Seed systems, science and policy (Draft)

Key messages

Africa needs to integrate and develop its various seed systems if it is to increase its present contribution to more than 2% of the global seed trade. Quality improvements in the informal seed systems and enhanced linkages with the formal seed systems are critical. A strategic partnership of research, enterprise and government is necessary to achieve this goal.

Summary

The importance of improved varieties and high quality seed to the growth and development of African agriculture cannot be underestimated. However, the differing standards, regulations and procedures; low investment in science; and poor infrastructure, act as barriers to enhancing: quality seed production, intra-regional trade within the continent and global competitiveness. Africa contributes only 2% of international seed trade.

The Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) has been supporting the development of a favourable policy environment through the Eastern Africa Seed Committee (EASCOM). This committee is comprised of breeders, regulators, policymakers and public sector representatives from each member country. The EASCOM platform facilitates the adoption and implementation of harmonized regional seed regulations, standards and procedures that were agreed in 2002. This has led to advances in variety evaluation, release and registration, seed certification, phytosanitary management, plant variety protection and seed import and export procedures in Eastern and Central Africa.

Box 1: Notable gains since harmonization started

Kenya has released 140 new crop varieties, 30% from the private sector; Uganda released 27 varieties, 50% from the private sector; Tanzania released 121 varieties, 30% from the private sector and Sudan released 243 varieties, all from the public sector. The total welfare gain for the ECA region is estimated to be over US$727 million.

Seed systems

Seed systems can be categorized into *formal, semi-formal* and *informal* based on the level of quality control, variety purity and distribution systems.

A formal seed system provides new and improved varieties of certified seeds of consistent quality, and relatively high purity. It is regulated by governments and industry. The system supplies on average 3-20% of all seeds used in production. However, this system is limited to only a few selected crops, e.g., maize, which accounts for 70% of all certified seeds used in a country such as Kenya. Local varieties should be given recognition in seed regulation.

An informal or traditional seed system is semi-structured and mainly operates at the individual or community level and offers relatively cheaper and readily available seed. It constitutes about 60-80% of the total seeds used, especially for indigenous vegetables, pulses, vegetatively propagated crops, oil crops and cereals such as millet and sorghum. However, this system lacks support in knowledge, skills and incentives for quality control and self-regulation. Farmers have difficulty producing seed and vegetative planting material of a consistent quality and have limited access to improved germplasm. The system is not attractive to private sector investment.

A semi-formal seed system is a blend of formal and informal systems. Farmers and community-based organisations multiply and sell small quantities of quality declared seed of improved varieties to other farmers within a restricted zone, with minimal formal quality control. In some cases, the initial seed originates from the formal seed system. In Tanzania, quality declared seed is inspected and approved by the Tanzania Official Seed Certification Institute at the district level where sales are restricted.

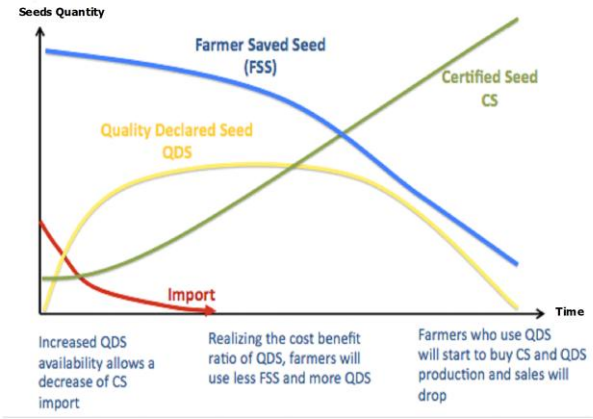

Figure 1. Strategic plan of seed systems in Rwanda by 2017

While these systems coexist in Eastern and Central Africa, Rwanda has developed a strategy aimed at improving seed quality and formalizing seed supply by 2017. This will be through: an improvement in quality declared seeds; and gradual decline of farmer-saved seeds by 2017. The commodities targeted are maize, potato and wheat. The sale of certified seeds is expected to increase.

The role of universities

The number of universities in several African countries has grown in the last decade. In Kenya, public universities grew from six in 2000 to 33 in 2013. Most of the universities have faculties of agriculture and offer courses in plant breeding and biotechnology, seed science and seed enterprise management, and related biophysical and social sciences. Many are contributing to seed industry development and growth through research, marketing and capacity building in seed science and technology (Box 2). They are working in partnership with other value chain actors in breeding, production, multiplication, conservation, certification and marketing and with regulatory agencies. However, universities need to provide additional support to seed sector development, policy formulation and marketing.

Many well-trained scientists are not meaningfully engaged in research and development activities, largely due to inadequate resources and unfavourable policies which demand exorbitant fees for validation of candidate varieties in mandatory national performance trials and distinctiveness, uniformity tests. For example, in Kenya these two tests require US$2,400 per entry. In addition, there is no provision of variety maintenance programmes and benefit sharing when new varieties are commercialized. This negates gains made in cultivar development and limits access to new seed technologies. It is notable that some universities are pursuing intellectual property protection for product innovations and benefit sharing. For example, in 2013, the University of Nairobi revised its intellectual property policy to take into consideration global trends and to cover a much broader range of innovations.

Recent policy changes demand that universities play a major role in addressing societal and development challenges which extend beyond their traditional teaching and research roles. This expanded role is known as the 'third mission'. The Africa Science Agenda for Agriculture developed by the Forum for Agricultural research in Africa (FARA), recognises that science for agriculture in Africa is too important to be outsourced, and demands that each country develop sufficient science capacity to participate in transformation of agriculture.

Box 2: Examples of contributions by universities

- Mekelle University (MU) in Ethiopia, working in collaboration with local farming communities, developed three high-yielding barley varieties with improved nutritional qualities (β-glucans, Iron and Zinc) which were officially released.
- The University of Nairobi (UON) working with Iowa State University and other collaborators in the seed value chain have established a Seed Enterprise Management Institute (SEMI) which is offering certificate, diploma and soon degree courses in various aspects of seed science and technology, including seed production, processing, storage, quality control and entrepreneurship. In the last five years, the university has released more than 18 improved bean varieties, including Africa's first biofortified bean varieties and short duration, drought-tolerant pigeon pea varieties for semi-arid areas. It has registered a seed company to produce certified breeder seed and partnered with seed companies, processing industry and other actors to commercialize its varieties and to ensure rapid and sustainable seed dissemination. UON also hosted a regional bean breeding programme for the last 10 years and developed a wider impact strategy that has been adopted by more than 28 African countries; between 2000 and 2011 it shared its genetic resources with more than 32 countries worldwide.

Role of policy

Policies are important in providing a level playing field for all stakeholders, allowing the recognition of all seed systems. Policies that encourage private-sector investment in the seed sector and ensure institutional support to develop new, improved varieties; provide quality assurance; improve market infrastructure; enforce contracts; and establish simplified procedures, are all important for the growth of the sector.

Policies should promote the informal system to eventually become formal. They should support an integrated seed delivery system that links seed systems with local, national, regional and international markets. This will provide options to beneficiaries and the pulling force and motivation needed to increase productivity. Rwanda's current strategy for transforming the seeds value chain by 2017 is a good example for other countries to consider.

Tax incentives for equipment, supplies and trainings aimed at capacity building and enhancing skill in seed sector should also be considered.

Recommendations

- ❑ Africa remains a minor player in the global multi-billion dollar seed trade. This trend needs to be reversed by eliminating the barriers that are severely limiting market size, strengthening capacities in seed delivery systems, and investing in adequate science and entrepreneurial capacity for commercializing seed innovations and increasing the competitiveness of African seed products.
- ❑ The African seed sector remains fragmented. All stakeholders must work together to strengthen linkages between farmers, regulatory organisations, national agricultural research institutes (NARIs), universities, extension agents, the private sector and policymakers. They should collaboratively undertake studies to identify gaps, develop interventions and inform policy formulation processes.
- ❑ Governments should consultatively develop long-term strategies to guide interventions and avoid duplication of efforts, enhance coordination and maximize benefit from synergies among the different stakeholders.
- ❑ The informal seed system should be supported as it is being transformed to a more formal system. Seed system actors should be given the required training to improve the quality of the seeds produced. Quality declared seed for crops that are not adequately covered under the formal system should be recognised where applicable.
- ❑ Regulatory institutions should be strengthened. There is need for more highly skilled human resources, modern facilities and easily accessible and up to date information on approved regulations and procedures for effective implementation of quality assurance schemes and timely delivery of services.
- ❑ There is limited cross-border seed trade within Africa. Enhanced domestication and implementation of the harmonized ECA seed standards, procedures and regulations are

needed. Conformance with international seed standards could increase Africa's participation in the international seed trade.

- Universities and NARIs should undertake joint seed business ventures with private companies to ensure that new varieties developed are marketed and accessed by farmers. Awareness, application and enforcement of intellectual property rights should be enhanced to motivate seed producers, plant breeders and the private sector to invest in the development of new and improved varieties.

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Note: This is a collaborative effort of CTA, ASARECA and African university lecturers and other stakeholders. For more information, please contact Judith Francis, CTA or Michael Waithaka, ASARECA.

The views expressed are those of the authors and do not necessarily reflect the views of the partner organizations.