

Case Study 4: Seed Business Models for EGS Production in Africa

Component: Early generation seed (ESG)

Executive Summary:

Early generation seeds (EGS) that encompass breeder, pre-basic, and basic seeds, are the critical connection between breeding activities and the eventual production and distribution of varieties to farmers. EGS production is a distinct step in seed production requiring specialized knowledge, skills, and facilities. It is estimated that 80% of the small and medium-sized seed companies, who can reach more than 60% of smallholder farmers in SSA, struggle to produce a consistent supply of quality foundation seed due to technical, infrastructural, and financial challenges. EGS production is dominated by the government in Africa, a fact that limits its availability for SMEs. Possible business models include: 1) Government support of public breeders to produce EGS for the private sector, 2) Traditional seed companies producing their own EGS, 3) Public-private collaboration and partnerships, and 4) Foundation seed companies.

QualiBasic Seeds (2017) and ECOBasic Seed (2021) companies are the first African regional EGS companies aiming at EGS production entity to supply high-quality foundation seed effectively and efficiently for small and medium enterprise (SME) seed companies in eastern and southern Africa and western Africa, respectively. They are still gaining experience as they just started working with hybrid maize but are planning to include other crops.

Partnerships among the public and private sectors are needed to enable sustainable EGS production and supply. Partnerships are recommended because neither the public sector nor the private sector can do it alone.

Context:

Early Generation Seed (EGS) Defined

Early generation seed (EGS) encompasses breeder seed, pre-basic and basic seed. EGS production constitutes the maintenance breeding of improved variety and regular multiplication and supply of high-quality breeder, pre-basic, and/or basic seed (van Gastel et al., 2002) for large-scale certified seed producers. EGS is the critical connection between breeding activities and the eventual production and distribution of varieties to farmers as its part of the seed value chain as well as the crop value chain (Figure 1).

The main purpose of EGS multiplication is to ensure that the genetic purity and potential of the newly released variety are maintained and that a regular supply of high-quality pre-basic and basic seed is produced and supplied for the entire seed Program (Atilaw et al., 2017). EGS production is a distinct step in seed production requiring specialized knowledge, skills, and facilities (Atilaw et al., 2017).

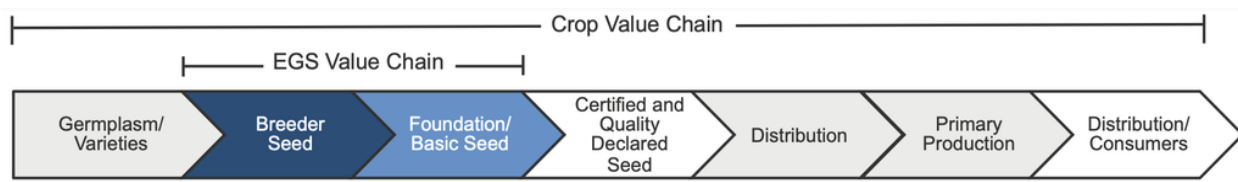


Figure 1: Extended crop value chain (Source - Agrilinks)

Challenges and Objectives:

The main purpose of EGS Early generation seed production is to maintain the genetic potential and identity of a variety and regular provision of high-quality breeder seed which is the basis for subsequent seed production (Atilaw et al., 2017).

Various studies indicated that the lack of EGS production is a primary bottleneck that constrains agricultural development and that partnerships between the public and private sectors would be needed to resolve it (Cramer et al., 2020). It is estimated that 80% of the small and medium-sized seed companies, who can reach more than 60% of smallholder farmers in SSA, struggle to produce a consistent supply of quality foundation seed due to technical, infrastructural, and financial challenges. EGS production requires investment in skilled manpower, dedicated facilities, and upfront financing without expected sales and returns until the certified seed is produced. SME seed companies often do not have such resources and are dependent on the public sector to supply EGS. EGS production is dominated by governments in Africa. For example, In Ethiopia, NARS is responsible for EGS production (breeder, pre-basic, and to a lesser extent basic seed) and research seed technology (Abebe et al., 2017). The production of EGS for public varieties is often not profitable because the volumes are low and field production costs are high. Public sector institutions that attempt to meet EGS demand unilaterally are often stymied by not only the lack of monetary incentives but by limited infrastructure and finite human and financial capital. Meanwhile, commercial seed producers that make up the private sector often do not see a profit incentive for moving upstream into EGS production, which is more capital intensive than later-stage seed multiplication.

Other bottlenecks that affect availability and reduce access to EGS include:

1. Complicated and disparate licensing agreements among the various regional genetics' suppliers;
2. Lack of availability of sufficient breeder seed from licensors;
3. Lack of financial resources, technical know-how, and infrastructure to maintain EGS.
4. Inadequate supply of breeder seed from public sector breeders
5. Legislation that often precludes private sector involvement in EGS production and limits EGS production overall
6. Lack of incentives for EGS production (Cramer, 2020).

The questions in the effort toward models of sustainable EGS production are 1) How can incentives for performance be reinforced where economic incentives are inadequate to trigger full private commercial EGS supply? 2) What is the real role and responsibility of the public and the private sector in assuring sustainable EGS supply? and 3) How can successful models be replicated and scaled out?

Interventions:

Africa principles

Africa developed the Principles of Commercial and Sustainable EGS Supply (Source: Adapted from EGS Africa Communiqué 2016):

1. EGS interventions should be guided by the seed value chain, starting with farmer use of—and willingness to pay for—new, improved varieties.

2. EGS operations should include hybrid, self-pollinated, and vegetatively propagated crops; cover formal, intermediary, and informal seed systems; and engage public, private, and community-based partners.
3. EGS supply should cater to different seed systems (not just the formal system).
4. Effective EGS supply should be part of enhanced seed-value-chain management and integration.
5. An assessment of the division of responsibilities for financing and supply of EGS should be undertaken, with specific consideration of public-private partnerships for open-pollinated and vegetatively propagated crops.
6. National agricultural research organizations (NAROs) are and should remain responsible for the production of breeder seeds for improved varieties developed by publicly financed crop improvement programs.
7. A gradual withdrawal of Consultative Group for International Agricultural Research (CGIAR) programs in direct involvement with EGS production is recommended to move toward a more sustainable seed sector.
8. Research organizations and their breeders should partner in the maintenance of breeder seeds to keep their priority focus on further crop improvement.
9. Several aspects of regional seed-trade harmonization efforts are relevant to EGS supply, including facilitating the movement of EGS supply across borders.
10. Donors should transition from direct interventions in the seed value chain to strengthening public and/or private-sector capacity in EGS supply.

Business models for EGS

Variety maintenance, production, and distribution of the breeder, pre-basic, and basic seed are carried out by either /or the public breeding institutions or the private seed sector. Sustainable EGS production will require crop and product diversification, public-private collaboration, vertical integration, institutional partnerships, access to finance, market assurance, and marketing strategies.

Possible business models include: 1) Government support of public breeders to produce EGS for the private sector, 2) Traditional seed companies produce their own EGS, 3) Public-private collaboration and partnerships, and 4) Foundation seed companies.

Foundation seed companies

There are two public foundation seed companies in Africa both created by the African Agricultural Technology Foundation (AATF) with support from BMGF and other donors. These are QualiBasic Seeds Company and ECOBasic Seed Company.

i. QualiBasic Seeds Company (QBS)

QualiBasic Seeds Company (QBS), launched in 2017, is the first EGS production entity in Sub-Saharan Africa to supply high-quality foundation seeds effectively and efficiently for small and medium enterprise (SME) seed companies on the continent. The QBS Mission is to produce and supply EGS of the highest quality and purity to seed companies in East and Southern Africa, to be their preferred supplier of foundation seed (FS) for the ultimate benefit of Africa's farmers. QBS bridges the innovations produced by crop breeders working with national and international research programs and the local seed companies that make them available to African farmers.

QBS was established to address the acute technical, infrastructural, and financial challenges the seed companies face in the maintenance, multiplication, and timely supply of quality foundation seed,

critically essential to improve farm productivity by smallholder farmers. Low access and use of poor-quality foundation seed by seed companies result in low crop yields and crop failure in some cases for the smallholder farmers, affecting sustainable food production and costing the continent a valuable development opportunity. Investing to operate a centralized system that services the foundation seed needs of various seed companies would make foundation seed production more effective and efficient, benefiting from economies of scale and the use of the most ideal agroecologies and seasons.

QualiBasic operations started with EGS seed for maize in East and Southern Africa then grew to serve other cereals and legumes across SSA when fully functional.

Three foundation seed production hubs with seed processing and storage facilities were established in Kenya, Zambia, and South Africa by the second and third years of operations, to meet the demand for products promptly and avoid lengthy delays in seed movements.

QBS operates along commercial lines ensuring reliable quality production of foundation seed. QBS achieve high-quality standards such as genetic purity and good germination, over several production cycles by leveraging economies of scale to support significant investment in production and quality management thereby ensuring timely supply of EGS to customers.

QBS services include:

- 1) High-Quality EGS i.e., supply of high-quality EGS with high genetic integrity, phytosanitary security, and industry-leading seed quality standards,
- 2) Plan Production -through working with the seed company to plan production and ensure delivery of high-quality EGS to satisfy the needs of its certified seed production, and
- 3) Technical Support through the provision of technical support to help the seed company with production and marketing for its certified seed.

“So far, QBS has been producing foundation maize for companies, but it plans to extend its services to other seed crops including soya beans, sorghum, millet, groundnuts, cowpea, and beans. This range of crops has a lot of recycled seed which has caused the yields to be very low,”
- Sylvia Horemans, Chief Executive Officer of Kamano Seed Company, Zambia.

2. **ECOBasic Seed Company**

ECOBasic Seed Company is the second AATF start-up seed company launched in Nigeria in Nov 2021 (AATF, 2021). ECOBasic is dedicated to the production of EGS for Seed companies in the West African Sub-region. Like QBS, ECOBasic seed company is driven by the vision to produce EGS of the highest quality and purity for hybrid seed production for seed companies, thereby enhancing profitability, productivity, and food security in West Africa.

In the short – Medium term ECOBasic will concentrate in Nigeria whilst in the long run it will serve to target the greater ECOWAS Region. Currently, over 90 percent of the Early Generation Seed (EGS) – breeder and foundation seed – sourced in Nigeria are from research institutions.

It will target local and international seed companies that produce certified hybrid seeds. Currently, ECOBasic is focusing on EGS for hybrid seed maize production. ECOBasic Seed will expand its product portfolio to include additional staple grain crops such as hybrid rice, PBR cowpea, soybean, and sorghum and will expand to new markets within West Africa.

ECOBasic seed company follows a business-to-business model where it will sell foundation seed to seed companies for their certified seed production that is used by farmers.

Results: Multinational seed companies continue to produce EGS for their proprietary crop varieties. SMEs also struggle to produce limited EGS despite the technical, facilities, and financial limitations. As noted for Ethiopia, various countries have NARS being responsible for EGS production (breeder, pre-basic, and to a lesser extent basic seed) (Abebe et al., 2017). The NARS-produced EGS is available to both public and private seed companies.

QBS and ECOBasic seeds are new in Africa and experiences are still being gained. The experiences gained so far indicate cautionary acceptance such as:

1. The EGS companies are at times treated as NGOs where customers expect free support services.
2. Difficulties in obtaining accurate forecasts and orders from customers
3. Many *stock-keeping units* (SK) are driven by multiple Hybrids and coupled with small volumes as customers either build confidence in QBS or launch new hybrids or both.
4. Difficulties in getting reliable out-growers, who irrigate, and follow protocols in Zambia, Kenya, and Nigeria.
5. Availability and purity of breeder seed forces at least one round of checking purity and possibly bulking.
6. Having a good, reliable, cost-effective lab for good practice (GP) testing.
7. Individual country regulatory differences and regional acceptance.
8. Profitability of crops other than hybrids – reliability of off-take and cost of production versus the price customers are willing to pay.
9. Gaining more share of business from seed company customers through building confidence.

Supporting Visuals or Quotes:

“National governments, international institutions, and universities need to work together with seed suppliers to harmonize regulations and streamline access to EGS for the benefit of small-scale farmers” - Cramer, 2019

Future Plans:

The way EGS is handled determines the maturity of a country’s seed system. Emerging EGS systems are generally reliant on public sector funding to produce EGS. Demand for EGS exists, but there are significant supply bottlenecks that constrain growth.

Expanding EGS systems similarly requires the public sector to fund and manage EGS production, but quality seed production is done on a commercial basis. The EGS system supplies some demand, but supply bottlenecks and/or demand constraints continue to impede growth.

Mature EGS systems benefit from both public and private sector support for EGS production, and the cost of producing foundation seed is mostly covered by seed sales. The seed system feeds a well-established commodity value chain, and demand is high for the trait packages offered by improved varieties.

Early evidence of EGS systems in Africa points to a transition from public to public-private partnerships in mature seed systems.

CESSA can track and report on the progress made on EGS seed production to instill confidence in other EGS providers to establish services for a wide range of crops across Africa.

Call to Action (CTA)/Key takeaways:

EGS production is a major hurdle faced by private sector companies in commercializing new varieties. Partnerships among the public and private sectors are needed to enable sustainable EGS production and supply. Public agricultural research institutions are hesitant or unable to move downstream into EGS production because they lack the mandate, people, business systems, and/or resources to meet demand unilaterally. Private seed producers are reluctant to move upstream into EGS production because of the limited profit potential in producing small volumes of high-quality seed (Agrilinks, 2020).

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