

WORKING PAPER

Seed Policy Harmonization in ECOWAS: The Case of Ghana

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The paper is part of a series of research on regional seed policy harmonization in Africa, to assess the process for implementing a seed regulatory system that can better deliver improved seed varieties to farmers

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Executive Summary

High-quality seed is fundamental to enhancing agricultural productivity, increasing food security, and improving rural livelihoods. It is well recognized that the legal and regulatory environment, both within countries and regionally, is a significant factor impacting the availability and accessibility of improved seed. In light of the importance of sound legal and regulatory frameworks, much work is being done at the national and regional levels to build these systems. Yet, as this case study and others by the authors indicated, implementing these frameworks remains an ongoing challenge and will require sustained focus and different interventions over time.

This case study on Ghana and the Economic Community of West African States (ECOWAS) is the third in a series by the Syngenta Foundation for Sustainable Agriculture (SFSa) and its partner the New Markets Lab designed to evaluate the process for implementing regional seed regulatory initiatives at the national level in a way that can better deliver improved seed varieties to farmers. These case studies are part of a larger project on regional seed harmonization launched by the partners in 2014, which includes an assessment of regional harmonization efforts in seeds done conducted by the New Markets Lab for SFSa on ECOWAS, the East African Community (EAC), the Common Market for Eastern and Southern Africa (COMESA), and the Southern African Development Community (SADC). Other case studies in this series cover Kenya (a member of both the EAC and COMESA) and Zimbabwe (a member of both COMESA and SADC). As a next step, the partners will conduct test cases to work through the regulatory process for variety release and registration in several of Africa's regions.

While this case study is focused primarily on Ghana, it also includes reference to Senegal's legal and regulatory system for seeds (See Box 1). This case study, as do all in this series, will highlight challenges and opportunities arising from the alignment of countries' national seed systems with regional seed frameworks and regulations. While regional harmonization is intended to streamline regulatory processes and establish common approaches and systems along the seed value chain, the case studies in this series have highlighted the significance of national seed systems in the context of regional harmonization. At this stage in regional harmonization initiatives, all of which have seen significant progress in their initial stages, notable differences remain in national approaches that will require further assessment. Each case study in this series is designed to stand alone, but the series was also created to enable comparison of regulatory practices across several countries, which will strengthen understanding of how implementation of regional seed initiatives can contribute to a well-functioning seed regulatory system.

Based on the authors' findings, Ghana's seed regulatory system is still in a state of transformation that holds significant promise for both developing a local seed sector that can meet farmers' needs and creating a broader regional market within ECOWAS. Unlocking this potential, however, will require progress with regulatory changes that are underway to strengthen Ghana's seed system and align Ghana's local seed law with the ECOWAS Seed Regulation (Regulation C/REG.4/05/2008 on Harmonization of the Rules governing quality control, certification and marketing of plant seeds and seedlings in the ECOWAS Region), as well as mechanisms within Ghana to better implement laws and regulations in practice.

Recognizing the changes that are underway in Ghana's seed regulatory system, interviews conducted in the development of this case study suggest that several aspects of Ghana's seed

system may give rise to further questions of implementation going forward. For example, the practice of variety registration and release in Ghana requires several seasons of both on-station and on-farm trials in order for a variety to be available in Ghana, and this process will need to both be benchmarked against the ECOWAS Seed Regulation and applied only for new seed varieties and not for those that appear in the West African Catalogue of Plant Species and Varieties (West Africa Seed Catalog). Another area that has been under significant discussion is plant breeders' rights protection, or plant variety protection (PVP). Again, legal changes are underway, and Ghana's National Seed Policy highlights the need for greater knowledge sharing in this important area.

In addition, Ghana's current seed law contains a provision (Plants and Fertilizers Act of 2010, Act 803, Section 39 (3)) tying the commercialization of seed to importation and the approval of import licenses, which is not common in countries' seed laws. While this provision, which also appears in a slightly less prescribed form in Ghana's National Seed Policy (Section 13.2.3), is clearly designed to encourage development of the local seed industry, capturing the benefits as the ECOWAS market opens up will rely upon a more balanced approach in this area.

Notable developments in Ghana do signal hope for the future of the seed sector. In addition to regulatory changes underway as noted above, another such development is the official launch of the National Seed Trade Association of Ghana and plans for closer collaboration within the sector. Overall, well-implemented national and regional seed policies would have major benefits, and mutual recognition of regulatory processes and easier movement of seeds between countries would significantly reduce costs and delay.

Overview of the Ghanaian Seed System

Agriculture plays an important role in Ghana's economy, accounting for 30 percent of the country's GDP, employing about 60 percent of its labor force (World Bank, 2012), and accounting for 40 percent of the country's exports (Ghana Seed Policy (GSP), 2013). Ghana is divided into five major agro-ecological zones, and rainfall patterns in most of these zones give rise to major and minor growing seasons. The country produces a variety of crops throughout climatic zones including cereals, legumes, fruits, vegetables and industrial. Ghana is the second largest producer of cocoa, with about 15 percent of the world market (USDA, 2012). Other major crops include rice, maize, cassava, pepper and plantain, with the latter four crops grown by over 40 percent of rural households in the country (Quinones, 2011).

Maize is the principal staple crop produced in Ghana. Maize is consumed by most households and accounts for more than 50 percent of total cereal production. The crop is well adapted and grows in most ecological zones in Ghana (Council for Scientific and Industrial Research (CSIR)/Alliance for a Green Revolution in Africa (AGRA), 2014). Between 2007 and 2012, twelve new varieties of maize were released by the Savannah Agricultural Research Institute (SARI), which exists within the Ghana CSIR (Sipalla, 2013). Although, maize seeds account for most of the sales of certified seeds, there is a low volume of trade in certified seeds, and a large proportion of farmers depend upon informal sources (Etwire, 2013).

In 1989, Ghana embarked on a significant privatization of its seed sector under a new seed program, dissolving the state-owned Ghana Seed Company (which had been established in 1979 to produce all classes of seed except breeder seed) and allowing the private sector to take over the commercial aspects of the sector (GSP, 2013). The dissolution of the GSC paved the way for

private sector involvement in the commercial components of the formal seed sector, with the public sector retaining the service-related aspects (Addo-Quaye, 2013), yet these roles are still shifting as discussed below. There are about 1,500 certified seed producers in Ghana, all of which are privately owned, and each year, about 150 certified seed growers produce improved seeds (World Bank, 2012).

Since the privatization of GSC, the number of small-scale maize seed growers increased from 50 in 1990 to over 100 in 1996. Certified maize production increased from 317 tonnes in 1990 to 1,082 tonnes in 1995 (Lyon, 1998). Between 2006 and 2007, over 2,000 metric tons of maize was marketed, produced mainly by local seed companies. In 2012, maize yields averaged 1.2-1.8 metric tons per hectare (Arhin, 2014).² Selection and preference for maize varieties may be influenced by a combination of factors, including traits such as early maturation, high yield, drought escape, adaptability to soil conditions, and required fertilizer use (Sugri, 2013).

The private sector's role in Ghana's seed system is increasing, with private companies actively involved in seed multiplication and sale, yet much activity remains in the public sector, including varietal development. Overall, the level of awareness and adoption of new seed varieties appear to be low, most likely due to inadequate delivery systems (CORAF, 2013). As is true throughout sub-Saharan Africa, many farmers continue to obtain their seeds from informal sources. These may include seed exchanges with other farmers, purchases from local markets, and seed saving. Demand for certified maize seed outstrips supply, with reportedly approximately 3000-4000 tons of certified seed locally produced to meet part of the total demand for 24,000 tons of certified seed. Ghana does not have many seed conditioning and processing facilities, and resources for certifying seed are limited, as discussed in greater detail below.

Ghana's National Seed Plan, which was released in 2015, serves as a comprehensive implementation strategy for the effective implementation of the National Seed Policy, which was released in 2013. The implementation strategy envisioned by the National Seed Plan highlights the importance of facilitating a shift in leadership in the commercial aspects of the seed industry to the private sector and the need for a strong government role in the provision of support services important for the effective development of the seed industry (National Seed Plan, 2015).

There are multiple seed related associations currently existing in Ghana. The Seed Producers Association of Ghana (SEEDPAG) is a private association of seed producers that includes 600 of the 1,500 private certified seed producers in Ghana. The Seed Trade Association of Ghana (STAG), an umbrella body of enterprises in the seed value chain, was launched in June 2015. STAG membership also includes private entities involved in the supply, processing, distribution, and marketing of improved seeds, as well as NGOs engaged in extension services, distribution, and marketing of seed. Since many companies are members of both associations, there is a need to streamline the activities. The plan is to establish a National Seed Trade Association (NSTA), which brings together SEEDPAG, STAG, and the Ghana Agricultural Input Dealers Association (GAIDA), CropLife Ghana, Ghana Rice Farmer Association. Thus far SEEDPAG has been active in development of the Seed Plan, Seed Policy, 2010 Seed Law, new Seed Regulations, and PVP bill. In the future it is expected that NSTA will play that role, and it holds the potential to be a voice for a growing industry going forward. It will be important that the NSTA engage in regulatory questions as they arise and balance the different aspects of the seed industry.

²This is however considerably lower than the potential yield of 4- 6mt/ha that could be produced.

Plant Breeding and Varietal Improvement

Although Ghana's Plants and Fertilizers Act of 2010 allows plant breeding and varietal improvement in Ghana to be carried out by both public institutions and private companies, most seed varieties have been developed by public institutes within the CSIR and Ghanaian universities, usually in collaboration with international research institutions and funding agencies. Private sector companies currently tend to be more involved in seed multiplication than varietal development. CSIR was established under the Ministry of Environment, Science and Technology in 1968 with the mandate to pursue the implementation of government policies on scientific research and development programs, including for seed. The Crop Research Institute (CRI) and SARI of the CSIR are primarily responsible for the development of breeder seed varieties in Ghana and obtain germplasm from international agricultural research centers such those within the Consultative Group for International Agricultural Research (CGIAR). Ghana has approximately five or six maize seed breeders, three rice breeders, and two soya seed breeders.

Variety Maintenance and Early Generation Seed Multiplication

Quality seed breeders must keep nucleus seed, or very high-quality seed, in order to produce and multiply seed that maintains its varietal characteristics throughout generations. Early generations of seed are called breeder and foundation seed (or sometimes pre-basic and basic seed). To multiply early generation seed, the producer must have a high degree of technical expertise as well as the right equipment and infrastructure. Seed multiplication can also require large tracts of land. The breeder often oversees the multiplication of early generations of seed. Research organizations primarily produce and distribute foundation seed for new crop varieties and depend upon the private sector or registered seed companies to multiply and market seed (Kuhlmann, 2015). Varietal maintenance can be a challenge in countries that lack sufficient infrastructure, such as gene banks, and Ghana has noted the need for improved equipment and infrastructure in order to effectively develop and maintain new varieties.

Formal and Informal Seed Delivery Systems

There are two parallel seed systems in Ghana: a formal system established by the State, and an informal or traditional system (CORAF, 2013). The formal system is characterized by the production and purchase of commercial certified seed while the informal sector is based on seed production and exchange among farmers at the local level (Lyon, 1998). The Ministry of Food and Agriculture (MoFA) has primary regulatory oversight over the seed sector and exercises oversight over the formal seed sector. MoFA consists of different institutions, boards, and directorates. Although the public sector is the primary actor involved in plant breeding, private seed companies may produce foundation seed subject to registration and certification by the Plant Protection and Regulatory Services Directorate (PPRSD) (Ghana Plants and Fertilizer Act, 2010).³ The Directorate of Crop Services (DCS) is responsible for facilitating the development and distribution of improved planting materials to farmers in collaboration with research and extension services providers as well as the private sector (MoFA, 2015).

³ Section 31 of the Seed Act prohibits the import, export, production, cleaning or sale of seed in commercial quantity without registration. The Act does not preclude any person from registration for the production of any class of seed.

Other institutions involved in the seed sector include the National Variety Release and Registration Committee (NVRRC), which oversees variety registration; the Grains and Legumes Development Board (GLDB), which produces and distributes foundation seed; and MoFA’s Department of Agricultural Extension, which is responsible for the provision of seed extension services. Additionally, the Ghana Agri-input Dealers Association (GAIDA) participates in seed marketing and distribution. Table 1 below broadly sets out the institutions involved in the Ghana seed sector and their roles.

Table 1: Regulatory institutions and key participants in the Ghana seed sector

Local variety breeding	Variety Registration	Foundation Seed production	Certified Seed production	Seed processing	Marketing and promotion	Distribution	Certification/Regulation
CRI/SARI/Univ.	NVRRC	GLDB, Research Institutes	Private growers registered with the PPRSD, SEEPAG	PPRSD & GLDB	Private Growers Registered with PPRSD, GAIDA	Private Agro-dealers, GAIDA	PPRSD

Source: Author compilation, based on AGRA (2010)

The PPRSD was created to organize, regulate, implement and coordinate plant protection services needed to support sustainable growth and agricultural development in Ghana (MoFA, 2015). The directorate is divided into four divisions: Ghana Seed Inspection and Certification Division (GSID), Crops, Pests and Diseases Management, Pesticides and Fertilizer Regulatory, and Plant Quarantine (MoFA, 2015). The GSID plays a central role and has responsibility for the certification of seed, registration of seed growers, dealers, producers, and traders, and conducting of field inspections. GSID also provides advisory services to seed growers and dealers.

Assessing variety demand remains a challenge. The research institutes rely on information gathered by the Seed Technical Advisory Committee or the National Seed Committee, which are made up of researchers, seed inspectors, and dealer/grower representatives. The quantity of foundation seed produced, therefore, may be highly dependent upon the amount sold in previous years, GSID forecasts, and the views of committee members (Lyon, 1998).

Within the informal seed sector, seed varieties are usually obtained from on-farm seed savings, or from off-farm sources that are traded and exchanged within farming communities. The informal seed sector is characterized by low yields and uncertainty of the quality of the seed (Wright, 1994). Activities within the informal seed system are not monitored or supervised by any public or private institution. Variety selection and distribution are usually carried out within a specific geographic area (Etwire, 2013). The informal system supplies about 80 percent of the seed needs of smallholder farmers and has historically been the main source of seed for staple crops (Crissman, 1993).

Regional harmonization

Harmonization of seed laws to conform to international best practices is regarded as an important factor in promoting a modern and competitive seed industry (See, e.g. Gisselquist, 2001). A common regulatory framework is expected to reduce the cost of trading seed and encourage economies of scale in seed production. A resultant effect of this can be the expansion of commercial seed production, which provides farmers with better access to new and improved

seed varieties and stimulation of productivity and growth (Rohrbach, 2003). While progress on harmonizing seed regulations can be seen across regional economic communities (RECs), including ECOWAS, effective implementation of regional harmonization will require further action at the national level as well as mutual recognition of rules and regulatory systems between countries (Kuhlmann, 2015).

In May 2008, Ministers of the ECOWAS Countries⁴ approved Regulation C/REG.4/05/2008 on Harmonization of the Rules Governing Quality Control, Certification and Marketing of Plant Seeds and Seedlings in the ECOWAS Region (ECOWAS Regulation). The Regulation covers eleven major crops that are important to food security and trade within the region: maize, pearl millet, rice, sorghum, cassava, Irish potato, yam, cowpea, groundnut, onion and tomato. Following the determination to adopt regulations on the administration of the seed system, ECOWAS adopted enabling regulations on the roles, organization and functions of the West Africa Seed Committee (WASC) in June 2012 (Keyser, 2015). The WASC had been created under the ECOWAS Regulation to implement regulations on seed quality control, certification and marketing. A summary of the ECOWAS Seed Regulation of 2008 and the Enabling Regulation of 2012 is included in Figure 2 below.

In West Africa, the West and Central African Council for Agricultural Research (CORAF) has been a significant partner in regional harmonization efforts, and has been tasked with implementation of the ECOWAS Regulation. CORAF was formerly the Conference of the African and French Leaders of Agricultural Research Institutes (CORAF/WECARD) and Conference of the Agricultural Research Leaders in West and Central Africa. CORAF's implementation efforts are focused through the West African Seed Program (WASP) funded by the U.S. Agency for International Development (USAID). CORAF recently issued an official release to ECOWAS, the West African Economic and Monetary Union (UEMOA),⁵ and the Permanent Inter-State Committee for Drought Control in the Sahel (CILSS) Member States, based on Article 88 of the ECOWAS Seed Regulations, requesting publication of the ECOWAS regulations in countries' official national Gazettes, which would allow the enforcement of the ECOWAS seed regulation across regions, although there are some notable differences in legal systems across ECOWAS as this Ghana Case Study highlights.

A major innovation of the ECOWAS Regulation is the establishment of the West African Catalogue for Plant Species and Varieties (West Africa Seed Catalogue). Any variety entered into the national catalog of a member state should be entered into the regional catalogue and be freely traded and allowed for multiplication throughout the region without any further registration requirement. ECOWAS differs from other regions in that new varieties only need to be registered in one member country in order to be eligible for entry in the regional catalogue; both COMESA and SADC require registration in two countries in order to be eligible for entry in the regional catalogue. The regional catalogue is essentially a compilation of the national catalogues of individual countries (Keyser, 2013).

⁴ The ECOWAS countries are Benin, Burkina Faso, Cape Verde, Côte D'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

⁵ Established in January 1994, the West African Economic and Monetary Union (UEMOA) consists of eight member states: Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. In addition to a shared regional currency, the CFA franc (underwritten by France through a guaranteed conversion ratio to euros of one to .0015), WAEMU pursues regional integration into a single market with measures such as a common external tariff and periodic reviews of member states' macroeconomic policies based on convergence criteria (IMF Online Survey, 2012).

Figure 1: Salient provisions of the ECOWAS 2008 and 2012 Regulations

- **Requirements for variety registration:** For an improved variety to be released in any country, it must have produced satisfactory DUS and VCU test results from trials carried out under the supervision of the country's national seed committee. The DUS tests may be carried out in a single location while the VCU tests must be conducted in several locations and include at least one set of farmer field trials. The criteria to be used for evaluating DUS and VCU data are based on international standards set by UPOV where they exist.
- **Regional variety catalog:** A variety that has been tested according to agreed DUS and VCU procedures and duly registered in one country's national variety catalog will be entitled to entry in the "West Africa Catalog of Plant Species and Varieties" after which it can be multiplied and traded anywhere in the region. The listing of a new variety in the regional catalog will be valid for 10 years, renewable for periods of five years thereafter.
- **Three seed categories:** For the 11 species covered, national catalogs and the regional catalog will group the varieties under three lists including **List A** for improved varieties whose seeds may be multiplied and traded within the region; **List B** for improved varieties whose seeds may be multiplied within the region for export outside the region; and **List C** (or "special list") for indigenous varieties or landraces that have been described/characterized by a country's NARI. Vegetables included in List A are exempt from VCU trials and crops in List B only require DUS tests.
- **Requirements for seed certification:** Every seed lot intended for domestic or international sale in ECOWAS shall be certified in accordance with international standards set by the OECD for field inspection and ISTA for laboratory analysis or other OECD/ISTA-based rules adopted by ECOWAS.
- **Mutual recognition of variety lists and seed certificates:** Each country must permit the importation and sale of varieties registered in the regional catalog that are certified in accordance with the harmonized rules. Licensed traders shall only be required to submit an advance declaration to the importing country's quality control and certification service.
- **Seed sector actors to be licensed professionals:** Licenses are compulsory for all sector participants, and must be renewed every three years by the quality control and certification service of each member state. Criteria and fees for licensing are defined by each member state. At the discretion of the member state, production licenses may be issued to private companies for any seed category including breeder seed and foundation seed.
- **Access to information:** Member states are required to ensure the full participation of seed sector participants in the process of public decision making on seed related matters and organize public access to seed related information available to public authorities.
- **Harmonized definitions and labeling standards:** Countries shall observe standard definitions of seed terms and ensure that standard labels with a minimum set of information are affixed to all seed packs.
- **Oversight and administration:** The West Africa Seed Committee (WASC), funded by the ECOWAS Commission, will serve to monitor and facilitate implementation of the regulations and support development of national seed sectors.
- **Right to appeal and confidentiality:** Licensed seed professionals have the right to appeal any decision against them by the national seed authority and to have their information treated confidentially.

Source: ECOWAS Regulations. (Keyser, 2015)

In addition to publication of the ECOWAS Seed Regulation, countries must take other steps in order to be in compliance with the ECOWAS system. Table 3 below indicates the status of implementation of the ECOWAS Seed Regulation across countries. Institutional capacities differ among countries within the region, and countries have made strides in bringing different aspects of their legal frameworks in line with ECOWAS rules (See Figure 3). A number of ECOWAS countries have yet to establish structures that comply with the ECOWAS Regulation. While some countries have passed domestic seed laws, these may not fully comply with the regional standards. Further, many countries continue to adhere to their own laws, notwithstanding these divergences. Ghana, as is discussed in the following section is one example, as are Burkina Faso, Mali, and Nigeria (Keyser, 2015).

Figure 2: Scorecard of compliance with ECOWAS Seed Regulation, as at September 30, 2015

Additional Measures to be undertaken by Member States (MS) for the implementation	Targeted Countries	Targeted Countries																%	
		Benin	Burkina Faso	Capo-Verde	Côte d'Ivoire	Gambia (The)	Ghana	Guinea	Guinea Bissau	Liberia	Mali	Mauritania	Niger	Nigeria	Senegal	Sierra Leone	Tchad		Togo
• Publication in MS' Official Gazette (2.1)		Y	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	71
• Review of Seed Regulatory Frameworks (2.2):																			
✓ National Seed Law		Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	82
✓ Decree instituting a National Catalogue		Y	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	76
✓ Decree establishing a National Seed Committee (NSC)		Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	88
✓ Decree creating Seed Sector Support Fund (SSSF)		Y	Y	N	N	Y	Y	Y	N	Y	N	N	N	Y	Y	Y	N	Y	59
✓ Decree on Enabling Technical Regulations (ETRs)		Y	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	76
• Adaptation of Procedures Manuals for (2.3):																			
✓ Variety Release		Y	Y	N	Y	Y	Y	Y	N	N	Y	N	Y	Y	Y	N	N	Y	65
✓ Seed Quality Control and Certification		Y	Y	N	Y	Y	Y	Y	N	N	Y	N	Y	Y	Y	N	N	Y	47
✓ Phytosanitary Certification		Y	Y	N	Y	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	35
• Capacity Strengthening on (2.4):																			
✓ Human Resources ¹		Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	82
✓ Material Resources ²		Y	Y	N	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	71
✓ Financial Resources ³		Y	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	76
❖ State in country (%)		100	100	0	92	100	83	83	8	58	83	33%	83	100	100	67	17	100	

Source: WASP, September 2015 (from Dr Paul Senghor)

Further, in some countries, notably Ghana and Nigeria, national constitutional structures require parliamentary ratification in addition to publication in the Gazette. Most ECOWAS countries follow a different legal system (Civil Code system) and do not require this additional step. This aspect of implementation highlights differences in legal systems within ECOWAS, and differences between Common Law and Civil Code systems may continue to present challenges as implementation of the 2008 Seed Regulation moves forward.

The ECOWAS seed system can be differentiated from other sub-Saharan African regions in certain respects, including variety registration. In COMESA and SADC, a variety must be registered in two member countries in order to be eligible for entry into the region's seed catalog. At this stage, affirmative entry into the regional catalogue is required even if a variety meets the two member states requirement, although the COMESA process appears to be a bit more streamlined. In even sharper contrast, the process established through the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), which is followed by most of the members of the EAC, allows that a variety registered in one country's national catalogue can be registered in another country following a streamlined domestic testing procedure with only one season of VCU trials, which essentially serves as a "confirmation" test.⁶

Other developments are underway. In August 2015, the ECOWAS Regional Seed Committee was launched and a plan of action developed. In collaboration with member countries of UEMOA as well as Mauritania and Chad, ECOWAS is also putting in place other measures (including the

⁶ The existing seed regulation harmonization arrangement in East Africa is based on an agreement on variety release and registration which was reached between Uganda, Kenya, and Tanzania and is based on the work of ASARECA, the Eastern and Central Africa Program for Agricultural Policy Analysis (ECAPAPA), and the Eastern Africa Seed Committee (EASCOM). It is currently being implemented under the ASARECA/ECAPAPA Agreement, Monograph Series No. 4. The ASARECA/ECAPAPA work also includes harmonization of seed certification procedures, SPS regulation, plant variety protection, and seed law and regulations (New Markets Lab, 2015). Rwanda has also shown interest in joining the arrangement.

development of implementing regulations) that will give effect to the 2008 ECOWAS Seed Regulation. The first of these regulations meant to specify how practical implementation will work, was the Enabling Regulation 01/06/12 on WASC, discussed above. CORAF was given responsibility by ECOWAS for the establishment and execution of the committee's mandate. Additional implementing regulations related to organization of the regional seed catalog, seed certification, and quality control requirements are under development (Keyser, 2015).

Notably, Ghana is also a member of the African Regional Intellectual Property Organization (ARIPO), a regional organization focused on intellectual property rights (IPR). In July 2015 ARIPO adopted the Arusha Protocol for the Protection of New Varieties of Plants which creates a regional PVP framework and which will have an impact upon PVP regulation in Ghana. While the draft ARIPO PVP Protocol conformed to the UPOV Convention, the final Arusha Protocol that was adopted contained amendments that precluded full compliance with UPOV. In particular, the final Protocol recognizes a system of national-level PVP rather than a unitary system for the entire territory (New Markets Lab, 2015).

Ghana's Legal and Regulatory Framework

Ghana regulates its seed sector through several policies, laws, regulations, and guidelines. MoFA is responsible for harmonizing domestic seed regulations with the 2008 ECOWAS Seed Regulation. Within the MoFA's GSID, the National Seed Council (NSC) and Plant Protection Advisory Council also play an advisory role in development and implementation of law and regulation. The National Seed Council is responsible for the formulation of seed policies, while the Plant Protection Advisory Council provides assistance in relation to the preparation and implementation of regulations under the 2010 Plants and Fertilizers Act.

Key policies, laws, and regulations are the Ghana Plants and Fertilizers Act of 2010, 2013 Ghana National Seed Policy, 2012 Plant Protection Regulations, Seed (Certification and Standards) Act of 1972, 2011 Ghana Biosafety Act, and 2015 National Seed Plan.⁷ A Ghana Plant Breeders' Bill, modeled after the International Convention for the Protection of New Varieties of Plants (UPOV) 1991,⁸ has been developed and is aimed at establishing a legal framework for the protection of the rights of breeders of new varieties of plants. The bill is yet to be passed into law, however, and Ghana's system is not yet aligned with UPOV and the World Trade Organization (WTO) Agreement on Trade Related Intellectual Property Rights (TRIPS), which calls for *sui generis* protection of plant breeders' rights.

The primary law governing the Ghanaian seed sector is the Plants and Fertilizer Act of 2010, which is divided into five parts, specifically those relating to Plant Protection, Seeds, Fertilizer Control, Plant and Fertilizer Fund, and Miscellaneous Matters. As is true in most legal systems, laws and other legal frameworks tend to guide overarching behavior while regulatory frameworks provide specific rules for implementation and enforcement of laws. The Plants and Fertilizers Act of 2010 has not been fully implemented, as certain regulations that will provide more detailed instruction are still in draft form and awaiting parliamentary approval.

⁷ The partnership of the West African Economic and Monetary Union (UEMOA), the Permanent Interstate Committee for drought control in the Sahel (CILSS), and ECOWAS are currently working on the *Procedure Manual for Quality Control, Seed Certification and Accreditation*. The manual is yet to be finalized.

⁸ Ghana is yet to ratify the UPOV.

As noted, the ECOWAS Seed Regulation covers a broad range of matters, including seed quality control, requirement for field inspections, and seed storage facilities. While the provisions of the Plants and Fertilizers Act of 2010 and Seed (Certification and Standards) Act of 1972 (Seed Certification Act) also apply to these areas, the MoFA has determined that some changes are necessary to bring Ghana's system in line with the ECOWAS Seed Regulation. At the time of this report, MoFA is developing Seed (Certification and Standards) Regulations (the Seed Regulations) that will implement the 2010 Plants and Fertilizers Act and align Ghana's system with ECOWAS. The draft Seed Regulations are expected to be considered by Parliament soon, perhaps sometime in 2016, although exact timing may depend upon a number of factors, including parliamentary consideration of the Seed Regulations and upcoming elections.

Ghana's progress in implementing the ECOWAS Seed Regulation differs a bit from other ECOWAS countries. ECOWAS Member States are required to publish (or gazette) ECOWAS legal instruments, and the harmonized ECOWAS Seed Regulation should supersede national legislation without requiring domestication. Constitutionally, however, Ghana's Parliament must ratify the ECOWAS Regulation before it can go into effect, which effectively requires an affirmative act of domestication before the ECOWAS Regulation can be implemented. Further, in practice, Ghana's national level instruments and procedures need to be aligned with the ECOWAS Seed Regulation. This includes both the needs for Seed Regulations that are aligned with the ECOWAS Seed Regulation and changes in quality control processes including the actions of agents, field border officials, and seed inspectors who will often refer to domestic law as the effective legislation. This practice is not unique to Ghana and is common among countries, which will often elect to follow national laws and regulations or domesticate regional regulations, even when they are self-executing, leading to differences in national legal systems and regional regulations.

Part Two of Ghana's Plants and Fertilizers Act of 2010, which deals with the seed industry, regulates the production, inspection, importation, exportation, and commercial transactions related to seed in Ghana as well as the activities of growers, cleaners, importers and exporters of seed (Etwire, 2013). The Plants and Fertilizers Act of 2010 establishes the NSC and two committees that fall under it, namely the NVRRC, which is the standing committee, and the Technical and Variety Release Committee (TVRC). The NVRRC is mandated to create and maintain the national variety list and to give recommendations regarding release of varieties, removal of varieties from the register, or the inclusion of crop species. The TVRC is mandated to advise the NSC regarding registration and certification procedures and fees, publish annually a list of varieties of crops grown in Ghana, and make recommendations regarding the release of new varieties or removal of varieties from the register, and conduct technical reviews as needed. The Committees are composed of representatives of private sector stakeholders in the seed sector and farmers' representatives, and both committees are responsible for recommending crop varieties for approval to the NSC and creating and updating the National Variety Register (Ghana Plants and Fertilizers Act, 2010). The composition of the NVRCC and TVRC does overlap, and this issue is slated for discussion at an upcoming Seed Council meeting. While the Seed Council is supposed to meet quarterly, however, this schedule is not always maintained due to resource constraints.

Variety Release and Registration

The Plants and Fertilizers Act 2010 covers variety release and registration in Ghana. Section 43 of the Act stipulates that a new variety may be introduced into the country only after it has

received approval from MoFA. A new variety shall be entered into the national variety list after appropriate distinctness, uniformity and stability (DUS) and value for cultivation and use (VCU) tests have been conducted. The Plants and Fertilizers Act, in section 43 (2), should allow for an automatic registration for varieties listed in the regional catalogue by permitting a new variety to be registered as a result of regional agreements on variety release, but other practices discussed below seemingly contradict this provision. The Plants and Fertilizers Act requires the issuance of Regulations covering variety release and provides that DUS and VCU conformity tests shall be undertaken by an accredited public organization, in accordance with guidelines set by the NVRRC (Ghana Plants and Fertilizers Act, 2010). The Seed Regulations, which will cover variety release, are in draft form and may be considered by Parliament in 2016.

In order to register a variety, an application must be submitted to the NVRRC requesting initiation of the variety release and registration process. In practice, the process involves two seasons each of on-station DUS and VCU trials and one to two seasons of on-farm trials. According to the ECOWAS Seed Regulation, vegetable seeds are not subject to VCU trials, although this is not specifically noted in Ghana's Plants and Fertilizers Act, and Section 43 of the Act does not exempt any kind of seed from testing. Supervised field trials are conducted by CRI and SARI (See Table 2) in collaboration with MoFA, and they are expected to take place in several locations. In practice, however, resource constraints may prevent multi-location field trials. Ghana also requires information on consumer preference, physicochemical analyses, and economic analyses. NVRRC coordinates with public institutions involved in the variety release and registration process and makes a recommendation to the NSC to approve or deny an application for variety registration. While all evaluations of a new variety are supposed to be independent, questions have been raised about potential conflicts of interest between the public institutions (which are also in the business of developing varieties) and the private sector. The length of time required for variety registration varies by crop and is dependent upon the length of growing seasons and availability of irrigation. Maize varieties can generally be registered within two years with irrigation; rice varieties may take three years or more and other crops, such as cassava, can take even longer.

Table 2: Participants in the variety release process

On-farm trials	CRI and SARI in collaboration with extension staff of MoFA
Consumer preference trials	The Women in Agricultural Development Division of MoFA
Physicochemical analyses	Department of Food Science at the University of Ghana
Economic analyses	Economists within CRI and SARI

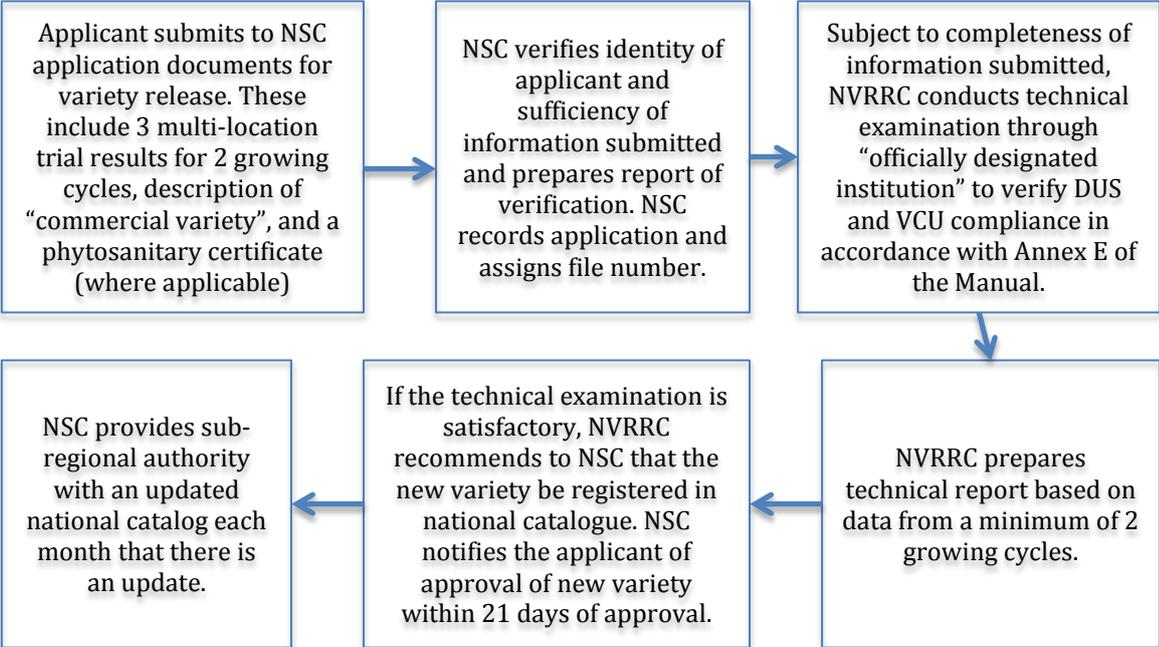
Source: Badu-Apraku et al., 2014

An application for the release of a maize variety follows the above procedure, with the submission of application documents including two years of on-station (multi-location) data, two years of on-farm data, consumer preference data, and data from physicochemical and economic analyses. The CRI and SARI are responsible for conducting field trials for maize varieties and hybrids. During the growing season, staff of the NVRRC will inspect the breeder seed fields on a minimum of two occasions (at flowering stage and during harvest) and decide whether a variety will be released based on the application data submitted and reports from the field visits. If the committee finds the performance of the seed satisfactory, a date is fixed to

consider the release of the variety. The applicant will present the necessary data during the meeting of the NVRRC in support of the release of the variety. According to a 2009 report on variety testing and release approaches conducted in relation to 13 countries sub-Saharan Africa, Ghana was noted as the only country that requires an economic analysis before the release of a new maize variety (Setimela, 2009).⁹

In 2012, MoFA released a manual on the *Procedure for Release and Registration of Crop Genetic Material* (Variety Release Manual), which sets out protocols for the DUS and VCU tests for eight crops (maize, rice, cowpea, cassava, yam, sorghum, ground nuts and sweet potato). Testing standards for other crops are to be developed as necessary. While the process stipulated in the Variety Release Manual may seem clear, it appears slightly different from the process for variety registration that is reported in practice. It is likely that any discrepancies will be ironed out through the new Seed Regulations, but some inconsistencies may arise until the new Seed Regulations are approved. The procedure laid out in the Variety Release Manual is depicted in Figure 3 below.

Figure 3: Variety Release Procedure in Ghana Variety Release Manual



Source: New Markets Lab, 2015. Information from Manual of Procedure for Registration of Species and Varieties in Ghana, January 2010

If the application submitted is incomplete, the NSC will request additional information to complete the application process. Also, if the technical examination turns out to be unsatisfactory, the NSC will notify the applicant of the rejection based on the results of at least two growing cycles, and the applicant may appeal within 20 working days of the date of the rejection; otherwise, the application stays rejected (Variety Release Manual, 2010).

It is noteworthy that the Variety Release Manual makes no reference to the CSRI, which is the primary research institute responsible for variety breeding, or any other research institute. It is

⁹ Data from economic analyses show how profitable and acceptable an existing technology or innovation for crop production is before a decision is taken to promote the variety on a larger scale.

unclear whether this presumes that the institute is required to develop all varieties or this omission is intended not to restrict this right to the CSRI. The Manual also requires the NSC to publish an approved variety in the official bulletin and provide an updated national catalogue on a monthly basis. It takes an average of two years for a maize variety to be released in Ghana (Setimela, 2009).

The Ghana Plants and Fertilizers Act 2010 requires all varieties of seed to be tested domestically notwithstanding whether a variety may have been tested and approved in a neighboring country in the same region with similar growing conditions. Under Ghana's 2010 Seed Law, the source of the variety would determine the length of the testing period, such that material submitted under the ECOWAS harmonized protocol may be short (Ghana Seed Policy (GSP), 2013). Under ECOWAS rules, however, a variety registered in one ECOWAS country and entered into the regional variety catalogue should be eligible for registration and marketing in another ECOWAS country without additional testing. Further, although the government of Ghana has released a National Variety Catalogue, the catalogue does not fully conform to the ECOWAS Seed Regulation with respect to the three seed variety lists required (Keyser, 2015).¹⁰

Seed Certification

Like most other countries in sub-Saharan Africa, Ghana maintains a centralized seed certification system. This practice is based on the underlying assumption that the government is responsible for the protection of the interests of seed consumers (Venkatesan, 1994). Seed certification in Ghana is provided for under the Plants and Fertilizers Act of 2010 and the Seed Certification Act. The Seed (Certification and Standards) Regulations are under review by MoFA and have not yet been issued.

In Ghana, not all seeds are eligible for certification; seeds shall only be certified if they are subject to inspection, sampling and laboratory testing by an accredited person authorized by the PPRSD. Under the Ghana Seed Policy, Ghana follows a system of Minimum Standards Certification that includes the setting of mandatory minimum standards for the different classes of specific crops, including maize, rice, sorghum, millet, cowpea, groundnuts, Bambara groundnuts, soybean, garden egg, onion, tomato, pepper, okra, cassava, yam, sweet potato, cocoyam, mango, citrus, and pineapple. The Minister may develop regulations establishing which crops are required to be certified based on the advice of the NSC and may set out the conditions under which seeds may be certified (Ghana Seed Act, 2010). The Plants and Fertilizers Act 2010 sets out four seed classes in section 44, namely: Parental Material, Pre-basic or Breeder Seed, Basic or Foundation Seed, and Certified Seed.

According to the Ghana Seed Policy, the seed certification system in Ghana also allows for situations in which Quality Declared Seed (QDS) schemes may be applied, though it does not identify any specific crops that will be subject to QDS. The National Seed Plan identifies the systemic incorporation of QDS into the certification process as a "key activity." QDS is generally more community based and is usually employed in areas where centralized certification might not be feasible, such as in the local production of seed by smallholder farmers or in the case of particular crops, and QDS systems often set crop-specific requirements for field standards,

¹⁰ The ECOWAS Regulation requires member states to maintain separate lists in their national catalogues: three seed categories (List A, B, and C) as described in Figure 2.

facilities, field inspections, and seed quality, including those that follow the guidelines set by the Food and Agriculture Organization of the United Nations (FAO) (Kuhlmann, 2013).

The GSID has exclusive oversight over the production of foundation seed through to the sale of certified seeds to grain producers or farmers (Etwire, 2013). GSID operates the National Seed Testing Laboratory (NSTL), which carries out seed sampling and laboratory quality tests to verify moisture content, purity, germination and health of the seeds before the seeds are certified for distribution and sale.

The seed certification process in Ghana involves: (a) registration of the seed producer with the GSID (all companies must also be registered under the Ghana Company Registration Act); (b) inspection of the seeds by an independent and licensed inspector who sends the seed samples to an authorized or accredited laboratory for examination where necessary; (c) testing of the seeds by an authorized or accredited laboratory in accordance with the International Seed Testing Laboratory Association (ISTA) Rules; (d) Tagging of the seeds (first generation certified seeds are tagged blue, while red tags are used for second generation and hybrid seeds);¹¹ and (e) Labeling of the seeds which requires the label to carry information such as variety name, weight, percentage of purity and information about variety registration (Ghana Plants and Fertilizers Act, 2010).

Despite having a robust mandate, limitations on GSID's resources impact its productivity. These capacity challenges include limited mobility, ill-equipped laboratories, and limited number of trained personnel to undertake various quality assurance activities (GSP, 2013). Ghana currently has 36 seed inspectors for the country. While the Seed Act allows for accreditation of private seed inspectors, this activity is currently done by the public sector. As part of its duties, GSID is required to inspect seed growers' fields at least twice during each growing season. In practice however, this level of supervision is unlikely, given staffing and budgetary shortfalls. The absence of a comprehensive quality assurance system in breeder seed production affects foundation seed production as well (GSP, 2013). The Ghana Seed Policy has identified the issues affecting its operations and has set out measures to be put in place to mitigate the drawbacks.

With respect to certification, ECOWAS is intended to harmonize certification across the region. Common practices include accreditation, qualifications (including staff and equipment), seed classes, field inspections, laboratories, packaging, and processing and storage. ECOWAS also requires member states to adopt the Organisation for Economic Co-operation and Development (OECD) standards for field inspection and ISTA standards for laboratory analysis. The OECD Schemes for the Varietal Certification or the Control of Seed Moving in International Trade ("OECD Seed Schemes") establish common practices for varietal certification by participating countries and cover seven seed species. A total of 58 countries, including seven African countries, formally participate in the OECD Seed Schemes, but Ghana is not yet a formal participant.

The ECOWAS Seed Regulation recognizes four seed classes, namely: parent material (G_0), pre-basic seed (G_1 , G_2 , G_3), basic seed (G_4), and certified seed and requires the harmonization of labeling systems for different generations of seed based on ISTA Standards in relation to such variables as isolation distance, number of inspections, germination test, and moisture content. Although not many countries within the ECOWAS region have enacted laws to regulate seed quality and certification, an even smaller group of countries has issued procedural manuals for

¹¹ Tagging is required for locally produced seeds only.

seed certification.¹² Seed inspectors are required to conduct a minimum of four visits during the cropping cycle: a preliminary inspection before cropping, pre-flowering phase, flowering phase and the pre-harvest phase. The minimum number of inspections is subject to factors such as crop condition, the seed farm environment, and cropping history (ECOWAS, 2008). Senegal, in contrast, tends to require only three visits for certification (See Box 1), although a fourth visit may also be requested. Seeds proposed for certification would then undergo laboratory analysis in accordance with ISTA rules to verify that the seed conforms to the agreed specifications. Seed crops that pass the field and laboratory inspections would be labeled by the official quality control and certification institution to ensure the inviolability of the package.

In Ghana, the GSID is responsible for seed certification and quality assurance. It performs laboratory testing of seeds to ensure that they meet minimum standards of purity and germination. Although it does not yet have an accredited laboratory,¹³ Ghana has become a member of ISTA. The country has, however, experienced difficulties adhering to ISTA standards in recent years and endeavors to conduct laboratory seed tests and analyses according to ISTA standards.

Article 69 of the ECOWAS Seed Regulation requires that seed certified by an authorized service in a member state be recognized as such by all other member states. However, section 44(3) the Ghana Plants and Fertilizers Act states that seeds will “only be certified if they are subject to field inspection, sampling and laboratory testing by an accredited person authorized by the Plant Protection and Regulatory Services Directorate to verify compliance with standards.” Section 38(2) of the Plants and Fertilizers Act also further provides that, subject to the Exports and Imports Act of 1995, nobody can produce, condition, or market any seed unless it is of a standard prescribed by the Plants and Fertilizers Act or its Regulations. These conditions give rise to questions regarding whether Ghana’s certification system complies with ECOWAS Seed Regulation.

Box 1: Overview of the Senegalese Seed System

Currently, plant breeding and varietal improvement in Senegal is largely carried out by the Institute Sénégalais de Recherches Agricoles (ISRA), a public research institution. ISRA produces breeder and foundation seeds for all cereals (rice, sorghum, millet, maize, groundnut, and cowpea). Most seeds are open-pollinated; hybrids are still not very well accepted. DISEM (the Division des Producteurs de Semences) is in charge of seed quality control. Senegal joined the OECD Seed Schemes in June 2015, and it will take at least two to three years to have an ISTA accredited lab in the country.

Senegal has a legal and regulatory framework governed on one hand by law (Law n° 94- 81 of December 23, 1994) related to variety registration, production, certification of seeds and plants, and, on the other hand, by three decrees (USAID, 2011):

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

¹² Iowa State University (ISU) has prepared government procedural blueprints for accreditation of seed companies, laboratories and individuals for seed certification that are being implemented with local adaptation in some countries. In 2007, ISU developed procedural manuals for the variety release of seeds and for seed certification and accreditation for the ECOWAS, UEMOA and CILSS regions. However, the extent of adoption of these manuals or compliance with the standards they contain is uncertain.

¹³ ISTA accreditation is a formal recognition of technical competence to undertake certain tasks. It enables an accredited ISTA member to issue ISTA international seed analysis certificates according to the ISTA Rules in force.

- Decree 97-603 concerning the creation of the Comité National Consultatif des Semences et des Plants (CNCSP), the National Advisory Committee for Seeds and Plants; and
- Decree 97-616 concerning regulation of the production, certification and trade of seeds and plants.

The national framework is reinforced by the implementation of the ECOWAS harmonized seeds framework. In Senegal, as in Ghana, two seasons of DUS and two seasons of VCU are required for variety release. Breeders are also trying to follow the ECOWAS VCU guidelines, but Senegal lacks a regulatory framework for DUS, and capacity for testing is a challenge. Locally produced vegetable varieties must have DUS tests (not VCU) for registration. Not many varieties have been registered outside of rice (rice varieties were registered in 1997 and 2007).

With respect to seed certification, there are approximately twenty seed inspectors (accredited controllers) in Dakar and six rice inspectors (in the Rice Valley). The certification process usually includes two to three rounds of field inspections, although sometimes a fourth visit is needed.

For importation, an import permit must be obtained from the Ministry of Agriculture, and other financial and administrative documents are required as well. For export, a certificate of origin and a phytosanitary certificate must be obtained from the Ministry of Commerce and Ministry of Agriculture respectively. Seed imported from ECOWAS is free of tax; otherwise a 7.9% duty will apply.

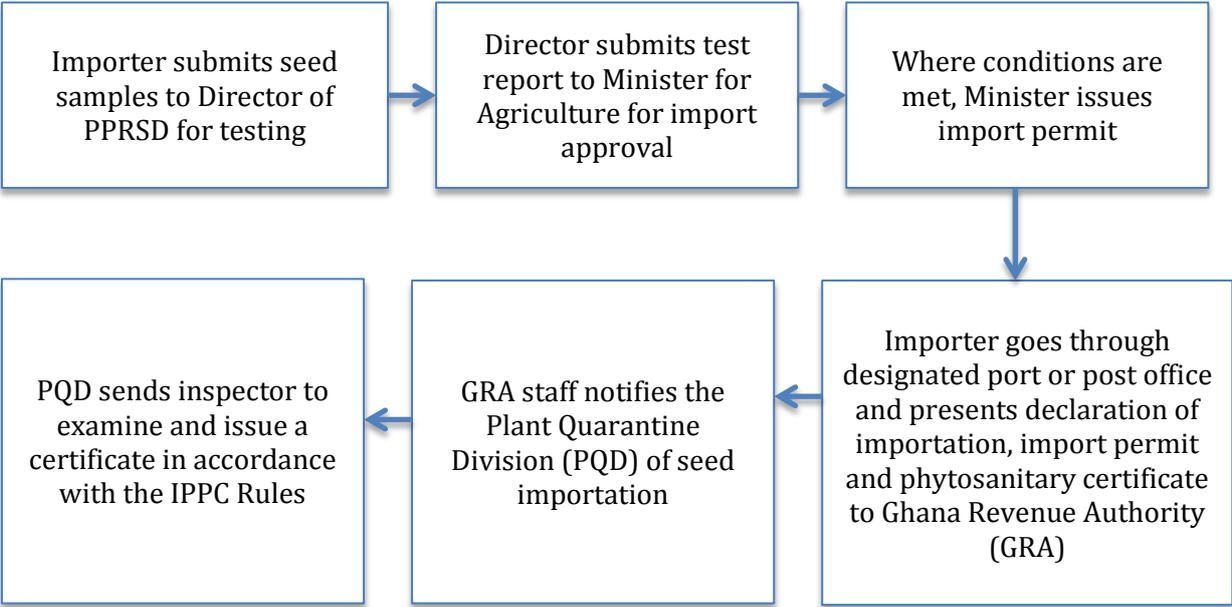
Cross-border trade

Both Part Two of Ghana's Plants and Fertilizers Act and Ghana's Seed Certification Act regulate and monitor imports, exports, and commercial transactions in seeds. The Seed Certification Act prohibits the importation, exportation, and sale of seeds of a variety that is not approved by the Minister. The Plant Quarantine Division (PQD) of MoFA's Plant Protection and Regulatory Services works closely with the country's Customs Excise and Preventive Services (CEPS) at all official entry points and maintains records of plant imports and exports, importers and exporters, and pests and diseases of quarantine importance. PQD is also responsible for the issuance of phytosanitary certificates and import permits. Ghana has 108 phytosanitary inspectors at 45 entry points and will require additional capacity as trade increases.

Importers and exporters must be registered, as must companies engaged in other activities in the seed sector such as retail and distribution. The Plants and Fertilizers Act prohibits the importation of plants, plant material or conveyance materials without an **import permit** and a **phytosanitary (plant health) certificate**. Unless the Minister determines that the import presents a risk, general import permits are required for the importation of seeds for cultivation and propagation (whether for personal use or not). To obtain an import permit from MoFA, an applicant is required to submit an application and the required fee at least 7 days before the date of importation.¹⁴ Section 39 of the Plants and Fertilizers Act also requires that a person intending to import seeds of any crop submit samples of the seeds to the Director for testing by an accredited institution. The Minister will then approve or prohibit the importation of the seeds based on the test results and recommendations contained in a report received from the Director.

¹⁴ The application should contain specific information including the name and address of importer, name and address of exporter, quantity of plant commodity to be imported, country of origin of the commodity, indication of the port of entry and the means of transport or conveyance.

Figure 4: Procedure for the importation of seed into Ghana



Source: New Markets Lab, 2015. Information from Ghana Plants and Fertilizers Act, 2010

Section 29 of the Plants and Fertilizers Act 2010 makes a distinction between the importation of seeds for the purpose of production for “experimental or research purposes” and importation of seeds for “direct and commercial distribution to farmers for production,” and provides that, upon approval for importation, the Minister shall authorize an importer to produce seeds for commercial production and distribution.

Special permits are also required for the importation of Genetically Modified Organisms, which are allowed for research purposes only. An import permit is valid for 6 months from the date of issue and valid for only one shipment of consignment from a country of origin. The phytosanitary certificate should be issued by an authorized person in the exporting country. To facilitate compliance with requirements prescribed on the import permit, the importer should forward a copy of the import permit to the exporter in advance of the shipment.

All imports must go through a designated port, and an importer is required to submit to the Ghana Revenue Authority (GRA) evidence of declaration of the imported materials at the port as well as the import permit and phytosanitary certificate. An officer of the GRA will then notify the PQD of MoFA of the arrival of such materials and would not release the materials until a plant quarantine officer so authorizes. Samples of seeds and other propagative materials undergo a seed health test after visual inspection, and a phytosanitary decision is taken on the basis of the test results. The Plants and Fertilizers Act 2010 requires that all imports conform to the International Plant Protection Convention (IPPC), to which Ghana is a signatory. Any plant, plant material or other item that may contain pests must, upon its importation, be inspected under the IPPC procedures. Both the import permit and the phytosanitary certificate should be patterned after the IPPC format.

A Pest Risk Analysis (PRA) may be required depending upon the phytosanitary status of imports and will also be conducted in accordance with IPPC procedures. Neither phytosanitary measures nor PRAs will, however, be required where imported goods have been processed to the extent that quarantine pest infestation is unlikely (MoFA, 2015).

Section 6 of the Plants and Fertilizers Act 2010 requires a prospective exporter of plants or plant material for which a phytosanitary certificate is required to request from the PQD a **safe pre-export examination** or other inspection or test required by the country of destination. The designated PQD officer will examine each consignment and, if satisfied that the requirements are met, issue a phytosanitary certificate. The examination shall be conducted within 6 hours before the stated export time (for perishable consignments) or between 6 hours and 3 days before the stated export time (for a non-perishable consignments). The registration is renewable annually by the PPRSD.

Regional harmonization of seed regulations is particularly critical in areas of international trade. Cross-border movement of seed requires careful implementation of standards, and countries are required to apply sanitary and phytosanitary (SPS) measures aimed at preventing the spread of plant and animal diseases and pests across borders such as not to restrict seed trade. Safety controls applied in cross-border trade include border tests, requirements for phytosanitary certificates, and post-entry quarantine measures (Kuhlmann, 2015). Under the ECOWAS Seed Regulation, import and export of conventional seeds shall be subject to declaration of the official quality control and certification institution, and all cross-border seed trade shall be accompanied by a phytosanitary certificate issued by the relevant national agency of the country of origin of the seed (ECOWAS, 2008).

In line with the regional standards, the Ghana Plants and Fertilizers Act 2010 prevents the importation of plants and plant material into Ghana without a phytosanitary certificate issued by an authorized person in the exporting country. This also applies to exports from Ghana to a country that requires a phytosanitary certificate in relation to the export of seeds. In addition, the exporter is to comply with all necessary requirements of the importing country.

A major distinction exists however between Ghana's regulatory system and the ECOWAS rules, including the ECOWAS Seed Regulation and ECOWAS Trade Liberalization Scheme (ETLS), which binds countries to minimize barriers to regional trade of crop inputs. The ECOWAS Seed Regulation requires free movement of seeds in the region as soon as they meet quality standards in the community and puts in place mutual recognition of certification based on community standards (ECOWAS, 2008). In contrast, the Ghana Plants and Fertilizers Act 2010, as discussed above, requires any importer of seed to submit samples of such seed for testing by an accredited research institution. The report of the test is subject to the approval of the Minister (Ghana Seed Act, 2010). In practice, seed companies have to pay the full amount of roughly \$3,500 for seed entry. This excludes the cost of materials used for on-station and field trials (Keyser, 2015). In the context of obtaining an import permit, Ghana also requires that importers agree to produce seeds for commercial production and distribution, which is also inconsistent with the requirements of ECOWAS.

Ghana, however, is not the only ECOWAS country whose practices diverge from the ECOWAS Regulation. The Nigerian National Agricultural Seed Council (NASC) also mandates local testing of all varieties intended for sale to farmers in Nigeria, maintaining that recognition of varieties listed in the West Africa Seed Catalog only apply to varieties imported for direct use on the importer's farm and not to seed intended for commercial sale to farmers. According to the NASC, the regional variety acceptance would expose Nigeria to "dumping" unless they conduct their own DUS and VCU tests (Ayoola, 2014).

Industry Experience

In development of this case study, the authors conducted interviews with seed companies in Ghana to understand their perspectives with respect to variety registration, seed certification, and international trade. One common problem identified is the costly and unpredictable nature of a seed production project. Their experiences are summarized below.

Company A is an established agri-input distributor in Ghana, selling seeds, crop protection products, fertilizers, and agricultural equipments. The seed portfolio includes mainly vegetable seeds and cereals (certified soybean, cowpea, and maize). Hybrid maize is largely sold to commercial farmers who operate farms above 250 acres. All the other seeds and a majority of maize seeds are open-pollinated varieties. The company has two major stores: the northern one sells mostly soybeans while the southern one deals with seeds of maize, cowpea, vegetables and fruits. The certified seed is usually packed in 45 kg bags with proper tags issued by GSID. Smaller packages are made for retail purposes. All retailers and wholesalers must be registered with (a) Environmental Protection Agency and (b) PPRSD, and the license to operate must be renewed regularly.

The import process for vegetable seeds has been smooth. The company needs to get an import permit from PPRSD and test samples upon arrival. Once imported, products are registered with PPRSD; it normally becomes easier to import the next time around.

The company identified accessibility (rather than the cost) of seed as the number one issue facing farmers. Because seed sales are seasonal (usually lasting for just a month), a shop structure is not viable for dealers. One solution would be to have some sort of a 'mobile structure,' which could move in and out easily for distribution of seeds and other inputs. An alternative would be to make better use of market days in rural areas.

Company B also deals with import and distribution of seed, fertilizers, and other inputs, albeit at a larger scale. The company has successfully registered a few maize and rice varieties in Ghana in recent years. The process for variety registration includes several steps. First, the company needs to write a letter to NVRRC formally requesting variety release. Then NVRRC contacts an independent institution (e.g. CRI or SARI) to conduct field trials for those varieties. Once a suitable institution has been identified, it will start to conduct 4 seasons of on-station trials (2 VCU and 2 DUS). Additionally one season of on-farm trials is required. If all the trials are done concurrently and without delay, the process can be managed within two years. Once all the data are available, these can be presented and discussed in the next NVRRC meeting. NVRRC then makes recommendation for approval or rejection to the National Seed Committee. If a variety is brought in from outside (but still within ECOWAS), a confirmation trial of one season is usually needed.

With respect to variety registration, it costs about USD 4000-5000 per variety per season. This implies that two seasons of on-station trials will cost about 8000-10000 USD. If the company calls for a NVRRC meeting (because it may otherwise not take place), it normally bears the cost of the meeting. Assuming a two-day meeting for 25 people, this could easily cost about USD 4000. Registering a variety by the private sector is currently a costly undertaking.

According to the company, there are currently over 15 maize varieties and 5 rice varieties registered by the public sector. However, most of them are not on the market and thus unavailable for farmers to use. This reflects a generic problem across many African countries:

the motivation behind public sector breeders is getting varieties registered, not to make sure that the varieties are what the farmers or market want. After all, it is not their job to produce and market the seeds. This disconnect between breeding and seed production and distribution contributes greatly to the under-development of the seed sector.

Currently most of the hybrid maize seed the company sells in Ghana is imported from outside; however, now the government is requesting that the company start to establish a seed production unit in the country with the aim of phasing out imports within a couple of years. In this regard there would be a number of constraints to overcome, including finding isolated land (and enough land), lack of technology and knowhow in seed production, and absence of cold chain facilities.

Company C is a distributor and sells agricultural inputs (fertilizer, chemicals, irrigation and machinery) among various other products. The seed business is relatively small. Since last year the company has been trying to expand its seed unit. It successfully negotiated an exclusive license with Pioneer to distribute its maize seeds in the country, and it started the import process of seeds of a registered hybrid maize variety. Unfortunately, the process had not been smooth. In fact the import permit could not be obtained due to various issues with MoFA. As a result, the seeds were not able to be shipped in, and the company had to cancel large sales deals agreed with commercial farms in the country. There is clearly huge demand for improved hybrid seeds.

According to the company, the variety has been fully registered and they have followed the right procedure. It seems that uncertainty behind some of the decision-makers has impeded the issuance of the permit. The uncertainty seemingly stemmed from the potential negative impact of importing a large quantity of improved seeds on domestic seed producers, who are currently producing much less than market demand and are not producing any hybrid varieties.

Ghana has 1.5 million hectares of maize. Assuming 15 kg seeds are required per hectare, about 22,500 tons of seeds are needed. To produce these seeds with the current level of technology (5 ton/ha), approximately 4500 hectares of isolated land would be needed. This is a tall order, and no companies could achieve this in the short or medium term. Therefore, banning imports is jeopardizing the farmers' access to seeds and thus preventing them from raising productivity and moving out of poverty.

The last company interviewed is one that is relatively young, established only six years ago. Its business consists of seed operations and an agricultural advisory consultancy. It distributes vegetable seeds (from overseas) and locally produced maize and rice seeds. The advisory services cover work related to food safety standards (e.g. UTZ), auditing, SPS standards, as well as extension services.

Recommendations

As noted, Ghana is at a turning point in development of its national seed system. How this system develops over the next few years will determine whether Ghana is able to take advantage of the opportunities that the larger regional market in ECOWAS holds. A number of decision points, outlined below, will be involved in improving Ghana's seed system, implementing the ECOWAS Seed Regulation, and possibly bringing dynamic change to the seed sector.

National Level

- **Clarify differences between Ghana's national law and ECOWAS Seed Regulation:** Ghana has proposed notable changes to its seed regulatory system, and stakeholders across the seed value chain are anticipating new developments. Some of the changes will clarify important points of difference between Ghana's national rules and the ECOWAS Seed Regulation, and it will be important to make sure that these include clarifying the rules on regional variety registration, importation of seeds, PVP, and seed certification. Even as the contemplated changes move forward through Ghana's system, the Government of Ghana and private sector should work together to develop practices in line with the ECOWAS Seed Regulation. Clearer guidelines (including clarification of processes such as import licensing) would provide more transparency to variety registration and importation and greater certainty to the private sector. Effectively managing this time of transition in regulation could place Ghana in a notable position as the regional seed market opens up.
- **Improve quality control and build capacity development within the seed sector:** As the Government of Ghana and private sector have both noted, capacity challenges exist throughout the seed value chain. Needs include increased training, accreditation of seed inspectors, better laboratory facilities, and facilities for storage. Addressing capacity challenges related to effective regulatory implementation could also include instituting programs that would scale-up the production of seed and support the development of seed distribution channels. As John Keyser notes, solutions can be practical; for example, Nigeria uses first year agriculture graduates to help meet the demand for seed certification while Burkina Faso encourages seed farmers with small plots to organize in seed producer groups to make field inspections more manageable. Improving quality control and increasing capacity within Ghana will also help build trust among regional partners regarding the quality of Ghana's regulatory process.
- **Enhanced private sector participation:** The recent launch of the National Seed Trade Association of Ghana is a notable step forward in increasing private sector participation in the seed sector. Members of the National Seed Trade Association have been closely following changes in law and regulation, and Ghana could establish a more regular mechanism for this type of exchange based on models tested and applied in other countries. A regular dialogue between the public and private sectors, with a focus on working through issues in real time as they arise, would create an effective mechanism for increasing understanding of laws and regulations as well as a channel for effective implementation.

Regional Level

- **Increasing Awareness of Regional Frameworks:** Getting the right frameworks at the regional level is certainly an important step forward, but many market participants may not be aware of the content of these high-level frameworks, particularly if national laws diverge. Information on the ECOWAS Seed Regulation could be shared in several ways: through simple and clear legal guides that outline the regional requirements and how to take advantage of them in practice, in-country platforms focused on a particular crop, or public-private initiatives at the national level. Building regulatory awareness of regional frameworks will be a key step in implementation and could be critical throughout ECOWAS.

- **Joint Regulatory Guidance for Regional Standards:** As countries amend laws and regulations to incorporate regional frameworks, it may still be unclear how these regulatory changes will work in practice. We recommend issuing guidance on how new regulations will be applied regionally. This should be done at both the national level and regionally through joint guidance with other regulators. Guidance should also be accompanied by practical steps to implement laws, regulations, and regional frameworks.
- **Focus on Implementation of Regional Standards for Cross-Border Seed Trade:** Within ECOWAS, cross-border trade may become a significant challenge in practice. Not only do rules need to be clarified, but border inspectors need to be trained regarding all aspects of harmonized seed regulations and application of regional SPS rules. Import and export requirements could also be built into trade facilitation efforts, for example, including the creation of information technology (IT) platforms.
- **Regulatory Collaboration:** One of the most significant hurdles to effective regional harmonization appears to be the degree to which regulators within a particular region are willing to work together and recognize each other's procedures and results. It is clear from the CORAF assessments that greater regulatory collaboration will be instrumental in ECOWAS, and countries like Ghana could take a leading role in this process. Across regions, much more could be done and best practices shared in this area, and regulatory collaboration appears to be among the most significant sticking points in effectively implementing regional harmonization.
- **Further Study of Legal Differences Within and Across Regions:** The design of legal systems plays a role both within countries and across and within regions. In Ghana's case, some of the challenges in implementing ECOWAS rules stem from Ghana's own legal system, which, by Constitution, requires Parliamentary ratification of regional agreements (effectively a requirement for domestication). Learning from different approaches among Civil Law countries (Francophone West Africa, for example, where legal systems tend to be more detailed with less interpretation left to regulators and courts) and Common Law countries (Ghana, Nigeria, and Eastern Africa, for example, where legal systems tend to involve greater regulatory discretion) could prove insightful with regard to further regional harmonization. Exploring this difference to a greater extent would also argue for further study of Ghana's system and its role in ECOWAS, as Ghana (as does Nigeria) also follows a Common Law legal approach in contrast to many of its neighbors.

Conclusion

This study illustrates the turning point that Ghana is facing in the development of its seed sector, which hinges largely on improvements in the legal and regulatory system and its implementation. It is at this particular junction that focused efforts in improvement and better implementation of law and regulation can have a significant impact on the development of the seed sector in Ghana. Full implementation of the Plant and Fertilizers Act 2010 and efficient domestic incorporation of the ECOWAS Seed Regulation will be vital for achieving the goals of Ghana and its partners as will movement on changes to the system contemplated for 2016.

Going forward, further analyses of how regional harmonization is being carried out at the country level should be done and updated on an ongoing basis, and tools for measuring and sharing information and progress in some of the areas noted above will be critical. In addition to

the policy statements contained in the Ghana Seed Policy, the recommendations above could evolve into concrete initiatives and regulatory guidance, and all will require a greater degree of private sector input (approaches should be tied to market demand and will vary to some degree with the particular crops and circumstances involved) to become operational. Innovative models for advancing implementation of laws, regulations, and regional protocols can be taken from work in other countries and regions, such as corridors approaches, collaborative platforms focused on innovation in the sector or a particular sector or crop, and inclusive legal models.

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ANNEX 1: Summary of ECOWAS Seed Harmonization

ECOWAS Harmonization on Variety Release	
<p>ECOWAS regional regulations are binding on member states and supersede national regulations, but countries must take further action at the national level to gazette ECOWAS Regulations and amend or enact laws.</p>	
Regional Status	National Implementation
<ul style="list-style-type: none"> • 2008 Regulation on Harmonization of the Rules Governing Quality Control, Certification and Marketing of Plant Seeds and Seedlings approved (2008 ECOWAS Regulations also being adopted in UEMOA). • Regulations establish an ECOWAS Regional Seed Committee and the West African Catalogue of Plant Species and Varieties (WACPSV), which would allow new varieties to be entered into the regional catalogue when registered in one member country. (CORAF to operationalize). • ECOWAS Protocols and Procedures for release and registration of new varieties and DUS/VCU guidelines for maize, rice, and sorghum are being rolled out. • ECOWAS Members must have a procedural manual for variety release. 	<ul style="list-style-type: none"> • ECOWAS regulations are binding and supersede national seed laws, but in practice national laws and regulations will need to be changed to implement the 2008 Regulation, including with respect to establishing national seed catalogues. Countries are required to publish the ECOWAS regulation in their Official Gazette. • Most member states have national seed laws and regulations, decrees on national catalogues of plant species and varieties, and decrees on national seed committees, but often these laws and regulations are not in full compliance with the minimum requirements under the ECOWAS Regulation. Few countries have developed procedural manuals for variety release.¹⁵ • In 2014, field trials, visits, and evaluations are underway under ECOWAS Protocols (SFSA Seeds2B effort in collaboration with CORAF/WASP); the first set in field in July 2014, with registration and certification expected by 2015. • Nigeria has made variety registration automatic for vegetable seed (See Gisselquist, 2013 and Keyser, 2013).
ECOWAS Harmonization on Certification	
Regional Status	National Implementation
<ul style="list-style-type: none"> • 2008 Regulation on Harmonization of the Rules Governing Quality Control, Certification and Marketing of Plant Seeds and Seedlings. • ECOWAS recognizes four Seed Classes: Parent Material, Pre-basic Seed (three 	<ul style="list-style-type: none"> • CORAF coordinating implementation support until 2018. • Most countries regulations related to seed production, quality control, and certification.

¹⁵ All ECOWAS member countries have seed laws except Cape Verde, Guinea Bissau, Togo, and Chad. Senghor, Paul. Status of Implementation of the ECOWAS Seed Regulation by Country. CORAF/WECARD, n.d. Web. Nov. 3, 2014.
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<p>generations), Basic Seed, and Certified Seed (three generations and hybrid).</p> <ul style="list-style-type: none"> • Harmonized labeling to be established based on ISTA standards. • Seed certified in one member country can be freely accessed in the market of another member, eliminating the need for a second certification. • Countries are required to develop procedural manuals for seed quality control & certification. 	<ul style="list-style-type: none"> • Few countries have developed procedural manuals for seed quality control & certification to comply with ECOWAS standards. • Regulations relating to seed certification and quality control under review at the national level. • Certification following ISTA procedures, but no country within ECOWAS has an ISTA-accredited lab (Keyser, 2013)
ECOWAS Harmonization on SPS	
Regional Status	National Implementation
<ul style="list-style-type: none"> • ECOWAS requires seeds imported to and exported from the region to be accompanied by a phytosanitary certificate issued by the Member State. • Countries are required to periodically review pest lists and exchange information on pests, but no universal pest quarantine list exists. 	<ul style="list-style-type: none"> • National agencies responsible for plant protection issue phytosanitary certificates for import and export, but national regimes vary considerably.

Source: Kuhlmann, SFSA 2015.