in collaboration with the Syngenta Foundation for Sustainable Agriculture and Crop Innovations, *Regulatory Aspects of Local Seed Collection*, August 2018.

²⁷ Lists A and B are created and described by Decree 81-605 of 18 May 1981 (amended) and Directives 2002/55/CE and 92/33/CE, and Directive 2008/72/CE (for rootstock varieties). Lists C and D are created and described by Directive 2009/145/CE of 26 November 2009 and Order no. AGRG 1031808A (Article 4) of 20 December 2010 (for species listed in Directives 2002/55/CE and 92/33/CE).

the registration and commercialization of traditional vegetable varieties.²⁸ Some countries have also, for instance, exempted traditional vegetable varieties from DUS and VCU testing if the seed is exchanged locally and not sold commercially.²⁹ Other countries go a step further and apply lenient assessment criteria, especially for traditional vegetable varieties. Malaysia, for instance, applies an “identifiability” test, based on a combination of plant variety qualities that are more heterogeneous, which is considered in both registration of traditional plant varieties and PBR for these varieties.³⁰ At the national or regional levels, any one or some combination of these three approaches could be adopted to streamline the vegetable variety registration and release processes.

(b) Regional Regulatory Approaches to Vegetable Crop Variety Registration and Release

African nations have placed a priority on harmonization of seed laws and regulations in order to promote a competitive market for vegetable seed and improve access to the wider regional market, grounded in regionally and internationally accepted best practices.³¹ To date, vegetable crops are not well recognized in regionally harmonized regulatory frameworks. As vegetable crops become more popular, this could become an issue, since the omission of vegetable crops at the regional level could lead to stricter and more inconsistent application of national rules. In the absence of specific regional rules applicable to vegetable crops, each individual country has developed its own processes for vegetable crop registration, which are not necessarily aligned regionally. This will make it more difficult to implement regional principles such as mutual recognition of varietal registration, to reap benefits from easier movement of seed across borders and reduce the costs and time involved in the process.

A regionally accepted regulatory framework on vegetable seed variety registration and release could codify different testing requirements for vegetable crops and integrate best practices. Regional approaches could, for instance, include some of the flexibilities noted above such as elimination of the requirement for VCU/NPT testing for vegetable crops. Adoption of such a flexibility at the regional level could reduce the costs of unnecessary or repeated trials that have already been conducted in other countries within similar ecological zones and streamline access to regional markets.

²⁸ Katrin Kuhlmann & Bhramar Dey, *Regulatory Dimension of Inclusive Seed Systems – A Global Study*, NEW MARKETS LAB AND CATHOLIC RELIEF SERVICES, (2020); *See also*, New Markets Lab in collaboration with the Syngenta Foundation for Sustainable Agriculture and Crop Innovations, *Regulatory Aspects of Local Seed Collection*, August 2018.

²⁹ Ethiopia and Nigeria are examples of such countries. *See*, Ethiopia’s Seed Proclamation No. 782/2013; the National Agricultural Seeds Council Act, 2019. In Nigeria though, the consultation with NASC confirmed that this exemption only applies where the traditional variety is in the informal sector and has not been commercialized. *Also see*, Katrin Kuhlmann and Bhramar Dey, *Regulatory Dimensions of Inclusive Seed Systems: A Global Study*, March 2020.

³⁰ *See*, Katrin Kuhlmann and Bhramar Dey, *Regulatory Dimensions of Inclusive Seed Systems: A Global Study*, March 2020.

³¹ Katrin Kuhlmann, et al., *Seed Policy Harmonization in ECOWAS: The Case of Nigeria*, 2018. *See also* Katrin Kuhlmann and Yuan Zhou, *Seed Policy Harmonization in ECOWAS: The Case of Ghana* (Basel, Switzerland: Syngenta Foundation for Sustainable Agriculture, September 2015).

The focus countries are members of different RECs. Kenya is a member of the EAC and COMESA; Malawi a member of SADC and COMESA; and Nigeria and Senegal members of ECOWAS. Within sub-Saharan Africa, the development of regional regulatory frameworks on vegetable seed registration and release could be targeted at these RECs, all of which have already developed or are in the process of developing regionally harmonized rules on seed (including rules on variety registration and release). Within the EAC, the EAC Seed and Plant Varieties Bill (EAC Seed Bill) is still in draft form.³² The EAC Partner States instead follow an agreement developed under the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)/ Eastern and Central Africa Programme for Agricultural Policy (ECAPAPA).³³ Under COMESA, the COMESA Seed Trade Harmonization Regulations of 2014 are applicable. Within SADC, the Memorandum of Understanding on the Harmonization of Seed Regulations in the Southern African Development Community (MoU) of 2008 is applicable. In ECOWAS, the Regulation C/Reg.4/05/2008 on Harmonization of the Rules Governing Quality Control, Certification And Marketing of Plant Seeds And Seedlings in ECOWAS Region (ECOWAS Seed Regulation), along with the Procedure Manual for Variety Registration in the National Catalogue for Crop Species and Varieties in West African Countries developed in 2008 (ECOWAS Procedure Manual).

These regional rules, however, with the exception of ECOWAS, were mostly developed with cereals and legumes singled out as priority crops, considering that most countries in sub-Saharan Africa have extensive experience breeding these crops as compared with vegetable crops, which are largely imported from outside of the African continent (see Table 1 above). It follows that most harmonized seed regulations do not explicitly refer to vegetable crops or include flexible rules developed specifically for vegetable crops (see Table 2). In all of the harmonized seed rules, with the exception of the 2008 ECOWAS Seed Regulation, DUS and VCU testing are prerequisites to registration of varieties in the regional seed catalogues (note that the EAC does not yet have a regional seed catalogue, although COMESA, SADC, and ECOWAS do).

While the EAC Seed Bill is still in draft form, EAC Partner States follow the ASARECA/ECAPAPA Agreement³⁴ on variety registration and release. Under the agreement, a variety registered in one EAC Partner State can be released in the second following expedited VCU testing for one season (one season of confirmation trialing), provided that sufficient data from previous field trials in similar agro-ecological zones is available.³⁵ The EAC Seed Bill includes a similar provision. In addition, the EAC Seed Bill requires that a variety must undergo two seasons of DUS testing and two seasons of VCU or NPT testing performed in a Partner State in order to be registered in the Community Plant Variety Catalogue. It also provides for the automatic release of a variety

³² New Market Lab, Economic Impact Assessment and Legal Review and Analysis of the East African Community Seed and Fertilizer Legislations, Study Commissioned by the East African Community with the Support of AGRA in 2019.

³³ ASARECA/ECAPAPA Agreement, Monograph Series No. 4.

³⁴ New Markets Lab, derived from research and adapted from Katrin Kuhlmann, "Harmonizing Regional Seed Regulations in Sub-Saharan Africa: A Comparative Assessment," SFSA, September 2015.

³⁵ New Markets Lab, derived from research and adapted from Katrin Kuhlmann, "Harmonizing Regional Seed Regulations in Sub-Saharan Africa: A Comparative Assessment," SFSA, September 2015.

in a third Partner State under similar agro-ecological conditions after its release in two other Partner States, provided that the data used for the release is made available for verification of the third Partner State.

In COMESA, the COMESA Seed Trade Regulations govern the process of variety registration and release at the regional level. COMESA regional rules requires that varieties undergo DUS testing, in accordance with Union for Protection of New Varieties of Plant (UPOV) guidelines, and VCU or NPT testing.³⁶ New varieties are required to undergo two seasons of DUS and VCU testing in two COMESA Member States,³⁷ while varieties released in one country require only one season of additional testing. Varieties released in two countries are automatically registered in the COMESA Plant Variety Catalogue upon submission of DUS and VUC testing.³⁸

Within SADC, new varieties can be entered into the SADC Variety Catalogue if they are released in at least two SADC Member States and have undergone one season of DUS testing in the country of application, along with two seasons of VCU testing, which can be done concurrently, in two SADC Member States.³⁹ Existing varieties that were registered and released in two SADC Member States prior to the launch of the SADC Variety Catalogue may enter the catalogue automatically, provided that DUS and VCU data are submitted along with the application.⁴⁰

In ECOWAS, variety registration and release are governed by the 2008 ECOWAS Seed Regulation and the Procedure Manual. The ECOWAS Procedure Manual includes technical aspects on the regional testing protocols for conducting DUS and VCU tests for selected crops and the step-by-step guidelines that ECOWAS Member States should follow in registering and releasing seed varieties. Only tomato and onion are listed as priority vegetable varieties covered under the ECOWAS Seed Regulation, and the ECOWAS Procedure Manual specifically includes DUS testing protocols for these vegetables. Under the ECOWAS Procedure Manual, these vegetables are subject to only DUS testing and not VCU testing, unlike the other priority crops covered under the Manual (other crops have DUS and VCU testing protocols, but tomato and onion only have DUS testing protocols). While flexible testing approaches for some vegetable crops are included in the ECOWAS Seed Regulation and Procedure Manual, which is commendable, a variety of other vegetables are grown within the ECOWAS region, and protocols on DUS testing for these vegetable varieties shall have to be developed at the regional level. Table 3 below shows a summary of vegetable seed variety registration and release regulatory approaches in the different focus RECs

³⁶ COMESA Seed Trade Harmonization Regulations, 20, 2014.

³⁷ COMESA Seed Trade Harmonization Regulations 27.

³⁸ COMESA Seed Trade Harmonization Regulations, 27-28, 2014.

³⁹ Memorandum of Understanding on the Harmonization of Seed Regulations in the Southern African Development Community (MoU), 2008, Annex II, Arts. 11 and 13.

⁴⁰ Memorandum of Understanding on the Harmonization of Seed Regulations in the Southern African Development Community (MoU), 2008, Annex II, Art. 15.

Table 3: Vegetable Seed Variety Registration and release Regulatory Approaches in the Different Focus RECs

Regional Economic Community	Regional Rules on Vegetable Seed	Focus Vegetable Crops	No. of Required Evaluation Tests
ECOWAS	Yes	Tomato and onion	DUS testing for two seasons
EAC (Draft Bill)	No	None	N/A
COMESA	No	None	N/A
SADC	No	None	N/A

Source: New Markets Lab, 2020. Based on analysis of ECOWAS, COMESA, and SADC regional seed regulations and EAC Seed Bill.

Absence of regional provisions on variety registration and release for vegetable crops within the COMESA, SADC, and (as planned) the EAC, creates a regulatory vacuum, which could lead to market uncertainty and ultimately affect availability and access of improved vegetable seed varieties in these regions. Stakeholders consulted noted that there is very limited understanding of the rules applicable to vegetable crops at both the national and regional levels. While some stakeholders were skeptical about creation of another layer of harmonized rules while the existing rules are not yet fully operational, a considerable number supported the development of a harmonized regional framework for vegetable seed to streamline vegetable variety regulatory processes. Stakeholders also noted that since countries are still at nascent stages of vegetable seed regulation, a regionally harmonized approach could be easier to adopt. With regard to variety registration and release, stakeholders in Senegal and Nigeria opined that the ECOWAS Procedure Manual should include protocols for additional vegetable crops beyond just tomato and onion.

(c) Vegetable Seed Variety Registration and Release in Focus Countries

While some countries in sub-Saharan Africa have recognized the uniqueness of vegetable seed and established flexible variety registration and release processes for vegetable seed, most countries have not. Even in the countries where flexibilities exist, stakeholder consultations have revealed that they are often either not applied, applied inconsistently, or not exercised due to lack of knowledge among the key stakeholders, which consequently prevents stakeholders from benefitting from these flexibilities.⁴¹

Within the focus countries, Kenya and Senegal have a flexible variety registration and release processes for new vegetable crops in their national seed regulatory framework, whereby vegetable seed is exempt from mandatory VCU testing.⁴² Malawi and Nigeria require a new vegetable variety to be subject to both DUS and VCU test (see Table 2, which summarizes the number of tests required prior to variety registration and release of a new vegetable variety in Kenya, Malawi, Nigeria, and Senegal).

⁴¹ New Markets Lab Consultations with Stakeholders, September/October 2020.

⁴² See also New Markets Lab and World Vegetable Center, Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa, forthcoming May 2021.

Table 2: Legally Required Number of Test Prior to Registration and Release of a New Vegetable Variety in Kenya, Malawi, Nigeria, and Senegal

<i>Country</i>	<i>DUS testing for two Seasons</i>	<i>VCU testing for two seasons</i>
<i>Kenya</i>	Yes	Optional
<i>Malawi</i>	Yes	Yes
<i>Nigeria</i>	Yes	Yes
<i>Senegal</i>	Yes	Optional

Source: New Markets Lab 2020. Based on Kenya, Malawi, Nigeria and Senegal national seed laws and regulations.

Relevant to regional harmonization, Senegal and Nigeria exempt vegetable varieties listed on the West African Catalogue of Plant Varieties and Species from any evaluation tests prior to commercialization at the national level, which stakeholders have reported increases availability of improved varieties for farmers in the region.

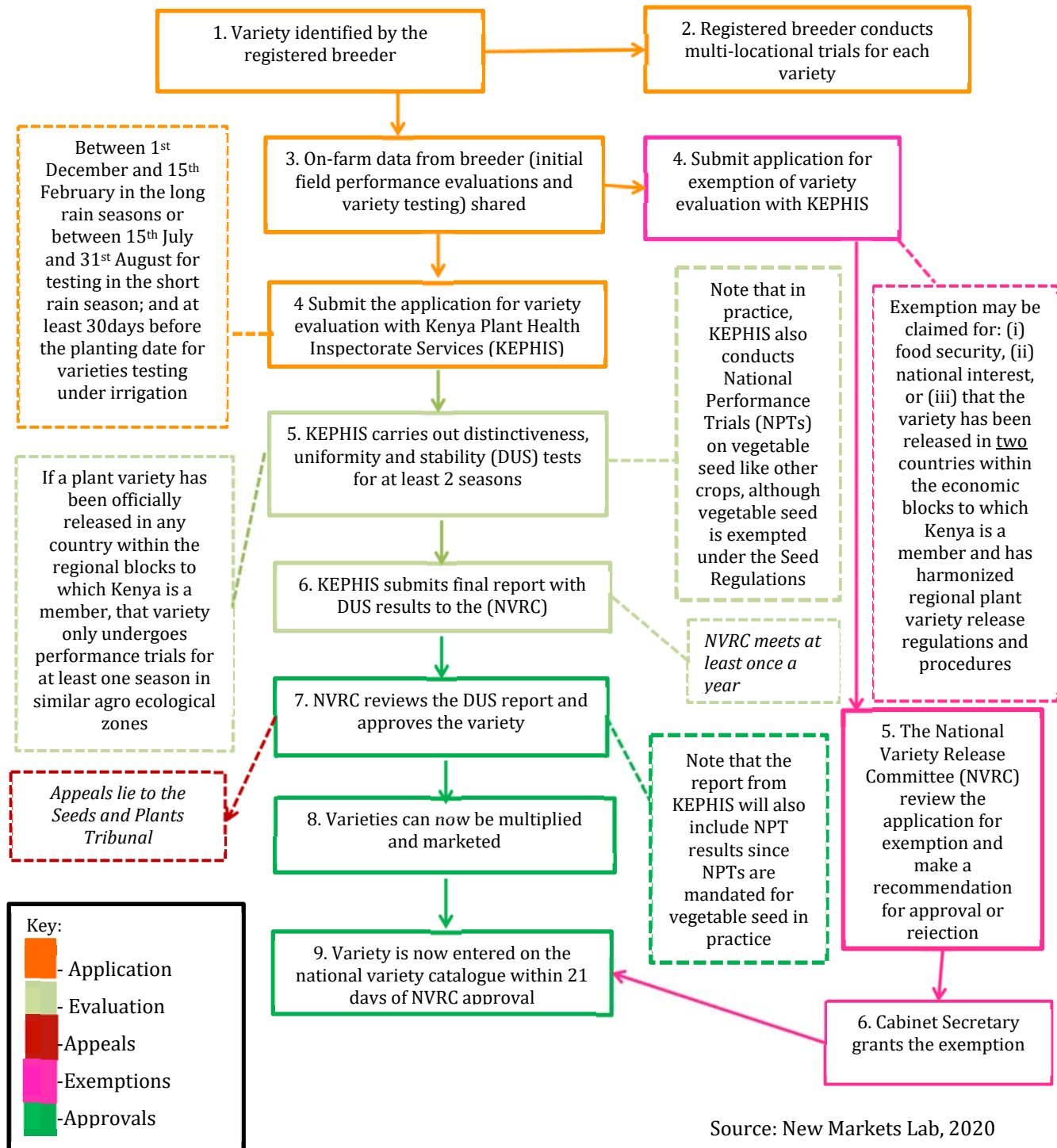
Vegetable Variety Registration and Release in Kenya

The vegetable seed variety registration and release process in Kenya is regulated under the Seed and Plant Varieties Act, Cap 326 and the Seed and Plant Varieties (Variety Evaluation and Release) Regulations, Legal Notice No. 215 of 2016 (See Figure 1 for a New Markets Lab Regulatory Systems Map on the variety registration and release process in Kenya). The Kenya Health Inspectorate Service (KEPHIS) is the regulatory body responsible for overseeing the variety registration and release process. All varieties are subject to evaluation trials prior to registration and release.

Under the Seed and Plants (Variety Evaluation and Release) Regulations, vegetable seed is mandatorily subject to only DUS testing prior to registration and release, while NPT trials are optional.⁴³ This legal flexibility treats vegetable seed differently from other crops that are subject to both DUS and VCU testing, which is a commendable good regulatory practice. However, consultations revealed that in practice, vegetable seed like other crops must be subject to both DUS and NPT testing prior to registration and release; and that the results from the DUS and VCU tests are required by the National Variety Release Committee (NVRC) during evaluation of the variety. Companies interviewed also showed limited knowledge and understanding of processes for vegetable seed variety registration and release, which partly explains why there are only a few vegetable varieties listed in the Kenyan national seed catalogue. The knowledge gap concerning the flexibility that exists for vegetable seed registration and release shall have to be addressed at the national level, for instance through information workshops in partnership with the Seed Trade Association of Kenya (STAK) and KEPHIS.

⁴³ Regulation 6(2) of the Seed and Plant Varieties (Variety Evaluation and Release) Regulations, 2016,

Figure 1: New Markets Lab Regulatory Systems Map for Vegetable Variety Registration and Release Process in Kenya



Source: New Markets Lab, 2020

With respect to regional harmonization, a variety could be exempted from DUS if has been released in a country (or countries) within the economic blocs of which Kenya is a member and has harmonized regional plant variety release regulations and procedures.⁴⁴ Notably, this exemption may not apply to vegetable seed, because the regionally harmonized rules under COMESA and EAC, of which Kenya is a member, are yet to make provision for vegetable seed.

After conducting trials, KEPHIS sends a draft report of the DUS results to the NVRC,⁴⁵ which then considers the DUS report⁴⁶ and approves and releases qualifying varieties.⁴⁷ For crops other than vegetable, the KEPHIS report would include both DUS and VCU trials results. After release by the NVRC, KEPHIS publishes the varieties that can be commercialized;⁴⁸ the KEPHIS director must ensure that the names of the released varieties are published in the Gazette within 21 days of the NVRC meeting.⁴⁹

Stakeholders noted that even though Kenya's rules allow for flexibility, in practice, vegetable varieties are subject to NPT trials, which means that the National Performance Trials Committee must evaluate the NPT results and submit a report with recommendations to KEPHIS. KEPHIS forwards this report to the NVRC together with the DUS results. This adds a layer of bureaucracy that is not provided for under the legal framework.

Vegetable Variety Registration and Release in Nigeria

In Nigeria, the process of vegetable seed variety registration and release is regulated by the 2019 National Agricultural Seed Council (NASC) Act,⁵⁰ and the Guidelines for Registration and Release of New Crop Varieties in Nigeria 2016, developed by the National Centre for Genetic Resources and Biotechnology (NACGRAB).⁵¹ NASC and NACGRAB are the regulatory bodies responsible for overseeing the variety registration and release process (See Figure 2 for a New Markets Lab Regulatory Systems Map of Nigeria's variety registration and release process). Nigeria does not have special rules applicable to

⁴⁴ Regulation 9(1) of the Seed and Plant Varieties (Variety Evaluation and Release) Regulations, Legal Notice No. 215 of 2016.

⁴⁵ Regulation 13(1) of the Seed and Plant Varieties (Variety Evaluation and Release) Regulations, Legal Notice No. 215 of 2016.

⁴⁶ Regulation 15 of the Seed and Plant Varieties (Variety Evaluation and Release) Regulations, Legal Notice No. 215 of 2016.

⁴⁷ Regulation 15 of the Seed and Plant Varieties (Variety Evaluation and Release) Regulations, Legal Notice No. 215 of 2016.

⁴⁸ Regulation 19(2) of the Seed and Plant Varieties (Variety Evaluation and Release) Regulations, Legal Notice No. 215 of 2016.

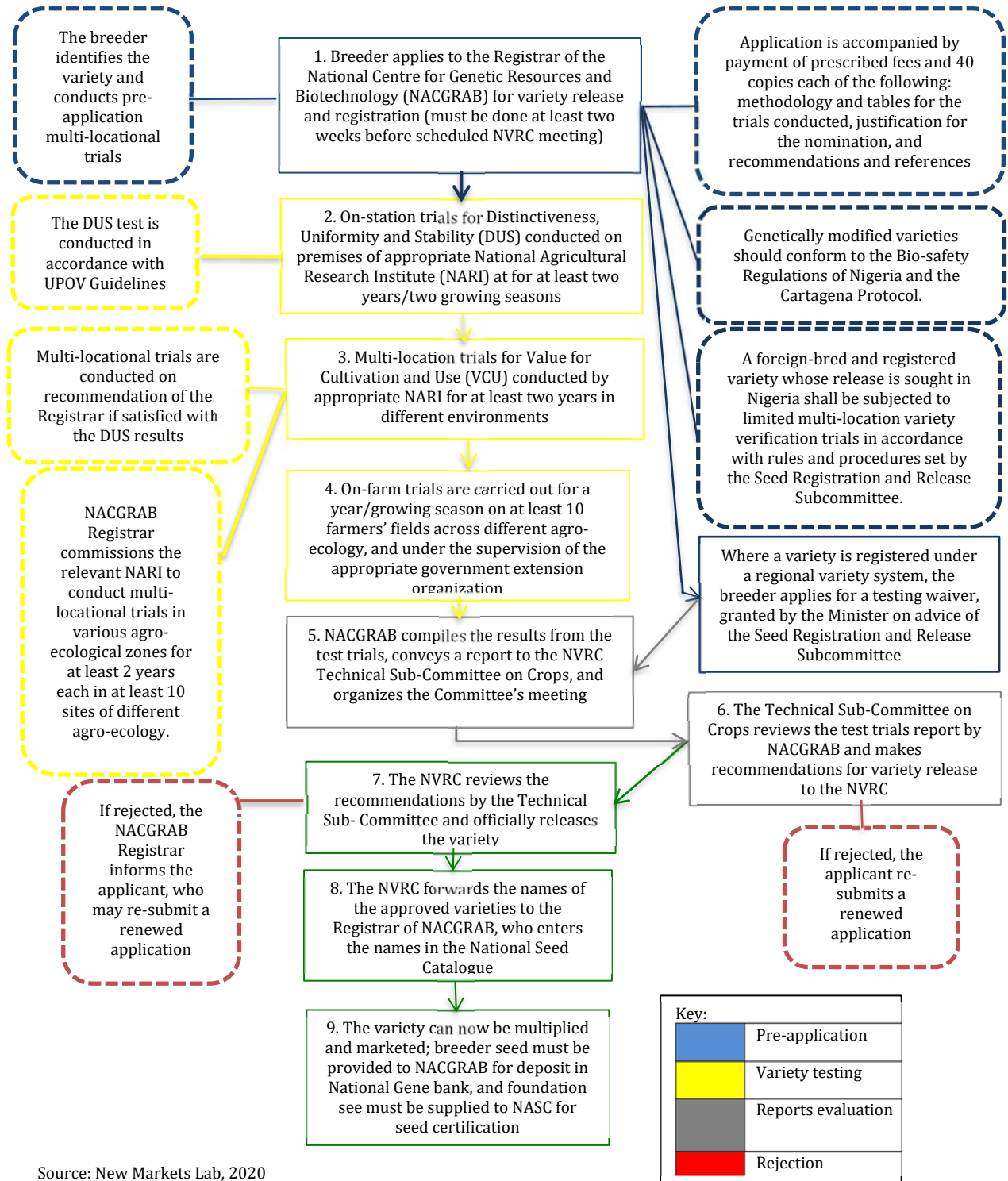
⁴⁹ Regulation 19(1) of the Seed and Plant Varieties (Variety Evaluation and Release) Regulations, Legal Notice No. 215 of 2016.

⁵⁰ The National Agricultural Seed Council Act, 2019. Available at: <https://nlipw.com/national-agricultural-seeds-act/>.

⁵¹ NACGRAB, Guidelines for Registration and Release of New Crop Varieties in Nigeria, 2016. Available at: https://tasai.org/wp-content/themes/tasai2016/info_portal/Nigeria/5.%20Guidelines%20for%20registration%20and%20release%20of%20new%20crop%20varieties%20in%20Nigeria.pdf.

vegetable seed, and the same regulatory framework for variety registration and release process is applied to all crops.

Figure 2: New Markets Lab Regulatory Systems Map for the Vegetable Variety Registration and Release Process in Nigeria



Source: New Markets Lab, 2020

Approval

Under the new NASC Act, the variety registration and release procedures do differ depending upon whether the variety is newly bred, used in the informal system and not commercialized, a foreign-bred registered variety, or a variety registered under the regional variety release system. New domestic and foreign-bred vegetable crop varieties intended for registration must undergo multi-year and multi-location trials like other crops, in accordance with the Variety Registration and Release Guidelines.

Vegetable varieties, similar to other crops, are subject to at least two seasons of DUS and VCU across different agro-ecological zones, in no fewer than 10 testing sites per season. Variety testing of new vegetable varieties is done under the supervision of the National Institute for Horticultural Research located in Ibadan. While the new NASC Act aimed to harmonize Nigeria's seed regulatory framework with the ECOWAS Seed Regulation, the requirement to subject vegetable seed, specifically tomato and onion, to VCU testing is inconsistent with the 2008 ECOWAS Procedure Manual.

After field tests, the Registrar of NACGRAB compiles the test results report, convenes the meeting of the Technical Sub-Committee on Crops, and conveys the findings of the test results report. The Technical Sub-Committee on Crops then reviews applications for variety registration and makes recommendations to the NVRC for final deliberation and approval. If approved, the Registrar of NACGRAB will notify the applicant and register the variety in the national seed catalogue.

Varieties used in informal seed systems, which include varieties that are yet to be commercialized such as traditional vegetable seed varieties, are only subject to registration and proper description prior to their sale on the market (which is more limited than commercial seed varieties).⁵² This is a notable flexibility in the regulatory framework that recognizes the different nature of traditional varieties and the lack of suitability of DUS testing requirements for these varieties. Based on consultations, the flexibility allowing for description and registration of informal varieties is aimed at promoting the commercialization of varieties that have long been ignored. This kind of flexibility does not exist in any of the other focus countries.

Relevant to regional harmonization, section 13(4) of the 2019 NASC Act allows for automatic registration in the national seed catalogue of a variety that has been registered under a relevant regional variety release system, with approval of the minister responsible for agriculture. Vegetable varieties that are listed in the regional seed catalogues would thus not be subjected to DUS or VCU test prior to registration. Consultations revealed that, in practice, vegetable seed varieties in the West African Catalogue of Plant Species and Varieties are imported without the requirement of evaluation tests, which has increased the choices of making improved vegetable varieties available to farmers.

Vegetable Variety Registration and Release in Malawi

⁵² Section 35 of the NASC Act, 2019.

In Malawi, the National Seed Policy of 2018, the Seed Act of 1996, the Seed Regulations of 2018, and the Guidelines for the Release of New Agricultural Technologies in Agriculture of 2000 comprise the legal framework for seed. The Seed Services Unit of the Department of Agricultural Research Services (DARS)⁵³ monitors and ensures compliance with the National Seed Policy and Seed Act.⁵⁴ Its sub-entity, the Agricultural Technology Clearing Committee (ATCC), oversees the release of crop varieties and other technology.⁵⁵ Malawi's Seed Act ascribes registration and release activities generally to the "Controller of Seeds" (or "Controller"). However, as implemented, the ATCC examines and registers varieties, while the Minister of Agriculture and Food Security retains ultimate decision-making authority to release new varieties.⁵⁶

Based on consultations and analysis of the seed regulatory framework, the same rules that apply to all other crops apply to vegetable seed. The vegetable seed industry is still underdeveloped and all the improved vegetable varieties in the local market are imported. While a variety must be registered prior to commercialization, an exemption is made for imported vegetable varieties, as the regulatory institutions are yet to develop the capacity to effectively test and evaluate vegetable varieties. This explains why there are no vegetable varieties listed on the national seed catalogue.

There are no regulations on variety registration and release in Malawi. However, if one was interested in releasing and registering a vegetable variety, ATCC does have guidelines in place that provide that the varieties or "*technologies to be released should be from experiments or projects conducted over a period of time with adequate replication of treatments as well as sites. The results should also be repeatable over time. Field trials should have at least 3 seasons or cycles of consistent data with extensive site replication.*"⁵⁷

The Controller conducts verification tests or uses the results of tests and trials obtained through agreements like COMESA or SADC, of which Malawi is a member.⁵⁸ Any data from other countries will only be used to back up locally obtained evaluation results but will not be the sole basis for considering a variety.⁵⁹ The Controller may refuse to recognize a vegetable variety if it is in the public interest to do so or where the variety is undesirable

⁵³ Malawi's government website, which was last updated in 2014, refers to those two entities as the Seed Certification and Quality Control Group and the Department of Agricultural Research and Technical Services (DARTS), respectively. All secondary sources, dated from 2017, use the above-the-line names. See "Seed Certification and Quality Control Commodity Team," DARTS, July 24, 2017, <http://www.sdn.org.mw/darts/progra/commod/seed.htm>.

⁵⁴ Abed Mathagu & Edgar Wavomba, *Requirements and Procedures for Release and Registration of New Crop Varieties in Malawi and Zimbabwe*, Seeds2B Africa, pg. 10, <https://seeds.aatf-africa.org/files/files/Release-registration-new-crop-varieties-malawi-zimbabwe.pdf>

⁵⁵ "Crops Development," Ministry of Agriculture, Irrigation and Water Development, Republic of Malawi, <http://www.agriculture.gov.mw/index.php/crops-development>.

⁵⁶ "Crops Development," Ministry of Agriculture, Irrigation and Water Development, Republic of Malawi, <http://www.agriculture.gov.mw/index.php/crops-development>.

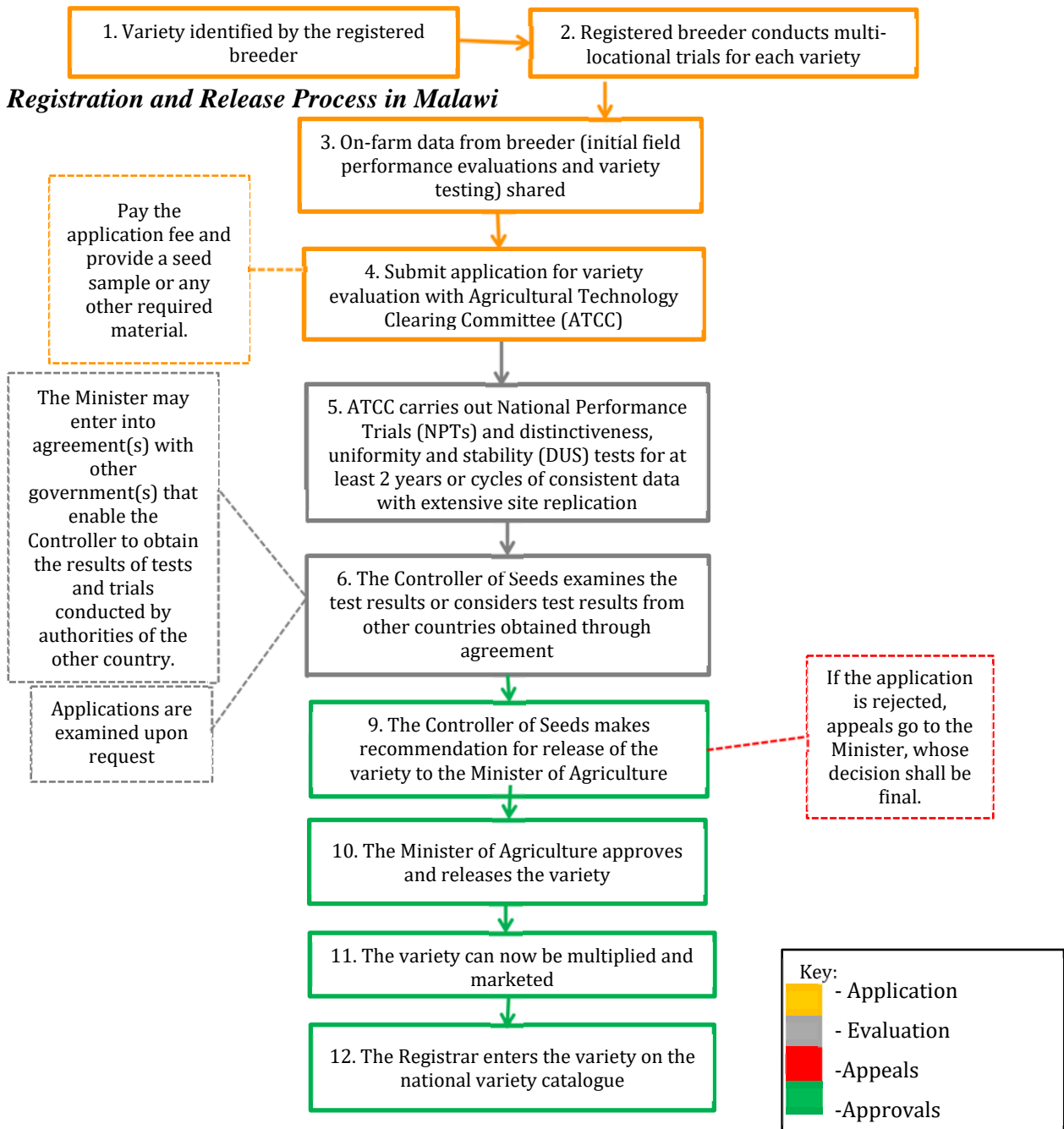
⁵⁷ Clause 7.2 ATCC Guidelines for the Release of New Agricultural Technologies in Agriculture of 2000

⁵⁸ Amended Seed Act, section 9(2). The Minister may enter into agreement(s) with other government(s) that enable the Controller to obtain the results of tests and trials conducted by authorities of the other country. See Amended Seed Act, section 14 (Malawi).

⁵⁹ Clause 7.4 ATCC Guidelines (Malawi).

for use.⁶⁰ If the Controller rejects or refuses an application, he or she will advise the applicant in writing of his or her decision and the grounds for the determination,⁶¹ with the possibility of appeal to the Minister, whose decision will be final.⁶²

Figure 3: New Markets Lab Regulatory Systems Map for the Vegetable Variety



Source: New Markets Lab, 2020

⁶⁰ Seed Act, section 13 (Malawi).

⁶¹ Seed Act, section 10(2)

⁶² Seed Act, section 31

If, after considering the application and examining results from tests or trials, the Controller determines that the application conforms to the requirements of the Amended Seed Act, the Controller will recognize the variety.⁶³ He or she will (1) enter the particulars into the variety list, (2) publish relevant information in the *Gazette*, and (3) inform the applicant of recognition.⁶⁴ Ultimately, the Minister of Agriculture retains decision making authority over the release of new varieties. The New Markets Lab Regulatory Systems Map in Figure 3 below depicts the vegetable variety registration and release process in Malawi.

The absence of a clear and strong vegetable seed registration and release regulatory framework in Malawi amplifies the need for a regional framework to guide the process, which stakeholders consistently highlighted. While Malawi can accept evaluation data for varieties listed in regional seed catalogues from RECs of which it is a member, vegetable crops are not prioritized under either COMESA or SADC. Harmonization of vegetable variety registration and release processes under these RECs could afford Malawi leverage on the provisions that recognize varieties registered in the regional catalogues, improve regional seed trade in vegetable seed, and widen the varietal options available to farmers.

Vegetable Variety Registration and Release in Senegal

Law no. 94-81 of December 23, 1994 related to registration of varieties, production, certification and trade of seeds or plants regulates the variety registration and release process in Senegal.⁶⁵ Senegal's National Advisory Committee for Seeds and Plants (Comité national consultatif des Semences et des Plants, CNCSP) under the Ministry of Agriculture and Rural Equipment (MAER) oversees the implementation the regulation of seed. The Technical Science Committee under the CNCSP reviews variety registration and release applications and issues recommendations to the CNCSP. Recommendations are then reviewed by MAER prior to the approval and registration of a variety. The New Markets Lab Regulatory Systems Map in Figure 4 below depicts the vegetable seed variety registration and release process in Senegal.

Senegal has harmonized its regulations with ECOWAS Regulation C/Reg. 4/05/2008 On Harmonization Of The Rules Governing Quality Control, Certification And Marketing Of Plant Seeds And Seedlings in ECOWAS Region through its publication in the Official Journal of Senegal No. 6771 of January 2014.⁶⁶ It thus follows that certain vegetable varieties, that is tomato and onion, must be subject to DUS and not VCU testing in accordance with the ECOWAS Procedure Manual. However, consultation with

⁶³ Seed Act, section 11

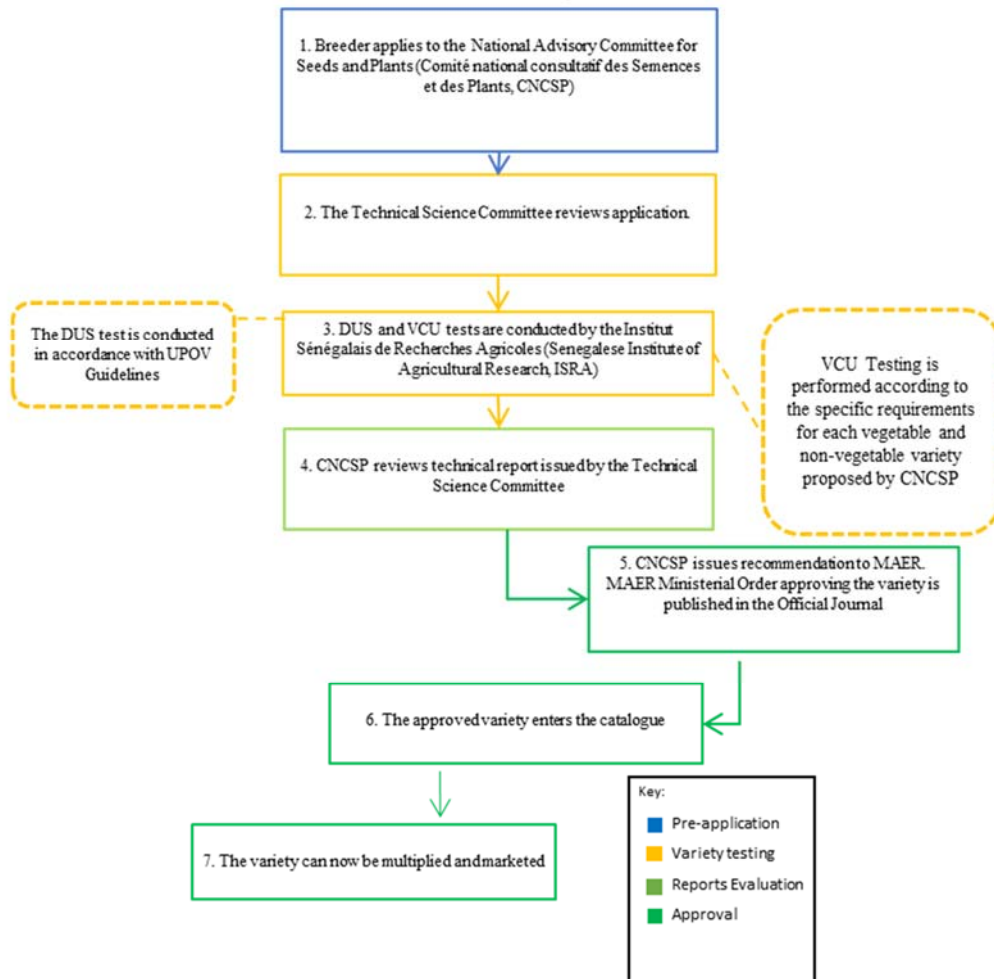
⁶⁴ Seed Act, section 11(3)

⁶⁵ Katrin Kuhlmann and Yuan Zhou, Seed Policy Harmonization in ECOWAS: The Case of Ghana, New Markets Lab and Syngenta Foundation for Sustainable Agriculture, 2016, at page 17. Available at: https://cb4fec8a-9641-471c-9042-2712ac32ce3e.filesusr.com/ugd/095963_fa0bc994b3194feeb25f55831a47e498.pdf.

⁶⁶ West African Seed Program, 2016 Annual Report on Implementation of Regional Harmonized Regulation C/REG.4/05/2008. Available at: <http://www.coraf.org/paired/wp-content/uploads/2018/05/Annual-Report-WASP-2016.pdf>.

stakeholders revealed that most were unaware of this exemption and that, in practice, vegetable seed is subject to both DUS and VCU testing. Moreover, the capacity for testing remains a challenge.⁶⁷

Figure 4: New Markets Lab Regulatory Systems Map for Vegetable Variety Registration and Release in Senegal



© 2020 New Markets Lab, based on Senegal Law no. 94-81, Decree No. 97-602, Decree 97-603, and Decree No. 97-616.

An application for variety registration must be submitted to the CNCSP. Institut Sénégalais de Recherches Agricoles (Senegalese Institute of Agricultural Research, ISRA) is in charge of testing, following the requirements established by CNCSP. Once testing is done, the Technical Science Committee issues its technical report to the CNCSP, which reviews it and proposes to the MAER that a variety be registered in the national seed catalogue. MAER then issues a Ministerial Order for registration in the national seed catalogue.

⁶⁷ Katrin Kuhlmann and Yuan Zhou, Seed Policy Harmonization in ECOWAS: The Case of Ghana, New Markets Lab and Syngenta Foundation for Sustainable Agriculture, 2016, at page 17. Available at: https://cb4fec8a-9641-471c-9042-2712ac32ce3e.filesusr.com/ugd/095963_fa0bc994b3194feeb25f55831a47e498.pdf.

Registration of a variety Senegal's national seed catalogue is valid for ten years and can be extended for periods of five years by submitting an application for extension to the CNCSP.

With respect to harmonization, Senegal's national seed catalogue⁶⁸ and internal regulations specifically refer to ECOWAS Regulation C/Reg. 4/05/2008, and varieties registered in to the West African Catalogue of Plant Species and Varieties can be traded freely within Senegal.

2. Seed Quality Assurance (Including Seed Certification)

Seed certification is the most common quality assurance system adopted by African governments and is designed to control seed quality through field inspection of registered seed varieties during production and laboratory testing to assess compliance with minimum purity and germination standards before commercialization of a variety. Certified seed is meant to signal to both the buyer and seed supplier that seed meets the set quality standards. At the international level, ISTA develops international seed testing standards and the OECD sets internationally recognized seed schemes, including seed schemes for vegetable seed. Compliance with the internationally recognized ISTA seed testing standards and OECD seed schemes presents an opportunity for seed produced at the national level to have access to wider regional and international markets. However, despite its prevalence, formal seed certification is not the only way to signal quality in the market, and flexible approaches to quality assurance exist as well, as discussed below.

(a) Flexible Quality Assurance Approaches for Vegetable Crops Across Countries and Regions

Just as not all countries apply comprehensive testing to vegetable crop varieties, a number of countries also exempt vegetable varieties from formal seed certification or apply more flexible approaches to seed quality control, ranging from more permissive seed classes (e.g., standard seed) to less complex quality assurance approaches. As is true in other regulatory areas, quality assurance is exacerbated by limited capacity and the relative unfamiliarity of many countries in sub-Saharan Africa with vegetable seed.

One approach has been to involve the private sector in the vegetable seed certification process. Within sub-Saharan Africa, countries like Kenya,⁶⁹ Nigeria,⁷⁰ Ghana,⁷¹ Tanzania,

⁶⁸ Decree 97-602, establishing a directory of species and varieties of plants cultivated in Senegal.

⁶⁹ Katrin Kuhlmann & Bhramar Dey, *Regulatory Dimension of Inclusive Seed Systems – A Global Study*, New Markets Lab and Catholic Relief Services (forthcoming, 2020).

⁷⁰ Section 23, NASC Act, 2019; Katrin Kuhlmann, Yuan Zhou, Adron Nalinya Naggayi & Heather Lui, *Seed Policy Harmonization in ECOWAS: The Case of Nigeria* (2018), https://www.syngentafoundation.org/sites/g/files/zhg576/f/seed_policy_harmonization_in_ecowas_the_case_of_nigeria_2019.pdf.

⁷¹ Katrin Kuhlmann & Yuan Zhao, *Seed Policy Harmonization in ECOWAS: The Case of Ghana*, 17 (2016), https://www.syngentafoundation.org/sites/g/files/zhg576/f/seeds_policy_ghana_seed_case_study_jan16_0.pdf.

Zambia,⁷² Zimbabwe,⁷³ and Uganda⁷⁴ have authorized the private sector to provide certification services the supervision of the government certifying agency, including field inspection and laboratory testing, in accordance with internationally recognized seed testing standards under ISTA. Compliance with international seed testing standards remains a challenge in most countries in sub-Saharan Africa, which either lack an ISTA accredited laboratory or have only one that is very costly, overwhelmed with workload, or both.⁷⁵ In order to address these challenges, private seed laboratories can be accredited as well. While accreditation of private seed inspectors and laboratories tends to accompany formal seed certification, it does shift some of the capacity burden to the private sector.

Another flexible regulatory approach to quality assurance of vegetable seed has been a more market-driven quality assurance approach, often referred to as truth-in-labelling. Under this approach, the seed producer vouches for the quality of the product, based on relevant standards and labeling requirements that describe type, class, quantity, quality, components, producer, and other relevant information as may be required by law.⁷⁶ The role of the government agency in this case is to ensure that standards and labeling rules are complied with, so that the consumer bases their purchasing choice on accurate information, and to effectively monitor quality and compliance. In sub-Saharan Africa, only South Africa has adopted this approach,⁷⁷ although Ethiopia is in the process of doing so on a limited basis alongside formal certification.⁷⁸ Other countries, like India and Nepal, also apply a mixed approach to seed quality control, with truthfully labeled seed permitted along with formally certified seed. Notably, in applying the truth-in-labelling mechanism, the government authority must have the capacity to effectively monitor compliance in the market. In addition, the private sector must have the capacity to monitor and ensure quality.⁷⁹ A combination of these capacities seems to be lacking in most countries in sub-Saharan Africa, which creates a challenge in implementing a pure truth-in-labelling approach.

72 Katrin Kuhlmann, Yuan Zhou, and Shannon Keating, *Seed Policy Harmonization in COMESA AND SADC: The Case of Zambia*, 9 (2019), https://www.syngentafoundation.org/sites/g/files/zhg576/f/zambia_case_study_final_edit_8_march_2019_clean.pdf.

73 Yuan Zhou & Katrin Kuhlmann, *Seed Policy Harmonization in SADC and COMESA: The Case of Zimbabwe*, 9-10 (2015), https://www.syngentafoundation.org/sites/g/files/zhg576/f/seeds_policy_zimbabwe_case_study_sept15.pdf.

74 Regulation 49 of the Seed and Plants Regulations, 2016.

75 New Markets Lab Stakeholder Consultations with stakeholders, September/October 2020. See also New Markets Lab and World Vegetable Center, *Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa*, forthcoming, May 2021.

76 *Voluntary Guide for National Seed Policy Formulation*, FOOD AND AGRICULTURE ORGANIZATION, 35 (2015), <http://www.fao.org/3/a-i4916e.pdf>.

77 *Module 3: Seed quality assurance*, in SEEDS TOOLKIT, 97 (FOOD AND AGRICULTURE ORGANIZATION, 2018), <http://www.fao.org/3/CA1492EN/ca1492en.pdf>.

78 Under Clause 12 of Ethiopia's Draft Seed Proclamation of 2020, provision is made for self-certification (seed quality self-assurance) and private or cooperative seed quality assurance schemes under the supervision of the government certifying authority.

79 *Voluntary Guide for National Seed Policy Formulation*, FOOD AND AGRICULTURE ORGANIZATION, 35 (2015), <http://www.fao.org/3/a-i4916e.pdf>.

An additional approach to quality assurance is the recognition of quality declared seed (QDS). QDS is a more flexible seed quality assurance approach introduced by the Food and Agriculture Organization of the United Nations (FAO) under its QDS System Guidelines⁸⁰ to assist small-scale farmers to produce quality seed, especially where the formal seed certification process is particularly costly and time consuming and institutional where the capacity of government certifying agencies is low.⁸¹ The FAO QDS System Guidelines include minimum standards for production of quality vegetable seed that could be adopted more widely.⁸² Within sub-Saharan Africa, Ethiopia,⁸³ Ghana,⁸⁴ Nigeria,⁸⁵ Tanzania,⁸⁶ Uganda,⁸⁷ and Zambia⁸⁸ all recognize QDS. SADC also recognizes QDS as a seed class. If well implemented, QDS can allow smallholder farmers to produce and access quality seed, particularly in more limited geographic areas, under the oversight of the government without subjecting seed to unduly stringent certification requirements. In most cases though, countries only apply QDS to varieties that are yet to be fully commercialized or are mostly in the informal sector.⁸⁹ QDS would, for instance, not apply to vegetable crops whose improved varieties are easily accessible to in the market.⁹⁰

Another flexible approach is the recognition of standard seed as a seed class, which is consistent with the OECD seed scheme for vegetable crops.⁹¹ In the production of standard class vegetable seed, the seed producer has the primary responsibility of ensuring that the seed meets the minimum purity and quality standards, with the oversight of the government certifying authority. The recognition of standard seed as a seed class can create more flexible opportunity for smallholder farmers operating in informal seed systems, while still ensuring quality seed in the market.⁹² Within sub-Saharan Africa, Kenya, Malawi, Tanzania, and Uganda all recognize standard seed as a seed class for vegetable crops,⁹³ with other countries acknowledging standard seed as a class as well.

⁸⁰ OECD, OECD Seed Schemes: A Synthesis of International Regulatory Aspects that Affect Seed Trade, September 2012, page 12. Available at: <https://www.oecd.org/agriculture/seeds/documents/international-regulatory-aspects-seed-trade.pdf>.

⁸¹ OECD, OECD Seed Schemes: A Synthesis of International Regulatory Aspects that Affect Seed Trade, September 2012, page 12. Available at: <https://www.oecd.org/agriculture/seeds/documents/international-regulatory-aspects-seed-trade.pdf>.

⁸² FAO, Quality Declared Seed System, FAO Plant Production and Protection Paper 185. Available at: <http://www.fao.org/3/a-a0503e.pdf>.

⁸³ Ethiopia's Seed Regulations of 2016.

⁸⁴ Seed Policy 2013, 51 (Ghana).

⁸⁵ Section 35 of the NASC Act, 2019.

⁸⁶ Seeds (Control of Quality Declared Seeds) Regulations 2020.

⁸⁷ Regulation 18(1)f) of the Seeds and Plant Regulations, 2016.

⁸⁸ Plant Variety and Seeds Act, s66 (Zambia).

⁸⁹ New Markets Lab Consultations with stakeholders, September/October 2020.

⁹⁰ New Markets Lab Consultations with stakeholders, September/October 2020.

⁹¹ OECD Schemes for the Varietal Certification or the Control of Seed Moving in International Trade, OECD, 153, (2020), <https://www.oecd.org/agriculture/seeds/documents/oecd-seed-schemes-rules-and-regulations.pdf>.

⁹² Katrin Kuhlmann & Bhramar Dey, *Regulatory Dimension of Inclusive Seed Systems – A Global Study*, NEW MARKETS LAB AND CATHOLIC RELIEF SERVICES, (2020).

⁹³ List of countries participating in the OECD Seed Schemes / Liste des pays participant aux Systèmes des semences de l'OCDE, <https://www.oecd.org/agriculture/seeds/documents/list-of-countries-participating-in-the-oecd-seed-schemes.pdf>. See also, New Markets Lab and World Vegetable Center, Study of Seed Laws

The integration of some of these flexible approaches at the national level, and ultimately the regional level, would bolster the quality assurance process, address limited institutional public sector capacity to formally certify vegetable seed, and improve access to national and regional vegetable seed markets. Table 3 below, developed by the New Markets Lab and World Vegetable Center,⁹⁴ depicts the range of flexibilities adopted by selected sub-Saharan African countries (including the focus countries) quality control of vegetable seed.

Table 3: Key Factors and Regulatory Flexibilities for Seed Certification in the Selected Sub-Saharan African Countries

Focus Countries	Mandatory certification for vegetable seed	Specific guidelines/regulations for vegetable seed certification	Quality Declared Seed Mechanism	Other alternatives to formal certification (self-certification and group quality assurance schemes)	Private sector involvement in testing and inspection	ISTA accredited laboratories
Ethiopia	✓		✓*	✓*		
Kenya			✓		✓	✓
Tanzania		✓	✓			✓
Uganda			✓		✓	✓
Malawi	✓	✓				
Zambia			✓		✓	✓
Zimbabwe					✓	✓
Benin	✓*	✓*				
Ghana			✓*		✓*	
Mali	✓	✓*				
Nigeria	✓†				✓	
Senegal	✓					✓
Burkina Faso	✓	✓*				

*Provided for in the relevant legislation/policy although its working in practice is unclear.

*Set out in proposed amendment.

† Qualified by exceptions

Source: New Markets Lab and World Vegetable Center, “Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa,” forthcoming, May 2021.

(b) Regional Regulatory Approaches to Vegetable Certification

At the regional level, the four RECs that are the focus of this case study have set field and laboratory seed testing standards for the respective priority crops in tandem with the international seed testing standards established under ISTA. Since national systems tend to influence practices adopted at the regional level, the countries’ gaps in regulation of vegetable seed are carried through to regional seed regulatory frameworks, which equally do not prioritize vegetable crops. Among all focus RECs, ECOWAS is the only regional bloc that has established vegetable seed certification requirements. Even so, ECOWAS makes provision only for tomato and onion seed. Stakeholders in Senegal and Nigeria noted that the ECOWAS Procedure Manual should, accordingly, be updated to include more elaborate protocols for additional vegetable seed beyond tomato and onion.⁹⁵

In addition to quality standards, the focus RECs recognize some of the OECD seed scheme-aligned seed classes and labeling and coloring requirements as indicated in the table below. For vegetable seed, OECD recognizes pre-basic, basic, certified, and standard seed (where

and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa, forthcoming, May 2021.

⁹⁴ New Markets Lab and World Vegetable Center, “Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa,” forthcoming, May 2021.

⁹⁵ New Markets Lab Consultations with Stakeholders, September/October 2020.

the producer has the primary responsibility for quality control).⁹⁶ The OECD also generally recognizes QDS as a less-demanding seed quality assurance approach based on FAO guidelines with minimum testing standards for crops including vegetables.⁹⁷ As noted above, the recognition of QDS and a standard seed class for vegetable crops can help bridge formal and informal seed systems,⁹⁸ while ensuring increased access to quality seed. These flexibilities are especially relevant considering the limited capacities of the formal certifying agencies in the focus countries. Notably, however, of the four focus RECs, only ECOWAS has established seed classes for vegetable seed, namely, parental material, pre-basic seed, basic seed, and certified seed.⁹⁹ ECOWAS, however, does not recognize QDS or standard seed for vegetable crops, which is contrary to the OECD seed scheme for vegetable seed. COMESA and SADC, which are the other RECs with regional seed rules, do not cover vegetable crops, although SADC does recognize QDS as a seed class.

Stakeholders also recommended standard operating procedures and harmonized minimum certification standards to ensure that high quality standards are established and met. These standards should be different for exotic and traditional varieties.

(c) Vegetable Certification in the Project Focus Countries

In all the focus countries, vegetable seed must be certified prior to commercialization, with minimum standards on certification established for vegetable seed. A great deal of effort has been focused on national seed certification frameworks and systems, mainly for cereals, grains, legumes, and vegetatively propagated crops. Very little emphasis has been directed towards development of such frameworks and systems for vegetable seed, which none of the focus countries besides Nigeria considers among their priority crops. This has resulted in significant incapacities in the regulation of vegetable seed, characterized by inadequate seed inspection, limited logistical support, absence of or limited internationally accredited laboratory facilities, and knowledge gaps among personnel.¹⁰⁰ In Senegal, for instance, while the legal framework mandates certification of vegetable seed, private sector stakeholders noted that no such certification happens in practice.

⁹⁶ OECD Schemes for the Varietal Certification or the Control of Seed Moving in International Trade, OECD, 153, (2020), <https://www.oecd.org/agriculture/seeds/documents/oecd-seed-schemes-rules-and-regulations.pdf>.

⁹⁷ OECD, OECD Seed Schemes: A Synthesis of International Regulatory Aspects that Affect Seed Trade, September 2012, page 12. Available at: <https://www.oecd.org/agriculture/seeds/documents/international-regulatory-aspects-seed-trade.pdf>. See also, FAO, Quality Declared Seed System, FAO Plant Production and Protection Paper 185. Available at: <http://www.fao.org/3/a-a0503e.pdf>.

⁹⁸ Katrin Kuhlmann & Bhramar Dey, *Regulatory Dimension of Inclusive Seed Systems – A Global Study*, NEW MARKETS LAB AND CATHOLIC RELIEF SERVICES, (2020).

⁹⁹ Regulation C/Reg.4/05/2008 On Harmonization Of The Rules Governing Quality Control, Certification And Marketing Of Plant Seeds And Seedlings In Ecowas Region, Art. 22, http://ecotipa.ecowas.int/wp-content/uploads/2017/07/C.REG_4.05.08-ON-THE-HARMONISATION-OF-THE-RULE-GOVERNING-QUALITY-CONTROL-CERTIFICATION-AND-MARKETING-OF-PLANT-SEEDS-AND-SEEDLINGS-IN-ECOWAS-REGION.pdf?kfkfknohngdbi?pphdbaaaieknglno.

¹⁰⁰ New Markets Lab and World Vegetable Center, Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa, forthcoming, May 2021.

In some of the focus countries, flexible vegetable seed quality assurance approaches have been adopted, which have played a key role in improving farmers' timely and cost-effective access to quality vegetable. In Nigeria, for instance, QDS is recognized for vegetable seed which is produced in the informal sector or is yet to be fully commercialized,¹⁰¹ which is a way to support the commercialization of indigenous vegetable varieties and improve access to quality vegetable seed by farmers. In Kenya and Malawi, standard seed is a recognized vegetable seed class.¹⁰² Kenya and Nigeria have also authorized private seed inspectors, which is likely to address challenges associated with limited capacity of government agencies to adequately certify vegetable seed in the respective countries.

3. Cross-Border Trade

Movement of seed across borders requires that the importer comply with regulatory requirements aimed at ensuring that the imported seed does not carry sanitary and phytosanitary risk and that it meets set seed quality standards.¹⁰³ Regulations on importation are based on international sanitary and phytosanitary (SPS) requirements set out under the International Plant Protection Convention (IPPC) and standards established by ISTA and OECD. Harmonized rules on cross-border trade align with these internationally determined standards, which countries must then adopt and implement at the national level. As a result, importing nations tend to require a phytosanitary certificate, an import permit, and an Orange ISTA Certificate. The import permit is issued by the importing national regulatory seed authority or the national plant protection agency and details the terms for the importation of seed. The phytosanitary certificate is issued by the exporting country's quarantine services authority in accordance with the terms of the import permit and IPPC rules. The Orange ISTA certificate is issued after seed is tested in accordance with ISTA seed testing rules by an ISTA accredited laboratory.

(a) Vegetable Seed Importation Requirements in Focus Countries

In all focus countries, there is some form of regulation to govern the process of vegetable seed importation. In Nigeria, the same rules that apply to the importation of field crops apply to vegetable seed imports, while Kenya, Senegal, and Malawi apply some flexibilities to vegetable seed imports. Senegal issued specific rules applicable to the importation of vegetable seed under a phytosanitary booklet,¹⁰⁴ while Kenya is in the process of developing vegetable seed specific regulations that will among others regulate the importation process.¹⁰⁵

¹⁰¹ New Markets Lab Consultations with NASC, 2020. See also, section 35 of the NACS Act, 2019.

¹⁰² New Markets Lab and World Vegetable Center, Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa, forthcoming, May 2021. See also, Kenya Seed and Plant Varieties (Seed) Regulations, 2016, and Malawi Seed Regulations, 2018.

¹⁰³ Jeffrey Jones, *Phytosanitary Measures and the International Seed Trade*, 213, https://www.upov.int/edocs/pubdocs/en/upov_pub_354.pdf.

¹⁰⁴ Livret phytosanitaire du Sénégal, 12 Mars 2017, MINISTERE DE L'AGRICULTURE ET DE L'EQUIPEMENT RURAL, DIRECTION DE LA PROTECTION DES VEGETAUX, <https://www.ippc.int/en/countries/senegal/reportingobligation/2017/03/livret-phytosanitaire-du-senegal/>

¹⁰⁵ New Markets Lab Consultations with stakeholders, September/October 2020.

With regard to standard importation documentation, stakeholders noted that the rules on obtaining an import permit are quite clear and that no major challenges arise in this context. Stakeholders did reveal, however, that compliance with SPS measures is one of the biggest challenges in importing vegetable seed. Considering that most countries have no special rules on vegetable seed importation, the same pest and diseases that are tested for in other crops are also assessed for vegetable seed. Moreover, stakeholders expressed concern that, in most cases, the diseases that are tested for no longer pose a threat in the importing countries. Compliance with SPS measures is overall regarded as a time consuming and costly process that affects farmers' availability of vegetable seed. This is especially problematic considering that imports are often the largest source of improved vegetable seed (or in the case of Malawi the only source of improved vegetable seed).

Vegetable seed imported into Nigeria,¹⁰⁶ and Malawi (with the exception of seed from COMESA and SADC member countries)¹⁰⁷ must be accompanied by an Orange ISTA Certificate as proof of certification. Stakeholders flagged this as a major challenge, considering that the seed is mostly imported from countries that do not require mandatory vegetable seed certification, and some countries like Malawi and Nigeria lack an ISTA accredited laboratory. While the Orange ISTA Certificate may be necessary for other crops, requiring it for vegetable seed is unnecessary. Kenya came to this realization, and as of October 1, 2020, eliminated the requirement that all vegetable seed be accompanied by an internationally recognized seed field inspection certificate as proof of certification under regulation 23(8) of the Seed and Plant Varieties (Seed) Regulations.¹⁰⁸ Senegal is another focus country that does not mandate an ISTA Orange certificate for imported vegetable seed.¹⁰⁹

(b) Flexible Importation Requirements for Vegetable Seed

In many sub-Saharan countries, the same rules apply to importation of vegetable seed that apply to field crops. Even though vegetable seed is intrinsically unique, most countries have not developed specific rules on vegetable seed imports. This is especially problematic where an Orange ISTA certificate is a mandatory requirement for the importation of vegetable seed, as these certificates are usually issued alongside formal certification, which is not always done for vegetable crops. Imported vegetable seed tends to originate from a few countries (Europe¹¹⁰ and South Africa in particular) that do not mandate certification of vegetable seed and, accordingly, would not necessitate an orange ISTA certificate. Orange ISTA certificates cover a number of traits, and as a result, the process is

¹⁰⁶ New Markets Lab Consultations with stakeholders, September/October 2020. See also New Markets Lab and World Vegetable Center, Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa, forthcoming, May 2021.

¹⁰⁷ New Markets Lab Consultations with stakeholders, September/October 2020. See also, New Markets Lab and World Vegetable Center, Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa, forthcoming, May 2021.

¹⁰⁸ New Markets Lab Consultations with stakeholders, September/October 2020. See also New Markets Lab and World Vegetable Center, Study of Seed Laws and Regulations Affecting the Development of the Private Vegetable Seed Sector in Sub-Saharan Africa, forthcoming, May 2021.

¹⁰⁹ New Markets Lab Consultations with stakeholders, September/October 2020.

¹¹⁰ Council Directive 2002/55/EC of 13 June 2002 on the marketing of vegetable seed.

considerably expensive. This cost is usually passed along to the final consumer, which ultimately makes seed more expensive. Moreover, some of the importing countries either lack an ISTA accredited laboratory or have one that is not accessible due to cost or workload, which complicates the testing process for importers.

The main flexibility with regard to vegetable seed importation process would be to eliminate the requirement for an Orange ISTA Certificate. Stakeholders reported that Senegal and Kenya do not require the orange ISTA certificate for vegetable imports, for example, and Ethiopia is moving in this direction as well.¹¹¹

(c) Regional Regulatory Approaches to Importation of Vegetable Seed

All the focus RECs have developed a regional regulatory framework for cross-border trade of seed. COMESA, SADC, and ECOWAS have established quarantine and phytosanitary measures to promote safer and faster movement of seed across borders. In all of the focus RECs, regional rules provide that seed registered in the regional catalogue can be freely traded in all member countries in the relevant region. In Nigeria, for instance, the NASC Act of 2019 is aligned with the ECOWAS regional seed rules and allows for the importation of vegetable varieties that are listed on the West African Catalogue of Plant Species and Varieties without requiring any evaluation test requirements.¹¹² A plant import permit and phytosanitary certificate are required prior to importation under COMESA, SADC, and ECOWAS seed rules. COMESA and SADC have also developed a harmonized pest list, while ECOWAS is in the process of doing so. For SADC member states like Malawi, compliance with the regional pest list is not mandatory, as long as alternative methods of pest control that are technically and economically feasible and provide the same level of protection as the SADC pest list are in place.¹¹³ Stakeholders noted, however, that compliance with national SPS measures for vegetable seed is a problem considering that most countries' pest lists are not updated. This has resulted in the redundant testing for pests that no longer pose a threat. To address this regulatory gap, a number of stakeholders recommended development of regionally harmonized pest lists for vegetable seed.

For vegetable seed, the biggest regulatory gap at the regional level has been the absence of inclusion of vegetable seed among the regional priority crops, with the exception of ECOWAS. This essentially means that the regional efforts aimed at easing cross-border trade in seed do not apply to vegetable seed. Even under ECOWAS, where onion and tomato are included as priority crops, implementation of harmonized seed rules on cross-border trade depends upon the existence of functional national institutions and infrastructural frameworks, which are lacking in many countries. Stakeholders have noted that although harmonized seed rules exist for some crops, some countries continue to apply

¹¹¹ New Markets Lab Consultations with Stakeholders, September/October 2020. Kenya's requirement under Regulation 23(8) of the Seed and Plant Varieties (Seed) Regulations stipulating that all vegetable seed be accompanied by an internationally recognized seed field inspection certificate as proof of certification was eliminated as of October 1, 2020.

¹¹² Sections 11 and 36(b) of the NASC Act.

¹¹³ Annex II, Article 25 of the Memorandum of Understanding on the Harmonization of Seed Regulations in the Southern African Development Community, 2008.

their own rules, which, at times, are inconsistent with the regional seed frameworks. This is particularly true in the case of vegetable seed, where harmonized rules do not exist at all. Consequently, countries apply varying regulatory approaches, for instance with pest risk analysis, which further complicates regional vegetable seed trade. Harmonized rules on vegetable seed would address this regulatory gap and others.

4. Plant Variety Protection/ Plant Breeders' Rights

Finally, while not a focus of regional efforts to date, an effective system for plant variety protection and plant breeders' rights is considered a priority for varietal development and investment in the vegetable industry. This is because breeders want to safeguard varieties that took time and cost to develop and may also wish to receive revenue from the commercialization of the varieties they develop, in order to allow for reinvestment in process of varietal development.¹¹⁴ Stakeholders noted that the absence of a legal framework on PVP and PBR is a disincentive to investing in the vegetable sectors in some countries.

Regulatory frameworks on PVP/PBR exist at the international and regional levels, and national systems are usually aligned with these. At the international level, the World Trade Organization (WTO) Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS Agreement) requires that a *sui generis* or unique regulatory framework for plant variety protection be established. The International Union for the Protection of New Varieties of Plants (UPOV) sets up this *sui generis* regulatory framework at the international level under the UPOV Convention of December 2, 1961, as revised at Geneva on November 10, 1972, on October 23, 1978, and on March 19, 1991.

At the regional level, OAPI has developed a PVP/PBR regulatory framework aligned with UPOV for West African member states, and a framework has also been developed by the African Regional Intellectual Property Organization (ARIPO) for Eastern and Southern Africa. OAPI differs from ARIPO, however, in that it establishes regional protection that is applicable across all member countries. Within the RECs in sub-Saharan Africa, only SADC has developed a PVP/PBR regulatory framework,¹¹⁵ while the EAC is in the process of recognizing regional PVP/PBR through its Draft Seed Bill.¹¹⁶ For seed, the EAC Seed Bill is the first regional regulation that includes provisions on PVP/PBR,¹¹⁷ which is a notable good practice, although implementation is left to the Partner States. PVP/PBR legal frameworks could also be adopted under other RECs, including ECOWAS and COMESA.

¹¹⁴ New Markets Lab Consultations with Stakeholders, September/October 2020.

¹¹⁵ Sabrina Masinjila, *The SADC PVP Protocol: Blueprint for uptake of UPOV 1991 in Africa* (2018), https://www.researchgate.net/publication/328630015_The_SADC_PVP_Protocol_Blueprint_for_uptake_of_UPOV_1991_in_Africa.

¹¹⁶ New Market Lab, Economic Impact Assessment and Legal Review and Analysis of the East African Community Seed and Fertilizer Legislations, Study Commissioned By the East African Community with the Support of AGRA in 2019.

¹¹⁷ New Market Lab, Economic Impact Assessment and Legal Review and Analysis of the East African Community Seed and Fertilizer Legislations, Study Commissioned By the East African Community with the Support of AGRA in 2019.

The PVP frameworks at the international, regional, and national levels confer PBR on a breeder in relation to the production, multiplication, sale, export, and licensing of the protected variety for a minimum of twenty years. A variety cannot be used for any of these purposes unless authorized to do so by the breeder who owns the PBR. The only two exceptions are use of the protected variety for research and experimental services and farmers' use and non-commercial exchange of saved seed (farmers' exception).¹¹⁸ Since most vegetable crop varieties exist within the informal sector, a stringent PVP law that does not allow for farmers' ability to use farm saved seed can make it difficult for farmers to access seed.

Within the focus countries, PVP/PBR regulatory frameworks exist in Kenya¹¹⁹ and Malawi,¹²⁰ while Nigeria has developed a draft PVP law that is fairly advanced in the legislative process.¹²¹ Senegal does not yet have a PVP regulatory framework, despite the OAPI requirement to do so. All of the focus countries that have PVP laws have based their PVP laws on the UPOV Convention.

While existence of a legal framework on PVP is important, ultimately its implementation is most relevant. Stakeholders in Kenya and Malawi noted that even though PBR protection is provided for under relevant laws, it is not strictly enforced for vegetable seed. Stakeholders in Kenya also revealed that, as a result, once a vegetable variety has been released, it essentially becomes public domain, which discourages investment in the industry.¹²² Among the focus countries, PVP/PBR regulatory frameworks should be strengthened where they exist, developed in Senegal, and put into force in Nigeria, with implementation strengthened in all cases.

¹¹⁸ New Market Lab, Economic Impact Assessment and Legal Review and Analysis of the East African Community Seed and Fertilizer Legislations, Study Commissioned By the East African Community with the Support of AGRA in 2019.

¹¹⁹ Seed and Plant Varieties Act, 2012.

¹²⁰ Plant Breeder's Right Act, 2018

¹²¹ New Markets Lab Consultations with stakeholders, September/October 2020.

¹²² NML Consultations with Stakeholders, September/October 2020.

Findings and Recommendations

The focus countries show quite a bit of variation in vegetable seed. This inconsistency in national regulatory approaches creates challenges for seed companies that could be interested in developing locally and trading in vegetable seed regionally. Stakeholders noted that there is very limited understanding of the rules applicable to vegetable crops at both the national and regional levels. This knowledge gap is exacerbated when regional rules are silent and each country applies differing rules the national level, which, ultimately, will affect the ability of stakeholders to benefit from the presence of a regulatory framework on vegetable seed, even where flexibilities exist.

Aligned vegetable seed regulatory approaches would improve potential for local vegetable sector development, encourage investment in the industry, and improve access to quality vegetable seed. Stakeholders also noted that, especially in countries with regulatory gaps, a harmonized vegetable seed regulatory framework would improve market efficiency and cost effectiveness and create regulatory efficiencies as well. In addition, regional harmonization generally facilitates access to new and improved varieties, eases the movement of seed, improves distribution, simplifies administrative procedures, encourages investment, and reduces costs.¹²³ Harmonized vegetable seed rules would integrate small and isolated vegetable seed markets in the respective regions through (1) harmonization of the seed variety testing, certification, and registration procedures; (2) adoption of a harmonized certification and quality assurance system; and (3) the implementation of uniform quarantine and SPS measures for vegetable seed.

More specifically, the following findings and recommendations could be considered in a regional approach to vegetable seed:

- At the national and regional levels, some institutional and regulatory changes would be needed to recognize the importance of vegetable crops and streamline the processes for vegetable variety registration and release, certification, trade and PVP.
 - Focus countries would have to prioritize vegetable seed in their policy instruments and put in place a strategic implementation plan aimed at improving the institutional and regulatory framework for vegetable seed. In Kenya, for instance, regulations on vegetable are being developed under the seed law, and this may present an opportunity to better streamline the procedures on variety registration and release, certification, and trade of vegetable crops.
 - Vegetable crops should also be prioritized at the regional level, following and building upon the example of ECOWAS.
- Regulatory flexibilities that appear at the national level should be considered at the regional level. For variety registration and release these include:

¹²³ New Markets Lab and Seeds2B, Manual on Regional Seed Regulation in the Southern African Development Community, 2020.

- Exempting vegetable crops from VCU testing and developing vegetable variety registration and release protocols for only DUS, similar to what ECOWAS did for tomato and onion under the 2008 ECOWAS Procedure Manual. This would create a basis for mutual recognition of national regulatory procedures and results from variety registration and release, in order to allow vegetable seed producers to benefit from a wider market created by regional harmonization and expedite the variety registration process.
- With regard to variety registration and release in ECOWAS, the ECOWAS Procedure Manual on Variety Release and Registration should include protocols for additional vegetable crops beyond tomato and onion.
- Regional frameworks could also recognize flexibilities in formal seed certification approaches in order to address the unique nature of vegetable seed and integrate the informal sector, where most vegetable seed is traded in the form of indigenous vegetable varieties.
 - QDS could be more widely recognized as a seed class, building on the SADC model, as could a standard seed class.
 - Authorization of private seed inspection and testing could be more widely recognized and applied as a good practice to make the certification process more time and cost effective.
 - RECs could develop standard operating procedures and harmonized minimum certification standards for vegetable seed that countries could adopt to ensure that high quality standards are met. Minimum standards at the regional level should be developed separately for exotic and traditional varieties, considering that they have developed differently in the market.
- For cross-border trade, flexibilities could also be adopted. These could include:
 - Adoption of a regional pest list for vegetable crops that is risk-based and reflects regional quarantine and phytosanitary conditions.
 - Vegetable-specific pest lists should be developed by all the focus countries, and quarantine and phytosanitary assessments should be risk-based.
- PVP/PBR regulatory frameworks could be referenced in regional seed rules, building upon the SADC and (draft) EAC models. Implementation could also be strengthened regionally to enable effective protection for vegetable varieties.
- At both the regional and national levels, knowledge building is needed to enable stakeholders to benefit from relevant regulatory provisions on vegetable variety registration and release, certification, cross-border trade and PVP.