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Comparative analysis of Ethiopia's 2013 Seed Proclamation and draft Seed Regulations

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Acronyms and Definitions

ACDI/VOCA	Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance
AGP-AMDe	Agricultural Growth Program – Agribusiness and Market Development
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
certification	seed certification is an official statement that packaged seed is of the variety stated on the label; certification requires visits by government or government-accredited experts to seed-growing fields to confirm that the plants are of the stated variety; in usual practice, governments or government-accredited agents also sample and test certified seed for quality (germination, purity).
COMESA	Common Market for Eastern and Southern Africa
DUS	distinctiveness, uniformity, and stability
EU	European Union
GMO	genetically modified organism
GOB	Government of Bangladesh
GOE	Government of Ethiopia
GOG	Government of Ghana
GOI	Government of India
GOK	Government of Kenya
GOS	Government of South Africa
GOTz	Government of Tanzania
GOTu	Government of Turkey
IFS	International Seed Federation
KEPHIS	Kenya Plant Health Inspection Service
PVP	plant variety protection
QDS	quality declared seed is seed for which government or government-accredited agents check some seed-growing fields and test some samples, but not as intensively as for certified seed; as defined by Ethiopia’s draft Regulations, agents may or may not check fields and test seeds
UK	United Kingdom
US	United States
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
VCU	value in cultivation and use

Executive Summary

In January 2013, Ethiopia's Parliament passed A Proclamation on Seeds. As of early October 2013, the Seed Regulations required to implement the Proclamation are in draft form. This report compares Ethiopia's emerging seed regulatory framework with laws and regulations in nine other countries with a focus on whether and how the various regulatory frameworks support or restrain the development of a private seed industry. The other countries considered in this report are: Bangladesh, the European Union (EU), Ghana, India, Kenya, South Africa, Tanzania, Turkey, and the United States (US).

A seed company is a business that wholesales seed with a brand name. When governments allow, companies compete by introducing new varieties from any source, such as from foreign companies or own breeding; these new varieties contribute to agricultural growth. (Note: This report deals with varieties from conventional breeding. Governments regulate genetically modified organisms [GMOs] with special procedures based on concerns about health and environment. This report ignores GMOs and related regulations.)

Bangladesh: From 1990, the Bangladesh Ministry of Agriculture (MoA) implemented pro-market reforms for seed companies. The key reform was that MoA made variety registration automatic and free for all but five "notified" crops (rice, wheat, jute, sugarcane, and potatoes). For notified crops, registration requires two years of government tests for value in cultivation and use (VCU) and for distinctiveness, uniformity, and stability (DUS). Bangladesh's reforms – especially automatic variety registration for most crops – fostered the development of a competitive private industry. Bangladesh has more than 200 mostly locally-owned seed companies, seed sales of \$125 million per year, and a dense network of competing seed retailers (roughly 1 per 1,000 farms). With private companies introducing maize hybrids, average yields increased from 1 ton per hectare in 1990 to more than 6 tons per hectare in 2012, the highest in Asia.

EU member countries: The only requirement to open a seed business in the EU is that managers must be available to provide information to regulators. To introduce a new variety, a company must submit the variety for official tests and approval in any EU country. Once a variety is registered in one country, it goes into an EU Common Catalogue, allowing seed sale throughout the EU. In effect, each EU country automatically accepts varieties registered in any other EU country. Seed certification is voluntary for vegetables but required for field crops. Because of its large market, and because companies can register varieties through any of 28 governments, companies register a lot of varieties. The EU Common Catalogue for vegetables lists more than 20,000 varieties; the Catalogue for field crops lists another 20,000 varieties.

Ghana: Ghana's seed industry has been constrained by regulations. A handful of companies import vegetable seeds. For field crops almost all varieties come from government breeding. No foreign maize hybrids are allowed for sale. Ghana's new Plants and Fertilizer Act 2010 and draft Seed Regulations (not yet approved) may or may not improve the situation. Draft Regulations require VCU and DUS tests for all crops, including vegetables, and appear to require seed certification for all crops as well.

India: India's seed regulatory framework allows people to register a new seed business with a nominal fee and no criteria. Variety registration is not required to sell seeds; companies can introduce varieties as they wish without MoA testing or even recognizing the varieties. For private varieties, seed certification is voluntary. Around 1990, Government relaxed restrictions

on large companies entering the seed industry and on import of seeds and germplasm for field crops. With regulations allowing private companies to operate, India has a large mixed public and private seed industry linked to world breeding. An incomplete list of new varieties for selected crops shows an average of 20-54 per crop per year during 2005-10. Private hybrids contribute to yield increases for major crops.

Kenya: Kenya's seed regulations require seed businesses to register with the Kenya Plant Health Inspectorate (KEPHIS); the criteria are onerous and vague (e.g. "all equipment necessary for seed processing and storage") and the fee is near US\$1,000. Variety registration (with official VCU and DUs tests and discretionary decision) is required for field crops but not vegetables. Similarly, seed certification is required for field crops but not vegetables. After South Africa and Nigeria, Kenya has the largest seed industry in sub-Saharan Africa with annual sales estimated at \$60 million in 2012. The Kenya Seed Company, a parastatal, dominates field crops but has been giving ground to new entrants, especially for hybrid maize. As of 2010, Kenya had 73 registered seed companies.

South Africa: South Africa's seed law and regulations require registration of "premises" but not companies; criteria are common-sense (e.g., solid floor). Variety registration is required for all major and minor crops. However, registration is essentially automatic after one year of DUS tests only. Seed certification is voluntary for all crops. South Africa's low barriers to introduction of new varieties allow seed companies to get varieties into South Africa faster and easier than into other African countries. Compared to other African countries, South Africa's seed industry is the best linked to international breeding, introduces more new varieties each year, and has the largest domestic market. South African companies extend varieties north into other African countries. Pannar and Hygrotech, large seed companies headquartered in South Africa, have subsidiaries in multiple African countries.

Tanzania: Tanzania's seed regulations require all seed businesses to be registered; the criteria for registration are detailed but otherwise not difficult. The seed industry has been held back by insistence on variety registration for all crops, including vegetables. Tanzania has a smaller seed market and fewer companies compared to Kenya. Tanzania's Seed Trade Association (TASTA) has 41 members as of August 2013. All seed must be certified, with some flexibility to allow quality declared seed (QDS), with less intensive government oversight.

Turkey: Turkey's experience in reforming its seed regulatory framework in the early 1980s may be relevant to Ethiopia's current situation. Turkey began the 1980s with: controls on variety introduction that held out almost all foreign-bred varieties; a few private companies dealing with vegetable seeds; parastatals dominating seed supply; price controls; subsidies; and seed distribution directed through cooperatives. A major element of 1982 reforms was a dramatic change in the MoA's acceptance of new varieties. From 1982, Turkey allowed seed companies to do their own VCU tests and accepted almost all submitted varieties. The number of companies increased from a handful in 1980 to close to 80 by 1994. Companies registered more varieties not only for hybrids but also for non-hybrid crops such as wheat and soybeans. Private hybrids had a big impact on maize yields. Annual seed exports increased from negligible in 1980-82 to an estimated \$12 million in 1992/93. The public sector continued to dominate seed sales for wheat, barley, and cotton.

US: The US Department of Agriculture (USDA) requires that persons shipping seed across state lines be registered with USDA; registration is automatic. Variety registration is voluntary; anyone can introduce a new variety without giving any information or getting any permission from USDA. Seed certification is voluntary for all crops. The US has the largest

domestic seed market and is also the biggest seed importer, open to seeds and varieties from other countries.

Ethiopia's seed regulatory framework: To date, Ethiopia's private seed industry has been held back by limits on private variety introductions and absence of a seed retail market through thousands of (non-existent) private dealers. Ethiopia's new 2013 Seed Proclamation is flexible, allowing Regulations and directives to fit various policy orientations; draft Regulations are more detailed, outlining a pattern of government controls that could either continue or significantly relax long-standing barriers to the development of Ethiopia's private seed industry. What will happen depends on what MoA does with the authority it gets from the Regulations.

For example, the Proclamation requires variety registration for all crops, but does not say how this is to be done. Draft Regulations ask for 1 season of VCU and DUS tests for varieties registered in another country, or 2 seasons for varieties not yet registered elsewhere. The impact of these controls will depend on whether MoA accepts information from companies' own tests and on how reliable MoA is to approve varieties that companies want to introduce.

The draft Regulations do not clarify if seed certification is compulsory for any class of seed and, if so, for what classes. Article 23 of draft Regulations could be interpreted to allow truthfully labeled seed.

One objective of the new regulatory framework is to share responsibility with regional authorities. The Ministry has sole authority to register varieties. Both the Ministry and regional authorities are expected to issue certificates of competence allowing people to start seed-related businesses. Regional authorities are solely responsible to certify seed in domestic trade. This design roughly parallels practices in the US and India, where central governments and states share authority to regulate seed trade.

Is Ethiopia ready for COMESA Seed Trade Harmonization? Heads of State of COMESA member countries are expected to consider and approve COMESA Seed Trade Harmonization Regulations later this year. Harmonization is expected to "encourage investment in seed business" and to "stimulate the breeding and availability of improved seed varieties resulting in increased variety choices for all farmers" (quoted from the draft Regulations). Ethiopia is well-situated to benefit from COMESA harmonization due to its large population and seed market, the suitability of its climate to produce healthy seed, and the availability of breeders and others with skills in seed production.

COMESA seed trade harmonization would require at least one small but significant change in Ethiopia's current draft Regulations. Specifically, harmonization proposes to create a COMESA Variety Catalogue, which would include varieties registered in at least two member states. All COMESA countries are to accept all varieties in the Catalogue. Ethiopia's Seed Proclamation is sufficiently flexible to allow MoA to accept varieties in a COMESA Variety Catalogue. However, Ethiopia's current draft Seed Regulations specifically require at least 1 season of VCU and DUS tests for varieties registered in another country; this would have to be revised to accommodate COMESA harmonization.

Recommendations: With a new Seed Proclamation and expected new Seed Regulations, Ethiopia has reached a point where an uncertain future contains a lot of promising possibilities. At the same time, the uncertainties can scare important stakeholders. How to proceed?

1: Continue to fund public research and public seed companies; and continue to distribute seed from public companies through cooperatives as long as that is what public companies and cooperatives want to do. A commitment to continue the existing system without major changes for at least 5-10 years assures that farmers get seeds. What is required to allow the private seed

industry to develop is to welcome start-ups; allow new varieties; and allow thousands of small stores across the country to retail seeds to farmers. In Bangladesh, India, and Turkey, reforms allowed the private sector to develop without privatizing or down-sizing state seed companies.

2: Adopt best practice policies for the private sector, as demonstrated in other developing countries as well as in rich countries. Even if the private seed industry in a country is small and inexperienced, the immediate introduction of best practice regulations allows it to grow. As the seed industry grows, the companies that grow with it have earned the farmers' trust.

2(a): Allow and encourage local experts and entrepreneurs to enter the seed business by liberally issuing certificates of competence for seed companies (i.e., companies that wholesale seed) based on simple criteria. Ethiopia needs a lot of seed companies to deal with all crops and regions and to ensure competitive markets.

2(b): Relax controls on variety introduction, recognizing that seed companies on their own test and demonstrate new varieties among farmers. Based on farmer interest, companies deliver seed to retail stores. Such farmer-centered systems for variety approval work in poor and rich countries, including Bangladesh, India, the Philippines, Thailand, and the US. With the current draft Regulations, MoA could accept information from companies' tests and approve essentially all varieties that companies propose. Alternately, MoA could consider to revise draft Regulations to allow automatic registration for varieties from the proposed COMESA Variety Catalogue or more generally from other countries as well, or for all vegetables, etc.

2(c): All companies to sell uncertified seed based on their own field checks and tests for seed quality. Such seed could be called truthfully labeled or quality declared seed. Promote quality by insisting on direct sales to farmers through retail dealers and by ensuring competition – lots seed companies and dealers. Seed certification is unusual for vegetables throughout the world. For field crops, certification is required in some countries (e.g., the EU) and is voluntary in others (e.g., Bangladesh, India, South Africa, and the US). Companies know their sales depend on farmers' respect for their brand name, and so strive to deliver good seed.

2(d): Over the next several years, register more than 1,000 small stores throughout Ethiopia to retail seeds to farmers.

Comparative analysis of Ethiopia's 2013 Seed Proclamation and draft Seed Regulations¹

1 Introduction

1.1 Purpose and focus of the report

In January 2013, Ethiopia's Parliament passed A Proclamation on Seeds (Government of Ethiopia [GOE] 2013). The Seed Regulations required to implement the Proclamation are, as of October 2013, in draft form (GOE 2012).

The purpose of this report is to compare Ethiopia's Seed Proclamation and draft Regulations to other countries' seed laws and regulations to see to what extent the law creates a policy environment that enables the private sector to generate and meet market demand for seed.

This report considers seed laws and regulations in Bangladesh, the European Union (EU) Ghana, India, Kenya, South Africa, Tanzania, Turkey, and the United States (US). Bangladesh, India, and Turkey liberalized seed regulations decades ago (Turkey circa 1982, Bangladesh and India circa 1990); reforms in all three countries relaxed regulations that were obstacles to private seed companies introducing varieties, but did not close or damage public sector seed production or research. South Africa has the leading seed industry in Africa. Seed laws and regulations in the EU and US have guided the design of seed regulatory frameworks in developing as well as developed countries throughout the world.

1.2 Outline

The remainder of this introduction describes essential features of a developing private seed industry. This provides a foundation against which to consider seed laws and regulations in Ethiopia and elsewhere.

Section 2 compares seed laws and regulations across countries and notes the impact of each country's regulatory framework on its seed industry.

Section 3 compares Ethiopia's Seed Proclamation and draft Regulations to its previous seed regulatory framework and assesses the emerging framework according to several measures: Is it flexible? Does it clarify federal and state responsibilities? Does it facilitate private sector development? Is it consistent with proposed COMESA seed trade harmonization?

Section 4 provides recommendations.

1.3 What seed companies do

Does Ethiopia's seed regulatory framework allow the private sector to generate and meet market demand? Are regulations burdensome? The answers to these questions require attention to what seed companies do in countries with best practice regulatory frameworks.

What is a seed company? A seed company wholesales seed under its brand name. Seed companies often import all or much of the seed they sell; this is especially so for vegetable seed, but may extend to high value hybrids for field crops, such as maize and sunflower. When seed

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companies source seed in-country, they generally leave most seed growing to contract farmers, which they supervise, but process and package the seed themselves (which they may do in rented facilities).

Seed companies come in all sizes, with each company characteristically focusing on a limited list of species, such as pastures, vegetables, or hybrid field crops. When governments allow easy entry into the seed business, locally-owned businesses dominate most if not all segments of the industry. Cooperatives or individual farmers may register as seed companies so they can package and distribute their name-branded seed to reach a market beyond their personal contacts. Although foreign companies may enter as subsidiaries, foreign companies generally find it cheaper and easier to license varieties or sell seed to local companies.

Seed companies introduce new varieties, linking farmers to world breeding: When governments remove obstacles to the introduction of new varieties, companies compete by offering menus of varieties with characteristics farmers value. In competitive seed markets, even very good varieties of field crops are commonly pushed out by better varieties within 5-7 years; the shift from old to new varieties is even faster for vegetables. This forces companies continuously to find and offer new and better varieties; in other words, seed companies are technology companies, introducing technologies that drive agricultural growth. Except for countries with the largest seed markets, such as China, India, and the US, most new varieties come from foreign public or private breeding. Depending on the crop, market size, and other factors, some companies breed in-country.

Seed companies sell quality: Seed companies build their markets over many years by selling seed with acceptable and reliable quality. To deliver quality seed reliably, companies must be able to control the source of their seed, i.e., to import seed for multiplication or sale and to choose year-by-year which local farmers to engage as contract growers.

Seed companies wholesale seed to dealers and foreign companies: Seed companies get their seed to farmers by selling wholesale to independent and competing retail dealers. This allows even small seed companies to reach large markets with minimal distribution costs.

In addition, seed companies sometimes wholesale seed to companies in other countries. Exported seed may or may not be processed and packaged. Export of unprocessed seed is common for high value vegetable seed. For example, due to India's climate and skilled but low cost labor, foreign companies contract companies in India to grow vegetable seed, which is exported in bulk for processing and packaging in other countries. Growing high value seed for bulk export is a business that could come to Ethiopia.

1.4 Miscellaneous issues

In most countries, the lead agency to implement regulations dealing with seed companies and trade is in the ministry of agriculture (MoA), and another agency in the MoA deals with phytosanitary controls at the border. These ministries go by different names; Ghana's for example is the Ministry of Food and Agriculture; for the sake of simplicity, this review identifies all such ministries as MoA. There are, however, some countries where the MoA does not implement seed regulations; in Kenya, for example, the Kenya Plant Health Inspection Service (KEPHIS) reports directly to the Government, not to MoA.

This report does not deal with plant variety protection (PVP). Seed companies do not need PVP to protect hybrids. Furthermore, as long as Ethiopia's regulatory framework blocks easy entry for new varieties, the time and cost to register a non-hybrid variety (offering lower

profits than hybrids) are likely to discourage companies from trying to introduce them, even if PVP were available.

This report also does not deal with genetically modified organisms (GMOs) for several reasons: in Ethiopia as in other countries GMOs are dealt with in other laws and regulations; the health and environmental debates surrounding GMOs are too established for a report such as this to make a useful contribution; and whatever Ethiopia does with GMOs would have little impact on farmer access to useful varieties given other problems with Ethiopia's seed industry.

2 Comparing Ethiopia's seed regulatory framework with regulatory frameworks in selected other countries

2.1 Bangladesh

Bangladesh's seed regulatory framework dates from the 1970s, when it adopted a flexible seed law that allows but does not require variety registration and seed certification. As of 1989, the government controlled approved varieties for all crops. However, from 1990, the MoA implemented pro-market seed reforms, which were subsequently formalized in the Bangladesh Seed Policy (Government of Bangladesh [GOB] 1993). In addition to its Seed Policy, Bangladesh's seed regulatory framework is based on: The Seeds Ordinance, 1977, as amended through 2005 (GOB 2005); and The Seed Rules, 1998 (GOB 1998).

Registering a seed company: The Bangladesh Seed Policy (Article 9.3) states: "Any individual or agency that wishes to import seed, develop and register new varieties, or package seed in labeled containers must first be registered with the National Seed Board. Registration will be automatic by paying prescribed fees." The Seed Rules provide an application form that covers all seed businesses, including companies and retailers, charging MoA only to verify the accuracy of the information. Registering takes seven days and is free (USAID 2012).

Introducing a new variety: Variety registration is automatic and free, except for varieties of five notified crops – rice, wheat, jute, sugarcane, and potatoes. For notified crops, registration normally requires two years of official tests for value in cultivation and use (VCU) and for distinctiveness, uniformity, and stability (DUS) after which MoA has discretion to approve or deny registration; when successful, registration takes circa 860 days and costs \$878 (USAID 2012). During 2000-10, private companies achieved registration for 76 rice hybrids by going through this system, but no varieties for any of the other 4 crops (Rashid et al. 2012). To allow companies to introduce new varieties of the five notified crops, any seed company can import small quantities of seed of non-registered varieties for testing.

Producing or accessing seed for wholesale delivery: MoA allows companies as they wish to contract farmers to produce seed without having to report who is growing seed. For certified seed, the company must tell MoA who is growing the seed and where so inspectors can visit the fields.

MoA issues import permits for seed. All imported seeds must satisfy phytosanitary criteria and meet seed quality standards. For notified crops, seed imports for commercial sale are limited to registered varieties. For hybrid rice, MoA limits the number of years a company can import commercial seed for a particular hybrid to promote in-country production of hybrid seed (allowing imported parent seed).

Seeds of all crops, including the five notified crops, can be sold as truthfully labeled seed (not certified). "Seed certification will be a service provided to private individuals, companies or public agencies who want to assure their farmer-customers that their seeds are of high quality"

(Article 9.5, Seed Policy). Breeder and foundation seeds produced by public agencies must be certified.

Reaching farmers and foreign buyers: Registration for seed retailers (input dealers) is required but automatic and free, requiring circa seven days (USAID 2012).

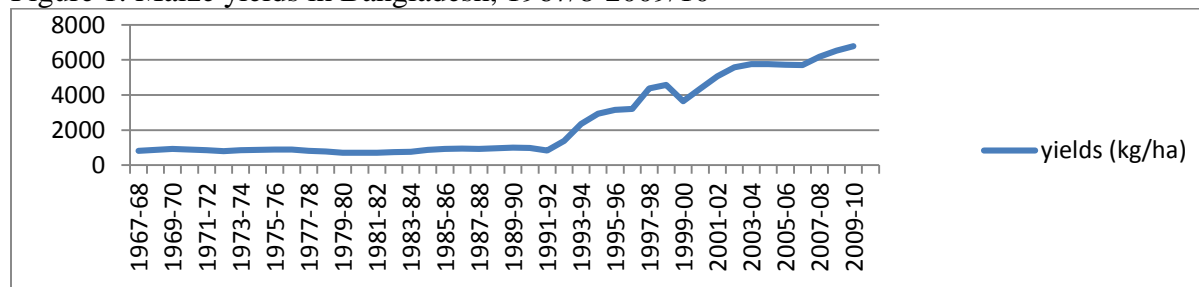
MoA requires that seed exports meet seed quality standards, presumably standards for retail sale in Bangladesh (Article 17, Seed Ordinance).

Impact of regulations on the seed industry: Implementation of pro-market seed policies from 1990 fostered the development of a competitive private industry. Bangladesh has circa 280 seed companies (Kabir and Huda 2009), a domestic market of \$125 million per year (Financial Express 2012), 17,000 seed retail shops (roughly 1 per 1,000 farmers) as well as 50,000 mobile seed vendors (The Independent 2013).

Although almost all seed companies are locally owned, Bangladesh’s seed industry is well-linked to the world seed industry. Bangladeshi companies access varieties and seed from foreign companies such as Pioneer and Monsanto through licensing and other arrangements. In a 2009 survey, 21 of 30 companies reported international collaborations: 9 reported collaborations with 1 country; 2 reported collaborations with 2 countries; 9 with 3-5 countries each; and 2 with 8-9 countries; the 15 countries involved in these collaborations were: Australia, China, France, Germany, Hong Kong, India, Italy, Japan, South Korea, Nepal, the Netherlands, New Zealand, the Philippines, Taiwan, Thailand, the US, and Vietnam (Kabir and Huda, 2009). In a 2008 survey of 18 seed companies, 13 reported research programs with a total of 91 research staff and \$10 million in annual expenditures (Rashid et al. 2012). Companies breed vegetables, maize, and hybrid rice.

With private companies introducing maize hybrids, maize yields increased from an average of less than 1 ton per hectare for several decades through 1992 to more than 6 tons per hectare in 2012 (Figure 1), exceeding yields in China and Japan (Bodker, Wulff, and Thorp 2006). As of 2010, farmers realized an additional \$125 million in annual income due to higher yields with hybrid maize (Table 5). Private varieties have had a big impact on vegetable production, but no measures are available. Hybrid rice seed from private companies seeds approximately 6% of Bangladesh’s rice area, boosting paddy yields an estimated 1 ton per hectare (Rashid et al. 2012).

Figure 1: Maize yields in Bangladesh, 1967/8-2009/10



Source: Weidemann 2011.

2.2 Ethiopia

Section 3 in this report describes Ethiopia’s former and emerging seed regulatory frameworks. For direct comparison with other countries, Section 2.11, below, summarizes some features of emerging seed Ethiopia’s regulatory framework, variety approvals (registration), and seed markets.

2.3 EU member countries

The EU's 28 member countries cooperate on seed regulations. As of fall 2013, the EU is considering a new seed law, On the Production and Making Available on the Market of Plant Reproductive Material (Plant Reproductive Material Law)(EU 2013a). These comments are based on a 6 May 2013 draft, which proposes to continue much of what has been in place for decades.

Registering a seed company: The draft Law requires registration for “professional operators” responsible for managing the production and distribution of seeds (Article 6). The only criteria for registration are that they are available to provide information on seed production, etc., to regulators.

Introducing a new variety: Seed sale is not allowed except for registered varieties. However, once a variety is registered in any EU country it goes into an EU Common Catalogue, which allows seed sale throughout the EU (EU 2013b). In effect, each EU country automatically registers varieties that have been registered in any of the 27 other EU members. For vegetable varieties not yet introduced into any EU country, registration in any EU country is based on 1 year of DUS tests only; for varieties of field crops not yet registered in any EU country, registration in any EU country is based on 2 years of VCU and DUS tests. The EU's requirement that varieties be registered has been criticized by people interested to grow heirloom varieties and by organic farmers; responding to critics, the draft Law makes exceptions for “niche markets” to allow trade in seeds of heirloom varieties and organic seeds (Article 36).

Producing or accessing seed for wholesale delivery: The EU's requirement that “professional operators” be registered extends to contract growers. Registration requirements are minimal.

Permits to import seeds from outside the EU depend on phytosanitary criteria and on meeting EU quality standards, except that imports of unprocessed seed are allowed if the exporting country is approved to provide unprocessed seed (Article 38).

Certification is voluntary for vegetables but required for field crops.

Reaching farmers and foreign buyers: The EU's requirement that “professional operators” be registered extends to seed retailers. Registration requirements are minimal.

Seed exports must satisfy rules established by the importing country. If the importing country has no rules, seed must meet EU quality standards (Article 46, EU 2013a).

Impact of regulations on the seed industry: Because of its large unified market, and because companies can register their varieties through any one of 28 governments, companies are motivated and able to register a lot of varieties. The EU Common Catalogue for vegetables lists more than 20,000 varieties for 41 species; the Common Catalogue for agricultural (field) crops similarly lists more than 20,000 varieties. The EU seed industry is well-developed, with sales per capita equivalent to the US (Table 6).

Because barriers to trade between EU countries are low, seed exports and imports are important relative to domestic seed sales (Table 6). The Netherlands' seed industry is heavily involved in international trade; companies import a lot of unprocessed seed which they process, package, and re-export as high value seed.

2.4 Ghana

Ghana is in the process of re-working its regulatory framework for seeds. Ghana has a new Plants and Fertilizer Act 2010 (Act 803)(Government of Ghana (GOG) 2010; a summary of

the Act is available on the web at: GOG 2013a). Implementation of the Act awaits approval of draft Seed Regulations (Certification and Standards) 2011 (GOG 2011).

Registering a seed company: The Act requires that anyone who sells seed “in commercial quantities” must be registered with MoA (Article 31). The Act and Regulations appear to be confused about what is a seed company, focusing on growers rather than wholesalers.

Introducing a new variety: The Act requires that all seed sold be of a registered variety (Article 38). Notably, the Act allows automatic registration for varieties in regional catalogues: “a new variety shall be registered as a result of regional agreements on variety release and registration” (Article 43). Otherwise, the Act (Article 43) and draft Regulations require VCU and DUS tests by “a competent independent body” for all crops, including vegetables, before seed sale is allowed, but do not specify how many seasons of tests are required or how many sites (Article 5, draft Regulations).

Producing or accessing seed for wholesale delivery: Draft Regulations require seed growers to be registered (Articles 17 and 21), and give MoA discretionary authority to approve based on whether a prospective grower (Article 21) “has been assessed to have adequate and suitable farmland and farm equipment to undertake the planting, cultivation and harvesting.”

Importers must be registered with MoA (Part II of the Act; see GOG 2013a). According to draft Regulations, seeds imported for sale must meet Ghana’s seed standards, which means, inter alia, that varieties must be registered (Article 5). Samples must be submitted to MoA for testing (Article 15, Regulations). Seeds must come with a phytosanitary certificate (GOG 2013a).

The Act does not require that seed be certified, saying only that seed must meet standards described in the Act or Regulations (Article 38) and that the Minister will “establish which crops shall be eligible for certification” (Article 44). However, draft Regulations appear to require certification for all crops; Article 30 of the draft Regulations requires that all tagged seed give the date of certification; furthermore draft Regulations do not mention or define truthfully labeled or standard seed. In any case, the extent of required seed certification is unrealistic. A 2013 IFPRI report notes “a significant gap between the resources available to GSID [Ghana Seed Inspection Division, an MoA agency] and the actual cost of performing the duties required by the past or new [draft] regulations” (p. 13 in Tripp and Mensah-Bonsu 2013). The MoA agency “required to lead in the [seed] quality assurance function and implement the recently introduce legislation is inadequately resourced” (quoted from Section 10.1.1 of GOG 2013b).

Reaching farmers and foreign buyers: Seed retailers must be registered with MoA (Article 31, Act; Article 17, draft Regulations). Registration appears to be workable, with circa 2,000 dealers registered (Tripp and Mensah-Bonsu 2013).

According to Part II of the Act, seed exporters must be registered with MoA, and seeds must be tested for quality and phytosanitary certificates (GOG 2010; GOG 2013a).

Impact of regulations on the seed industry: Ghana’s seed industry has been constrained by regulations. A handful of companies import vegetable seeds. For field crops almost all varieties come from government research; for these varieties, MoA exercises monopolies on production of both breeder seed and foundation seed. Growers approved by MoA multiply foundation seed (or first generation certified seed) to produce commercial seed, all of which must be certified by MoA. In recent years, one company has imported hybrid maize seed from Pannar for own use and another has been testing several maize hybrids from Pioneer for possible registration (Tripp and Mensah-Bonsu 2013).

2.5 India

India's seed regulatory framework is established by The Seeds Act, 1966, and amendments (Government of India [GOI] 1966, 1972), The Seeds Rules, 1968, and amendments (GOI, 1968, 1973, 1974, 1981), The Seeds (Control) Order, 1983, and amendment (GOI 1983, 2006a), the Plants, Fruits and Seeds (regulation of import into India) Order, 1989 (GOI 1989), as well as the Essential Commodities Act, 1955 (as amended up to 24/12/1986), and subsequent amendment (GOI 1986, 2006b).

Registering a seed company: The Seeds (Control) Order established a system to license dealers in seeds, defined as businesses “selling, exporting or importing seeds” (Section 2, clause [c], Seeds [Control] Order). This definition covers seed companies, i.e., companies that wholesale packaged seed. The Order sets a nominal fee and no criteria for licensing and asks state governments to appoint licensing authorities. The GOI issued this order under authority from the Essential Commodities Act (GOI 1986).

Introducing a new variety: Variety registration is not required to sell seeds. Companies can introduce varieties as they wish, without GOI testing or even recognizing the varieties. However, prior to 1988, GOI restrictions on private imports of seeds and germplasm blocked private introduction of varieties from foreign breeding. Along with other reforms around the same time, the New Policy on Seed Development, 1988, relaxed import restrictions to allow companies to introduce varieties from foreign breeding (GOI 1988)

Producing or accessing seed for wholesale delivery: MoA does not limit or interfere with companies' arrangements with contract growers.

Imported seeds must meet minimum seed quality standards as well as phytosanitary criteria (Article 17, Seeds Act). GOI restricts imports of seeds for planting for some crops, including wheat, cotton, groundnut, and potatoes (schedule II, GOI 1989); but even for these, companies can import seeds or genetic material for breeding or multiplication for sale. The Essential Commodities Act allows government to control trade and thus imports of seeds of food crops, fruits, vegetables, fodder, and jute (GOI 2006b).

For seeds of private varieties, seed certification is available but voluntary. Seeds must be labeled according to variety (registered or not) and meet minimum standards of germination and purity. However, certification is compulsory for seeds of varieties released by public research institutes.

Selling seeds to farmers or foreign buyers: The Seeds (Control) Order arranges for state governments to license retail dealers, with no conditions and nominal fees, allowing states to exempt specified sub-classes of dealers from licensing. India has a dense network of competing shops retailing seeds.

Article 17 of the Seeds Act requires exported seeds to meet India's quality standards and to be labeled according to variety or kind. With authority from the Essential Commodities Act, government can limit seed exports for food crops, fruit, vegetables, pastures, and jute (GOI 2006b). GOI has at times used these controls. Otherwise seed exports must be of a stated (but not necessarily registered) variety and meet minimum quality standards.

Impact of regulations on the seed industry: Around 1990, GOI relaxed restrictions that had prevented large Indian and foreign companies from getting into the seed industry (Shreedar et al. 2012) and made it easier for companies to import seeds and germplasm for varieties from foreign breeding (GOI 1988). These reforms stimulated expansion of the private seed industry (Pray and Nagarajan 2012). India has a large private sector seed industry linked to world breeding. In addition, central and state governments have research agencies and public seed

companies. An incomplete list for selected crops shows an average of 20-54 new varieties introduced per crop per year during 2005-10; this list includes varieties from only 34 companies (Table 4 in section 2.11). Private hybrids have contributed to yield increases in major crops (Table 1).

Table 1: Impact of private hybrids in India

Impact indicators	Millet	Sorghum	Rice	Cotton	Maize	Sunflower	Vegetables
% area under HYVs or hybrids (2008-9)	68.6	53.1	3.1*	80.8	58.8	41.7	30-40*
Proprietary hybrids as % of all HYVs and hybrids	82	75	95*	95	>90	>95	100*
% change in mean yield (1980-1 to 2008-9)	54.9	31.4	38.7	58.8	52.0	13.1	NA

* Data for hybrids only, excluding other HYVs.

Source: Pray and Nagarajan (2012).

2.6 Kenya

Kenya's seed regulatory framework is established by: The Seeds and Plant Varieties Act, 1972, as amended through 2002 (Government of Kenya [GOK] 2002), The Seeds and Plant Varieties (Amendment) Act, 2012 (GOK 2012); The Seeds and Plant Varieties (Seeds) Regulations, L.N. No. 287 of 1991 (GOK 1991), and The Seeds and Plant Varieties (National Performance Trials) Regulations, 2009 (GOK 2009). The agency responsible for enforcing the Act is the Kenya Plant Health Inspectorate (KEPHIS), a regulatory body reporting directly to the government, not to MoA (GOK 2013).

Registering a seed company: Seed companies (described in the Regulations as seed merchants) must be registered with KEPHIS. The criteria are onerous and vague (e.g. "adequate" trained personnel, "extensive...seed distribution channel of registered agents," "all equipment necessary for seed processing and storage") and the application fee is near US\$1,000.

Introducing a new variety: Variety registration before seed sale is required for all important food crops but not for vegetables (GOK 2009; Schedule 2, GOK 1991). Registration is based on discretionary decision after two seasons of VCU and DUS tests (Setimala et al. 2009; Article 10 in GOK 2009) except that varieties registered in another country in the East African Community (Burundi, Rwanda, Tanzania, Uganda) may be considered after one season of VCU and DUS tests (Article 10, GOK 2009).

Producing or accessing seed for wholesale delivery: Seed growers must be registered with KEPHIS; the criteria and fees are minimal.

Seed companies (merchants) can import seeds. Seeds must satisfy phytosanitary concerns, meet Kenya's quality standards and, for crops for which variety registration is required, be of registered varieties. In addition KEPHIS has discretion to refuse imports based on judgments that the foreign source is "not reliable" or that there are already enough seeds of the variety within the country (Sixth Schedule, GOK 1991).

Seed certification is required for all important food crops (Schedule 2, GOK 1991) but not vegetables. KEPHIS has a reputation for implementing certification according to the rules, whereas certification agencies in some African countries, such as Uganda, are reported to certify seeds without the required field visits.

Reaching seeds to farmers or foreign buyers: Retail seed dealers must be registered with KEPHIS. Fees are nominal.

Seed exports must meet minimum quality standards as required for sale in Kenya, but there is no control on varieties allowed for export (Article 20, GOK 1991).

Impact of regulations on the seed industry: After South Africa and Nigeria, Kenya has the largest seed industry in sub-Saharan Africa. The International Seed Federation estimates the size of Kenya's domestic seed market at \$60 million in 2012. The Kenya Seed Company, a parastatal, dominates the market for field crops but has been giving ground to new entrants, especially for hybrid maize. As of 2010, Kenya had 73 registered seed companies (Odame and Muange 2010). Kenya's horticultural (cut flowers and vegetables) sector introduces a lot of new varieties, hundreds of which have been submitted to KEPHIS for PVP (Sikinyi 2009).

2.7 South Africa

South Africa's seed regulatory framework is established in: the Plant Improvement Act 53 of 1976, as amended through 1996 (Government of South Africa [GOS] 1996) and subsequent amendments; and the Regulations Relating to Establishments, Varieties, Plants and Propagating Materials, 1980, as amended through 2000 (GOS, 2000) and subsequent amendments.

Registering a seed company: South Africa's seed Act and Regulations require registration of "premises" but not companies. Regulations set criteria for nurseries, places where seed is processed, where seed is pre-packed, where seed is sold, and where seed is tested; criteria are common-sense (e.g., solid floor, protected from insects).

Introducing a new variety: Variety registration is required for all major and minor crops (Article 13 in the Act). Registration is essentially automatic, based on one year of DUS tests only, without VCU tests (Setimela et al. 2009).

Producing or accessing seed for wholesale delivery: The Act and Regulations say nothing about growers. Seed companies may engage growers as they wish, without attention or approval from MoA.

Anyone can import seed. Seed imports are subject to phytosanitary controls and must also meet quality standards and be of a registered variety (Article 26, Act; Article 41, Regulations). The Minister may allow exceptions.

Seed certification is voluntary. However, a breeder may ask that seed certification be required his or her variety; all such varieties are listed by crop in Table 8 of the Regulations; Table 8 is frequently amended (GOS 2013). Whether certified or not, seeds must meet minimum criteria for germination and purity, as described in Table 4 of the Regulations (GOS 2005). The Act (Article 24) allows the Minister to appoint private parties to certify seeds; the Regulations (Article 8A) set criteria for registration of private laboratories but not private certifiers.

Reaching seeds to farmers or foreign buyers: The Act and Regulations require seed retailers to register their premises; the criteria are reasonable.

Seed exports are allowed with permission of the MoA. MoA may test the seed, but neither the Act nor Regulations stipulate that seed must meet any specific standard or be of a registered variety.

Impact of regulations on the seed industry: South Africa's low barriers to introduction of new varieties allow seed companies to get varieties into South Africa much faster and more reliably than into other African countries. Among all African countries, South Africa's seed industry is the best linked to international breeding, introduces the most new varieties each year, and has the largest domestic market. South Africa's seed companies have been conduits for technology introduction, extending varieties north into other African countries. Several large seed companies with headquarters in South Africa, including Pannar and Hygrotech, have subsidiaries in multiple African countries (Kirsten et al. 2010).

2.8 Tanzania

Tanzania's seed regulatory framework is based on The Seeds Act, 2003 (Government of Tanzania [GOTz] 2003) and The Seeds Regulations, 2007 (GOTz 2007).

Registering a seed company: The Act and Regulations require all "seed dealers" to be registered. The form to apply for registration is the same for prospective "seed dealers" who wish to be growers, processors, importers, exporters, distributors, and stockists (Fifth Schedule, GOTz 2007). The criteria go into some detail, but may not be a serious obstacle, e.g., allowing processors to own or rent equipment.

Introducing a new variety: According to the Regulations, variety registration is required for all crops, including vegetables, before seed sale is allowed. Registration for all crops is based on 2 years of DUS tests and one year of VCU tests, followed by discretionary decision (Sections 4 and 7, Regulations).

Producing or accessing seed for wholesale delivery: Seed growers must be registered; the process appears to be automatic, with minimal criteria.

Importers must be registered (Article 13, Act). Seeds must have a phytosanitary certificate and a "certificate of quality issued by a Recognized Certification Agency" and the variety must be named (Article 33, Regulations).

The Regulations (Article 32) state: "No seed may be offered for sale unless it is certified." However, the situation is not entirely clear; certification may not be required for all seed: According to Article 26, the "Minister may make rules and procedures for certification and control of Quality Declared Seed"; moreover, "The Minister may...exempt some seed or class of seeds from the provisions of these Regulations" (Article 39).

The Act (Article 8) and Regulations (Article 42) allow the Minister to accredit private individuals to certify seeds. This could make certification less of a burden, but may favor larger companies with better connections to professionals that could get accreditation.

Reaching seeds to farmers or foreign buyers: Seed retailers must be registered; the procedure appears to be almost automatic, with minimal criteria (Fifth Schedule, Regulations).

Seed exporters must be registered. Seed exports are allowed without limits on quality or variety, but the variety must be named (Article 13, Seed Act; Article 34, Regulations).

Impact of regulations on the seed industry: Tanzania's seed industry has been held back by insistence on variety registration for all crops, including vegetables, before seed sale is allowed. Lack of development is reflected in a relatively smaller market (Table 6) and fewer companies compared to Kenya. Tanzania's Seed Trade Association (TASTA) has 41 members as of August 2013. On the other hand, Tanzania's Regulations accommodate production of vegetable seeds for export under contract to foreign companies; Tanzania's vegetable seed exports are comparable to Kenya's (Table 6).

2.9 Turkey

Turkey's seed regulatory framework is established by the Seed Act (Government of Turkey [GOTu] 2006) and by several regulations. The regulations are available in Turkish but not English on the Food and Agricultural Organization's website, <http://faolex.fao.org/>. This report is based on the Act and on several secondary sources (Bouzkurt and Engiz 2001; Gisselquist and Pray 1997).

Turkey's experience around 1982 in reforming its seed regulatory framework is relevant to Ethiopia's current situation. Turkey began the 1980s with: controls on variety introduction that

held out almost all foreign-bred varieties; a few private companies dealing with vegetable seeds; several parastatals including joint ventures with foreign multinationals dominating seed supply; price controls; subsidies; and seed distribution directed through cooperatives. After considering the situation for several years around 1980, government of Turkey committed to reforms, some of which are described in the following paragraphs.

Registering a seed company: Seed companies must be registered. As part of early 1980s reforms, the government registered some seed companies as research companies, allowing them to do their own VCU tests; other companies had to ask the government or research companies to test their proposed varieties (Gisselquist and Pray 1997).

Introducing a new variety: A major element of 1982 reforms was a dramatic change in the MoA's acceptance of new varieties. Prior to 1982, MoA required several years of VCU and DUS tests and then often rejected submitted varieties. As of 1982, most varieties came from public research. From 1982, Turkey allowed seed companies to do their own VCU tests, accepted almost all submitted varieties, and allowed seed sale before variety registration on a case-by-case basis. Relaxing controls on variety registration led to a large increase in numbers of varieties registered not only for hybrids but also for important non-hybrid crops, such as wheat and soybeans (Table 2). Turkey continues with compulsory variety registration, and the duration of DUS and VCU tests is 2 years.

Table 2: Number of new varieties in Turkey before and after 1982 regulatory reforms reduce

Crop	Total number of varieties approved to 1982	Number of new varieties, 1982-87	Number of new varieties 1987-92
Wheat	21	22	38
Sunflower	3	29	45
Maize	44	95	99
Sugar beets	11	18	6
Potatoes	8	13	35
Soybeans	2	43	27
Tomatoes	43	32	203
Cucumbers	1	8	115
Tobacco	31	7	2
Cotton	9	8	11

Source: Gisselquist and Pray (1997).

Producing or accessing seed for wholesale delivery: Seed growers must be registered.

MoA approves imports based not only on phytosanitary certificates, but also on quality and variety. For vegetable seeds, MoA requires OECD certification or ISTA certificates (USDA 2012). However, variety registration is not required for seeds imported to produce for export (Article 14, Act).

Seed certification is voluntary for vegetable seeds (e.g, imports are allowed with ISTA certificates based on laboratory tests without field checks) but required for field crops.

Reaching seeds to farmers or foreign buyers: In 1983, the government removed price controls on seeds. Government continued to distribute seed from parastatal production through cooperatives, but private companies sold through dealers. Seed retailers must be registered. As of

2001, there were about 3,500 “sale points” throughout Turkey; this includes cooperatives as well as private dealers (Bouzkurt and Engiz 2001).

Seed exports must meet Turkey’s seed quality standards.

Impact of regulations on the seed industry: With early 1980s reforms, the number of companies increased from a handful in 1980 to close to 80 by 1994, and to about 95 at the end of the century (Bouzkurt and Engiz 2001). The private sector hugely expanded sales of seed for hybrid maize, soybeans, and hybrid sunflower, among other crops. Private hybrids had a big impact on maize yields and farmers’ income (Table 5, below). The public sector continued to dominate seed sales for wheat, barley, and cotton. Annual seed exports increased from negligible in 1980-82 to an estimated \$12 million in 1992/93 (Gisselquist and Pray 1997) and to \$61 million in 2011 (Table 6).

2.10 US

The seed regulatory framework in the US is established by The Federal Seed Act, issued in 1940 and revised through 1998 (US Department of Agriculture [USDA] 1998), and the Rules and Regulations of the Secretary of Agriculture (US Government 2013).

Registering a seed company: The USDA requires that persons shipping seed across state lines label the seed and that labels include a “code designation” from USDA identifying who is responsible for the seed. States may ask for registration in separate state laws and regulations.

Introducing a new variety: Variety registration is voluntary. Anyone can introduce a new variety without giving any information or getting any permission from USDA.

Producing or accessing seed for wholesale delivery: Seed growers do not need to be registered with USDA. States may ask for registration in separate state laws and regulations.

The USDA regulates imports with attention to phytosanitary criteria. Seeds of any variety and quality may be imported.

Seed certification is voluntary for all crops. The owner of a variety may stipulate that seeds of the variety must be certified, but that has nothing to do with government regulations.

Reaching seeds to farmers or foreign buyers: Seed exporters or exports do not need USDA permission.

Impact of regulations on the seed industry: The US has the largest domestic seed market, and is also the biggest seed importer (Table 6). The US is open to seeds and varieties from other countries.

2.11 Summary tables

Tables in this sub-section summarize information on seed regulatory frameworks (Table 3), variety introductions (Table 4), impact of private varieties of hybrid maize on yields and farmers’ income (Table 5), and seed sales (Table 6) for the countries reviewed in this report.

Table 3: Impact of seed regulatory frameworks on crucial seed industry activities, selected countries

Country	To start a seed company, MoA registration is:	To introduce a new variety, variety registration is:		To produce or access seed for wholesale delivery:				To sell seed:	
		Voluntary or automatic and low cost	Required, with discretionary approval after time and expense	MoA reg'n of contract farmers is:	MoA controls on seed imports are based on:	Seed certification is:		MoA reg'n of seed dealers is:	MoA approvals of seed exports are:
						Voluntary	Required		
Bangladesh	Required but automatic (7 days, no charge).	Automatic for all but 5 notified crops	For 5 notified crops (rice, wheat, sugarcane, jute, and potatoes) MoA tests varieties for 2 years (VCU and DUS) then decides; when successful, registration takes circa 860 days and costs \$878	Not required.	(a) phytosanitary criteria; (b) seed quality; and (c) for 5 notified crops the variety must be registered (Article 17, Ordinance)	At the retail level for all species and varieties	For breeder and foundation seed produced by government agencies	Required but automatic (7 days, no charge)	Required, based on seed quality (Article 17, Ordinance)
Ethiopia	Required based on criteria and discretionary judgment		For all crops, with discretionary decisions after 2 seasons' DUS and VCU tests, or 1 season for varieties registered in another country (however, Article 7 requires data from 2 seasons before official VCU tests)	Required based on criteria and discretionary judgment	(a) phytosanitary concerns; (b) seed quality according to Ethiopian standards; (c) variety registered in Ethiopia	May be allowed; see next column	All seed must be certified or QDS; required field checks and lab tests for QDS are not clear; requirements for imported seed are not clear	Required based on criteria discretionary judgment	Required; seed must meet the importing country's quality standards
European Union member countries	Required, but with minimal criteria (able to give information)	Automatic for varieties registered in any other EU country	If not yet registered in another EU country: For field crops, 2 years VCU tests and DUS; For vegetables: 1 year DUS test, no VCU.	Required but with minimal criteria (able to give information)	(a) phytosanitary issues; (b) seed quality equal to EU standards (except for unprocessed seed from specific countries)	For all vegetable seeds	For all field crop seeds	Required, but with minimal criteria (able to give information)	Required, based on the importing country's rules (where there are no such rules, seed must meet EU quality standards)

Country	To start a seed company, MoA registration is:	To introduce a new variety, variety registration is:		To produce or access seed for wholesale delivery:				To sell seed:	
		Voluntary or automatic and low cost	Required, with discretionary approval after time and expense	MoA reg'n of contract farmers is:	MoA controls on seed imports are based on:	Seed certification is:		MoA reg'n of seed dealers is:	MoA approvals of seed exports are:
						Voluntary	Required		
Ghana	Required (Article 31, Act); draft Regulations focus on growers, and do not clarify criteria for registering a seed company	The Act but not draft Regulations allow automatic registration based on regional agreements	For all crops including vegetables (except for varieties from regional lists), based on VCU and DUS tests by an independent authority; regulations do not say how many seasons of tests are required	Required, with MoA discretion to approve based on "adequate and suitable" farmland and equipment (Article 21, Regulations)	(a) importers must be registered; seeds must have (b) phytosanitary and (c) quality certificates, and (d) be of a registered variety (except seed imported for own use)	Not for any crop, but the situation is not entirely clear	For all crops; all packaged seed must give date of certification (Article 30, Regulations); MoA may accredit private parties to certify seed Article 13, Regulations)	Required but not an obstacle; Ghana has circa 2,000 dealers retailing seed	Required; (a) the exporter must be registered with MoA, and seeds must (b) be tested and (c) have a phytosanitary certificate
India	Required but automatic (nominal fee)	Voluntary for all species	-	Not required	(a) phytosanitary criteria; (b) seed quality for sale in India; (c) the label states the variety or kind of seed; (d) seed import for cotton, wheat, and some other crops is allowed only by government	For all crops, except for varieties released by public research	For varieties released by public research	Required but automatic (nominal fee); states may waive the requirement	Required; (a) seeds must meet India's quality standards; and (b) labels must state the variety or kind. The Essential Commodities Act allows GOI to limit seed exports for food crops, fruit, vegetables, and jute for other reasons
Kenya	Required, based on onerous and vague criteria and high fees	Voluntary for vegetables	For all field crops and pastures based on 2 seasons VCU and DUS, except 1 season only for varieties registered in Burundi, Rwanda, Tanzania, or Uganda	Required but with minimal criteria and low fees	(a) phytosanitary issues; (b) seed quality; (c) food crop and pastures, seeds must be of a registered variety; and (d) whether there are enough seeds of the variety in Kenya	For vegetables	For all field crops and pasture crops	Required, but with minimal criteria and nominal fees	Required based on seed quality

Country	To start a seed company, MoA registration is:	To introduce a new variety, variety registration is:		To produce or access seed for wholesale delivery:				To sell seed:	
		Voluntary or automatic and low cost	Required, with discretionary approval after time and expense	MoA reg'n of contract farmers is:	MoA controls on seed imports are based on:	Seed certification is:		MoA reg'n of seed dealers is:	MoA approvals of seed exports are:
						Voluntary	Required		
South Africa	Not required; however, premises for cleaning, packing, and sales must be registered based on common-sense criteria	Required but automatic (1 year of DUS is a low cost formality)	See left.	Not required	(a) phytosanitary concerns; (b) seed quality; (c) whether the variety is registered	For all crops unless a breeder says otherwise	For varieties for which the breeder asks that certification be required	Not required; however registration of premises is required based on minimal criteria	Required; MoA may ask for seed tests before deciding to allow or not (neither the Act nor the Regulations specify what tests may be required)
Tanzania	Required, with some detailed but workable criteria	No	For all crops, including vegetables, MoA asks for 2 years DUS and 1 year VCU tests followed by discretionary decision	Required, but without onerous criteria	(a) the importer must be registered; seeds must have (b) a phytosanitary certificate and (c) a certificate of quality (regulations do not specify the quality); and (d) the variety must be named	The Minister may allow, but the situation is not clear	Required for all crops, including vegetables, unless the Minister allows otherwise	Required, but without onerous criteria	Required, based on (a) registration of the exporter; (b) presentation of import permit from the importing country; (c) the variety must be named
Turkey	Required (available documents in English do not show the criteria)	No	Required for all crops; after 1982 reforms, MoA allowed companies allowed to do their own VCU tests and accepted almost all submitted varieties; currently MoA requires 2 years of VCU and DUS tests	Required (available documents in English do not show the criteria)	(a) phytosanitary issues; (b) registered varieties (except for seeds to be used to produce for export); and (c) OECD certification or ISTA certificates for vegetable seed.	For vegetables	For all field crops	Required (available documents in English do not show the criteria)	Required, based on seeds meeting Turkey's seed quality standards

Country	To start a seed company, MoA registration is:	To introduce a new variety, variety registration is:		To produce or access seed for wholesale delivery:				To sell seed:	
		Voluntary or automatic and low cost	Required, with discretionary approval after time and expense	MoA reg'n of contract farmers is:	MoA controls on seed imports are based on:	Seed certification is:		MoA reg'n of seed dealers is:	MoA approvals of seed exports are:
						Voluntary	Required		
United States	Required but automatic (for USDA to assign a code to use on labels)	For all crops		Not required (but states may require)	phytosanitary criteria	For all crops	For some varieties, but the requirement comes from the owner of the variety, not from government	Not required (but states may require)	Not required

Table 4: Average number of varieties registered per year from government agencies and private companies, selected countries and crops

Crops	Bangladesh (annual averages 2003-012) ^a			Ethiopia (annual averages 1999-2009)			India (annual averages 2005-10)			Kenya (annual averages 2000-08)			Tanzania (annual averages 2000-08)			South Africa (annual average 2000-10)		
	Private	Public	Total	Private	Public	Total	Private ^b	Public	Total	Private	Public	Total	Private	Public	Total	Private	Public	Total
Cereals																		
Maize	9.1	0.8	9.9	0.7	1.8	2.5	22.7	13.0	35.7	7.4	7.8	15.2	4.1	1.1	5.2	43.8	1.5	45.3
Rice	9.2	2.8	12.0	0	1.3	1.3	13.2	40.0	53.2	0.0	0.8	0.8	0.0	0.6	0.6	0	0	0
Wheat	0.0	0.7	0.7	0	4.5	4.5	6.7	15.8	22.5	0.0	0.8	0.8	0.0	0.6	0.6	5.5	1.8	7.4
Sorghum	1.1	0.0	1.1	0	2.1	2.1	12.5	7.3	19.8	0.1	0.8	0.9	0.0	0.2	0.2	6.1	0.4	6.5
Other food crops											0.0	0.0	0.0	0.0	0.0	0.0		
Potato	0.0	1.9	1.9	0	0.2	0.2	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.4	6.4
Sunflower	0.0	0.1	0.1	0	0.1	0.1	NA	NA	NA	0.0	0.3	0.3	0.2	0.3	0.6	5.5	0.5	6.0
Soybeans	0.0	0.2	0.2	0	0.6	0.6	NA	NA	NA	0.0	0.6	0.6	0.0	0.1	0.1	7.6	0.7	8.4
Groundnut	0.4	0.5	0.9	0	1.1	1.1	NA	NA	NA	NA	NA	NA	0.0	0.0	0.0	1.0	0.2	1.2
Common bean	0.1	0.1	0.2	0	2.0	2.0	NA	NA	NA	0.0	1.3	1.3	0.0	0.9	0.9	8.6	1.5	10.1

NA: data not available from the sources used.

^a For crops with shaded squares, variety registration is voluntary; for these crops, numbers of private varieties may be under-counted because companies sometimes do not register varieties.

^b Numbers of private varieties in India are from 34 companies only, and so undercount private variety introductions.

Sources: Data for India are from Pray and Nagarajan (2012). Data for Bangladesh, Kenya, South Africa, and Tanzania are from Pray et al. (2011); Gisselquist et al. (2013); and SCA (2013). Data for Ethiopia are from GOE (2009).

Table 5: When governments allow more varieties, what happens to yields and incomes?

Country	yields (tons/hectare)		Estimated impact on farm income (\$/year)
	Pre-reform	Post-reform	
Bangladesh	1 t/ha (1990)	>6 t/ha (2007-10)	\$125 million (2010)
Turkey	2.18 t/ha (1980-82)	4.13 t/ha (1990-92)	\$97 million (1990-92)

Sources: Gisselquist and Pray (1999); Rashad et al. (2012); Pray et al (2012).

Table 6: Selected seed trade statistics

Countries	Population in 2013 (millions)	Domestic sales, 2012		Seed exports, 2011			Seed imports, 2011		
		\$ millions	\$ per capita	Vegetables (\$ millions)	Total		Vegetables (\$ millions)	Total	
					\$ millions	As a % of domestic sales		\$ millions	As a % of domestic sales
Bangladesh	153	125	0.8	NA	NA		NA	NA	
Ethiopia	87	20	0.2	NA	NA		NA	NA	
European Union									
France	66	2,800	42.4	366	1,616	58%	150	683	24%
Germany	80	1,170	14.6	73	745	64%	97	714	61%
Italy	60	767	12.8	118	319	42%	177	417	54%
Netherlands	17	590	34.7	1,146	1,476	250%	330	628	106%
Ghana	25	6	0.2	NA	NA	NA	2	2	33%
India	1,233	2,000	1.6	29	59	3%	47	70	4%
Kenya	44	60	1.4	5	10	17%	8	24	40%
South Africa	50	450	9.0	21	73	16%	29	89	20%
Tanzania	47	15	0.3	4	10	67%	1	2	13%
Turkey	76	750	9.9	18	61	8%	104	166	22%
United States	316	12,000	38.0	507	1,394	12%	318	908	8%

Source: Population from Wikipedia (2013). Seed data for Ethiopia and Ghana are author's estimates. Seed data for Bangladesh for July 2011-June 2012 are from Financial Express (2012). All other seed data are from International Seed Federation (2013).

3 Assessing Ethiopia’s new and emerging seed regulatory framework

Ethiopia’s private seed industry has been held back by limits on private variety introductions (Table 4) and the absence of a private seed market mediated through thousands of (non-existent) private dealers. The existing formal seed system, based almost exclusively on varieties from the public sector, has not given farmers enough good new varieties to support acceptable rates of yield growth. For bread wheat, durum wheat, hybrid maize, OPV maize, chickpea, and some other major crops, the average age of the 2-3 dominant varieties by crop ranges from 14 to 33.5 years, (p 38, GOE 2012b). The emerging regulatory framework could – by allowing the private sector to develop – accelerate variety introduction and yield growth.

Ethiopia’s emerging seed regulatory framework starts with a new Seed Proclamation in 2013 (Government of Ethiopia [GOE] 2013), but will depend crucially on Seed Regulations yet to be finalized and approved – currently in draft form (GOE 2012a) – and on subsequent administrative decisions, policies, and Ministry Directives.

This section examines Ethiopia’s seed legislation with attention to: general issues in the design of the regulatory framework; whether it allows a private seed industry to develop; how the new regulatory framework is different from the previous one; and whether the Proclamation and draft Regulations accommodate the expected COMESA seed harmonization agreement.

3.1 General issues in the design of the regulatory framework

Is the Seed Proclamation 2013 flexible, allowing the Government to respond to changing circumstances? Yes. The Proclamation leaves room to write regulations and directives that fit various policy orientations (e.g., more or less favorable to the private sector), technical opportunities (e.g., contract seed production for export), and changing circumstances.

Does the Proclamation suitably assign authorities to the Federal and Regional governments? The general pattern in the Proclamation is that the Ministry is responsible for standards and foreign trade, while regional authorities implement most of the regulations through contacts with companies, growers, and dealers.

According to the Proclamation the Ministry has sole authority to register varieties, to supervise seed imports and exports, to set criteria for issuing certificates of competence (for getting into the seed business), and to set seed quality criteria.

Both the Ministry and regional authorities are expected to issue certificates of competence, to test seed, and to accredit laboratories.

The regional authorities are responsible to certify seed in domestic trade, i.e., to visit fields growing seed (Articles 12 and 13). This parallels practices in the US and India, where whatever certification is done is by state agencies (although very little seed is certified in the US, and only some seed in India).

While the division of labor between Ministry and regions seems logical, implementation will likely run into snags. For example, the Proclamation charges the Ministry to make an “integrated production plan”; but regional authorities might not want to accept production targets from the center for their regional government seed companies. Tension between the Ministry and regions is not necessarily a bad thing; tensions can be taken as evidence that regions have some autonomy and authority, which is intended with devolution.

Does the Proclamation create adequate certainty for market development? Taken alone, the Proclamation is too flexible. On the one hand, the Proclamation allows Regulations, administrative practices, and Directives which would 100% obstruct development of a public and

private competitive seed industry linked to world breeding. On the other hand, the Proclamation allows Regulations, administrative decisions, and Directives which would be 100% conducive to the development of such an industry.

Thus, the Proclamation is adequate for market development, but the certainty that allows the seed industry to develop will depend on other steps: workable regulations and specific MoA actions and permissions to demonstrate and establish a new order.

3.2 How is the 2013 Seed Proclamation 2013 different from the 2000 Proclamation?

The Seed Proclamation 2013 has several differences with the previous Seed Proclamation issued in 2000 (GOE 2000) as summarized here and in Table 7. In general, the 2013 Proclamation goes into less detail and is thereby more flexible, allowing changes in Regulations to accommodate changing circumstances, without having to amend the Proclamation.

Regional authorities: The 2013 Proclamation gives regional authorities specific roles in implementing seed Regulations. The 2000 Proclamation provided for delegation of authority, but did not specify regional authorities.

Who can grow, process, wholesale, or retail seed? The 2013 Proclamation says that any seed producer, wholesaler, or retailer must have a certificate of competence, but does not give criteria (Article 19), leaving details to regulations. The 2000 Proclamation detailed criteria for granting certificates of competence (Articles 5 and 6).

Seed import controls: According to the 2000 Proclamation, imported seeds must be of a variety registered in Ethiopia (Article 25). The 2013 Proclamation relaxes this requirement if seeds are used to produce seeds or produce for export (Article 17).

Seed production planning: The 2000 Proclamation charges the National Seed Industry Agency to “decide the type of varieties to be imported and locally produced” (Article 30). The 2013 Proclamation is more directive, asking MoA for “integrated production planning” with annual production plans including “responsibilities of actors” (Article 7).

Seed export controls: The 2000 Proclamation stipulates that seed exports must be of varieties approved in Ethiopia and meet Ethiopian seed quality standards (Article 14). The 2013 Proclamation allows exports of seed for varieties not registered in Ethiopia (Article 17).

3.3 Does the regulatory framework allow a private seed industry to develop?

On some points, the 2013 Seed Proclamation and draft Regulations are favorable for development of a private seed industry. However, the overall tendency in the draft Regulations appears to be toward controls that inhibit private sector development – company entry, variety introduction, and articulation of the retail network. Nevertheless, the impact of draft Regulations on private sector development could be modified by later Directives and administration decisions.

Who can grow, process, wholesale, or retail seed? The Proclamation requires seed growers, processors, or traders to be registered with the Ministry or a regional authority. The Regulations set subjective criteria which give registrars discretion to approve or deny (e.g., Article 44 requires a seed processor to have “access to appropriate facilities” and “qualified personnel”).

Introducing a new variety: Draft Regulations ask for 1 season of VCU and DUS tests for varieties registered in another country, or 2 seasons (years) for varieties not yet registered in any country (Article 4). However, the Regulations also ask applicants to submit results from two previous years, raising the time to test to 3-4 rather than 1-2 years (Article 7). In any case, years

to test is not the only obstacle; the MoA has discretionary authority to accept or reject submitted varieties, and may be open or closed to new varieties.

Must all commercial seed be certified? Seed quality control oversight, as proposed in the draft Regulations, may or may not be an obstacle for seed producers and vegetable seed importers. Draft Regulations ask that all seed produced in Ethiopia be approved as certified seed (Article 24) or Quality Declared Seed (Article 25). Certification requires government or government-accredited staff to visit fields growing seed and to sample and test processed seed. The requirements for QDS seed leave some room for interpretation; draft Regulations say that “authorities may conduct random checks” but do not say checks are required (Article 23). These criteria could be interpreted to allow QDS as truthfully labeled seed, insofar as there is no requirement that regional authorities must test seed.

For imported seed, draft Regulations (Article 19) charge the Ministry to “be responsible for the quality control and certification of imported and registered seed released on the domestic market as Certified Seed.” If this is interpreted to mean that all imported seed must be certified, it could block vegetable seed imports; most of the best vegetable seed in world trade is not certified.

Seed production plans: Draft Regulations state: “The Ministry...shall establish annual production targets and allocation of responsibilities” (Article 18). If this is interpreted to mean MoA will coordinate public sector seed production and will do no more than collect data on intentions and past production from private companies, it is not a problem for private companies (as long as data from companies is kept confidential). However, if the Article is interpreted to mean MoA will tell companies how much to produce, it blocks private sector development.

3.4 Is Ethiopia ready for COMESA seed trade harmonization?

The COMESA Ministers of Agriculture, in 2008 meeting in the Seychelles, asked COMESA to expedite steps towards harmonization of seed regulations and standards among COMESA countries. In their September 2013 meeting in Addis Ababa, the Ministers approved the Draft COMESA Seed Trade Harmonization Regulations, 2013 (COMESA 2013) and urged member governments to adjust their regulatory frameworks to accommodate harmonization. COMESA approval is not yet final; Heads of State of COMESA member governments are expected to consider the agreement in late 2013.

The draft COMESA Seed Trade Harmonization Regulations (Article 3) state: “[t]he objectives of these Regulations are [inter alia] to:...encourage investment in seed business... increase access to existing varieties...and...stimulate the breeding and availability of improved seed varieties resulting in increased variety choices for all farmers.” Harmonization is initially proposed for 12 crops (Schedule D in COMESA 2013): beans, maize (hybrid and OPV), rice (hybrid and inbred), groundnuts, cotton (hybrid and OPV), wheat, sunflower (hybrid and OPV), sorghum (hybrid and OPV), soybean, pearl millet, cassava, and Irish potato.

These objectives are particularly relevant for Ethiopia, which is well-situated to benefit from harmonization due to its large population (and therefore seed market), the suitability of its climate to produce healthy seed, the availability of breeders and others with skills in seed production, and the large potential market for hybrid maize seed. Harmonization could accelerate development of Ethiopia’s seed industry by linking it to seed industries in 18 other member countries – including industries with strong companies, varieties that could be useful in Ethiopia, and strong public and private breeding programs. COMESA harmonization opens opportunities

for Ethiopians to get into seed business and improves farmers' access to world technology and breeding.

If and when COMESA Heads of State approve seed trade harmonization, Ethiopia is challenged to align its seed regulatory frameworks with what is agreed. This could be achieved without changing the Seed Proclamation. However, it would require at least one change in Ethiopia's current draft Regulations.

Specifically, COMESA seed harmonization proposes to create a COMESA Variety Catalogue, which would include varieties registered in at least two member states and subsequently accepted (by a new COMESA Seed Unit) into the Catalogue. Seeds of all varieties in the Catalogue are to be accepted in all COMESA member countries – in effect, all varieties in the Catalogue are to be automatically registered in all COMESA member countries, except that individual countries may object to specific varieties with cause, such as risk to human health or environment (Article 29 in COMESA 2013).

In Ethiopia, automatic acceptance of all varieties in the COMESA Variety Catalogue is allowed by the Seed Proclamation, Article 4, which gives the Minister authority to release (register) varieties on the basis of whatever process and information the Minister considers adequate. However, for varieties registered in another country Ethiopia's current draft Seed Regulations specifically require at least 1 season of VCU and DUS tests followed by an MoA decision to accept or deny the variety (Article 4, clause 2).

To accommodate the COMESA agreement, a new clause could be added to Article 12, as follows: "The Minister may declare that varieties from any specified crop or from any specified country of origin or from any Catalogue prepared by a regional organization may be registered without any further tests or decisions."

Other minor changes might be considered to align rules for labeling or for import permits with COMESA harmonization. Experts could consider whether the necessary adjustments could be achieved through Directives without changing the Regulations.

Table 7: Impact of Ethiopia’s previous and emerging seed regulatory frameworks on crucial seed industry activities

Previous or new regulatory framework, legal instrument	To start a seed company, MoA registration is	To introduce a new variety, variety registration is:		To deliver seed:				To sell seed,	
		Voluntary or automatic with no or low cost	Required, with discretionary approval after time and expense	MoA registration of contract growers is:	MoA controls on seed imports are based on:	Seed certification is:		MoA registration of seed dealers is:	MoA approvals of seed exports are:
						Voluntary	Required		
Previous framework based on 2000 Seed Proclamation	Required based on criteria and discretionary judgment		For all crops	Required based on criteria and discretionary judgment	(a) phytosanitary concerns; (b) the variety must be registered both in Ethiopia and in the exporting country (Articles 14 and 25); and (c) Ethiopian quality standards		For all crops (Articles 16 and 18)	Required based on criteria and discretionary judgment	Required; seeds must (a) be of a registered variety and (b) meet Ethiopia’s quality standards. (c) MoA has discretion to approve or deny (Article 30)
New framework									
Seed Proclamation 2013	Required leaving criteria to Regulations (Article 8)		For all crops, leaving criteria to the regulations	Required, leaving criteria to Regulations	a) phytosanitary concerns; (b) seed quality according to Ethiopian standards; (c) variety must be registered in Ethiopia, except for seed to be multiplied for export (Article 17)	May be allowed; see next column	All seed must be certified or Quality Declared Seed; QDS seed must be tested by regulators but may not require visits to seed-growing fields	Required, leaving criteria to Regulations	Required; the variety must be registered in Ethiopia, except for seed imported for multiplication and export (Article 17)
Seed Regulations (2012 draft)	Required based on criteria and discretionary judgment		For all crops, with discretionary decisions after 2 seasons’ DUS and VCU tests, or 1 season for varieties registered in another country (however, Article 7 requires data from 2 seasons before official VCU tests)	Required based on criteria and discretionary judgment	(a) phytosanitary concerns; (b) seed quality according to Ethiopian standards; (c) variety registered in Ethiopia	May be allowed; see next column	All seed must be certified or QDS; required field checks and lab tests for QDS are not clear; requirements for imported seed are not clear	Required based on criteria and discretionary judgment	Required; seed must meet the importing country’s quality standards

4 Recommendations

With a new Seed Proclamation in 2013 and with ongoing discussions about draft Regulations, Ethiopia's seed regulatory framework has reached a point where an uncertain future contains a lot of promising possibilities.

Importantly, uncertainties and fears that reforms will upset or damage the existing mostly public sector system can be put to rest. What is required to allow the private seed industry to develop does not entail changes to public sector research, seed production, or distribution. What is required is simply to let companies act: welcome start-ups; allow new varieties; and allow small stores across the country to retail seeds to farmers. In Bangladesh, India, and Turkey, reforms that allowed the private sector to develop did not involve privatizing or closing state seed companies. More than 20 years later, reforms have not led to a withering away of state seed companies, and have not undermined government research.

Recommendation 1: Continue to fund public research and public seed companies; and continue to distribute seed from public companies through cooperatives as long as that is what MoA, public companies, and cooperatives want to do. A commitment to continue the existing system without major changes assures that farmers will get seeds, and also assures important stakeholders that their commitment to seed supply is recognized and that they will not lose their jobs and roles.

Recommendation 2: Adopt best practice policies for the private sector, as demonstrated in developing and rich countries. Even though Ethiopia's private seed sector is small, the immediate introduction of best practice regulations will allow it to develop and to grow, whereas delay in establishing workable regulations keeps it weak, isolated, and underdeveloped.

The fear that an inexperienced private seed industry will harm farmers is overblown. When a private company starts to sell seeds through retail dealers, even if it makes mistakes, it cannot do much damage because of limited sales. When a seed company makes mistakes, it loses farmers' trust and goes out of business. As Ethiopia's private seed industry grows, and as it begins to make an important contribution to farmers' production and incomes, the companies that grow with it will have earned and will value the farmers' trust as crucial to future sales.

Here are four elements of best practice regulations that MoA could implement with the emerging regulatory framework.

Recommendation 2(a): Set and enforce criteria for certificates of competence that are not a barrier for new seed companies to start. A seed company wholesales seed which it may import and/or process and package locally. The 2013 Seed Proclamation requires wholesalers, importers, and processors to be registered based on certificates of competence from MoA or regional authorities, but leaves the criteria for these certificates to Regulations.

According to draft Regulations (Article 44), the criteria for a certificate of competence for "seed importer, exporter, distributor or retailer" are "access to appropriate facilities for seed storage" and "engaged personnel with basic knowledge of handling seeds." These criteria appear workable as long as MoA and regional authorities are willing to accept crude but adequate storage facilities and engaged personnel with knowledge from hands-on experience. The category "distributor" could be understood to include seed companies (i.e. any company that is responsible for the labels on packaged seed).

Will the implementation of this Article – and other regulations – be workable for small companies without routine access to high government officials? Regulations that are onerous will, at best, allow a handful of multinationals and large companies to operate. Such a private but over-controlled industry is not disciplined by competition and does not link farmers to competitive world breeding for all crops.

Recommendation 2(b): Relax controls on variety introduction, recognizing that seed companies on their own test and demonstrate prospective new varieties among farmers to

assess and stimulate farmer interest; based on farmer interest, companies deliver seed to retail stores. This is allowed in the 2013 Seed Proclamation, which requires that varieties be registered but gives the Minister authority to say how that is to be done. Draft Regulations could be an obstacle, however, asking for 1-2 years of VCU and DUS tests followed by MoA decision to accept or reject.

There are several ways to proceed. MoA could relax controls on variety introduction with the existing draft Seed Regulations by making a clear commitment to companies to allow companies to do their own VCU and DUS tests (i.e., to recognize each company as a “responsible body” for testing; see Article 7, draft Regulations) and will approve essentially all varieties that companies propose. This would be similar to what Turkey did in 1982, which brought a large increase in the flow of new varieties to farmers (Table 2).

Alternately, MoA could consider to revise draft Regulations to allow automatic registration for varieties from the proposed COMESA Variety Catalogue or more generally for some crops (e.g., vegetables) or from a longer list of relevant countries, including India, Mexico, etc. This could be done by inserting two new clauses into Article 12 of draft Regulations, as follows:

- 1/ The ministry will register new varieties of vegetables submitted by any person, company or agency on the basis of a description of the variety, including results of a prior DUS test by any public or private, without any further tests or decisions.
- 2/ The Minister may declare that varieties from any specified crop or from any specified country of origin or from any Catalogue prepared by a regional organization may be registered without any further tests or decisions.

Similar arrangements are common in regional and other countries. For example, variety registration is not required for vegetables in some African countries, including Kenya and Uganda. Variety registration is not required for any crop in India, and is automatic for all but five crops in Bangladesh.

Recommendation 2(c): Allow private companies to sell seed for all or most crops based on their own quality checks. In other words, allow companies to sell truthfully labeled, uncertified seed. This is allowed in the 2013 Seed Proclamation which says (Article 10) “The Ministry will cooperate with Ethiopian Standards Agency in developing seed standards” but does not specify standards.

Both the Proclamation and Draft Regulations recognize two classes of commercial seed: certified seed and Quality Declared Seed (QDS). For QDS seed, the draft Regulations (Article 23) say that “the Regional authority may conduct random checks” but do not require checks. MoA could interpret this to allow companies to sell seed from fields that government inspectors have not visited and that has been tested for quality by the company but not by any government laboratory. In other words, the definition of QDS seed could be recognized to include truthfully labeled seed.

Seed certification is unusual for vegetables throughout the world. For field crops, the EU requires that all seeds be certified; in many other countries, including Bangladesh and India, certification is voluntary for all crops. Contrary to common fears about private sector misconduct, compulsory certification does not assure better seed. No matter how much government officials inspect seed plots and test processed seed, if a company wants to cheat it can do so after all checks and before seed sale. But that’s not what seed companies do. Companies know their sales depend on farmers’ respect for their brand name, and so strive to deliver good seed.

Whether a company is producing truthfully labeled or certified seed, it has to know how to produce good seed. Having a government agent visit seed plots and test seed duplicates company efforts. Duplicate effort and consequently higher costs are easier to bear for companies producing high value seeds, such as hybrid maize seed, but can be a major

obstacle for companies producing lower value seeds for open-pollinated and self-pollinated varieties.

Recommendation 2(d): Allow the rapid expansion of a network of private seed retailers in small towns throughout Ethiopia. As noted above (Recommendation 2[a]), seed retailers must be registered with MoA or regional authorities based on certificates of competence. According to draft Regulations (Article 44), the criteria for certificates of competence are “appropriate facilities for seed storage” and “engaged personnel with adequate knowledge of seed handling.”

With these criteria, MoA could accelerate the registration of seed retailers. Hundreds to more than 1,000 stores are required to allow seed companies to conveniently reach farmers throughout Ethiopia. Many stores would be small, selling vegetable seeds only for most of the year, with seasonal sales of hybrid maize and other field crop seed. Initially, many stores might be general stores that add seeds to their shelves. Cooperatives might want to get into the business.

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